# THE IMPACT OF THE LATE ANTIQUE LITTLE ICE AGE (535-700 AD) ON THE TÜRK KHAGANATE

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DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MA IN THE DEPARTMENT OF HISTORY

YEDİTEPE UNIVERSITY

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I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Coşkun Faik Kavala

24.05.2022

**ABSTRACT**

Throughout history, climate changes and climate crises have affected human societies. The Late Antique Little Ice Age, which is accepted to have started with sudden climate crises caused by volcanic eruptions, is a period of global cooling that is considered the leading cause behind many political and social crises experienced in various parts of the world in the sixth and seventh centuries. Considering the geographical fragility of the Inner Asian steppes, especially the Mongolian plateau, the livestock-based economies and federative structures of the nomadic states established in this region, it is understood that the climate crises have adverse effects on the nomadic communities. The climate crises, which are also confirmed by the statements in the Chinese sources, had crucial impacts on the political history of the Türk Khaganate. Of the four separate (536-545, 581-583, 627-630, 679-685) crises that were determined to have occurred, the first one facilitated the collapse of the Rouran Khanate and the foundation of the Türk Khanate, the second crisis led to the outbreak of the Türk Civil War, and the third crisis accelerated the collapse of the Eastern Türk Khanate, and the fourth crisis facilitated the re-establishment of the fourth Türk Khaganate under the leadership of Kutluk.

**Keywords**: Climate change, climate crisis, Late Antique Little Ice Age, the Türk Khaganate

## ÖZET

Tarih boyunca iklim değişiklikleri ve iklim krizleri insan topluluklarını etkilemiştir. Volkan patlamalarının sebep olduğu ani iklim krizleriyle başladığı kabul edilen Geç Antikçağ Küçük Buz Çağı, altıncı ve yedinci yüzyıllarda dünyanın çeşitli bölgelerinde yaşanmış pek çok siyasi ve sosyal krizin arkasındaki sebep olarak görülen bir küresel soğuma dönemidir. İç Asya bozkırlarının, özellikle Moğolistan platosunun coğrafi kırılganlığı, bu bölgede kurulan konar-göçer devletlerin hayvancılığa dayalı ekonomileri ve federatif yapıları göz önüne alındığında, iklim krizlerinin konar-göçer topluluklar üzerinde olumsuz etkilere yol açtığı anlaşılmaktadır. Çin kaynaklarında geçen ifadelerin de doğruladığı iklim krizleri, Gök-Türk Kağanlığı'nın siyasi tarihinde önemli etkilere sebep olmuştur. Gerçekleştiği saptanan dört ayrı (536-545, 581-583, 627-630, 679-685) krizden ilkinin Rouran Kağanlığı'nın yıkılıp Gök-Türk Kağanlığı'nın yıkılmasında, ikincisinin Gök-Türk İç Savaşı'nın çıkmasında, üçüncüsünün Doğu Gök-Türk Kağanlığı'nın yıkılışında ve dördüncüsünün Gök-Türk Kağanlığı'nın Kutluk öncülüğünde yeniden kurulmasında etkili oldukları anlaşılmaktadır.

**Anahtar Kelimeler**: İklim değişikliği, iklim krizi, Geç Antikçağ Küçük Buz Çağı, Gök-Türk Kağanlığı

# PREFACE

The earth the humans live in is going through an anthropogenic global climate change process. The leading cause of this phenomenon is the spread of the use of fossil fuels and carbon emissions, which begin with the industrial revolution. As the adverse effects of this climate change have begun to be seen by events such as seasonal anomalies, hurricanes, forest fires, and floods at the beginning of the XXI. century, the future projections on this subject drew attention to climate changes and their effects throughout human history.

It is now well-known that climate change has played a vital role in shaping political and social events in past times when anthropogenic carbon emissions were not yet effective. Before modern times, the main reasons for climate change were supposed to be solar flares and volcanic activity. With the use of the information provided by the sciences such as volcanology, climatology, and dendrochronology, the history of humanity is better understood. The synchronization of the rises and falls of civilizations with climate changes is remarkable.

By the utilization of the data obtained in sciences such as volcanology, climatology, dendrochronology in historical research, the synchronization between these events has ceased to be seen as coincidental today: The rise of the Roman and Han Empires with the warming period called the Roman optimum, the Migration Period with the fall in the global temperatures,  the spread of the Justinian Plague with the Late Antique Little Ice Age, the population growth in Europe with the Medieval Warm Period, and the XVII. century crisis with the Little Ice Age.The fact that pastoral nomads of the Inner Asian steppes are more heavily affected by climate changes than the sedentary agricultural societies has been discussed for some time

among those who study the history of Inner Asia. Also, it has been argued that the federative structure of the policies established by nomads facilitates the fall of the 'nomadic empires' in crisis conditions. With this study which focuses on the history of the Türk Khaganate, we aimed to draw attention to the natural phenomena behind the political crises in Turkic history. We aimed to carry the study of Turkic history to a broader area by utilizing scientific studies based on the analysis of ice cores and tree rings. Thus, we aimed to contribute to the Turkic historiography literature in our country.

Throughout the research and writing of my thesis, I have received a great deal of support and assistance. First of all, I would like to express my sincere gratitude to my esteemed teacher and supervisor, Professor Doctor Ahmet Taşağıl, whose expertise on the subject, support, and feedback guided me throughout the work.

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**ABBREVIATIONS**

GJTSJC Gujin Tushu Jicheng 古今圖書集成

JTS Jiu Tangshu 舊唐書

SS Suishu 隋書

TD Tongdian 通典

XTS Xin Tangshu 新唐書

WS Weishu

ZZTJ Zizhi Tongjian 資治通鑑

ZS Zhoushu 周書

# INTRODUCTION

The study aims to examine to what extent the climate crises during the global cooling period, called the Late Antiquity Little Ice Age (between the years 536 and 700), affected the Türk Khaganate. To perform this analysis, the mentioned period, the climate crises that took place throughout the period, and the impacts of these climate crises in other regions were tried to be revealed in detail. In addition, the steppe geography on which the Türk Khaganate was founded and the basic features of the pastoral nomadic socio-economic-political order were presented in detail.

The study consists of three parts.

In the first part of the study, the period called 'Late Antiquity Little Ice Age' was examined. In this chapter, the results of the analyzes made on the ice cores extracted from the centers in Greenland and Antarctica and on the tree rings obtained from regions such as Siberia, Scandinavia and the Alps were used. After discussing the climatic changes caused by volcanic and caldera eruptions throughout the Earth's pre-human history, the impact of major volcanic activities such as the Toba Eruption on human societies, historical records of the Late Antique Little Ice Age, studies of ice cores and tree rings, and hypotheses regarding volcanic activities that may have taken place during the specified period are examined. Subsequently, the climate effect in the background of the political events in the VIth and VIIth centuries in the Mediterranean basin and the Iranian world, the Slavic, Avar and Lombard migrations in Eastern Europe, and the correlation between the climate change and the emergence and spread of the Justinian Plague are demonstrated.

In the second part of the study, the steppe geography of Central Asia, the pastoral nomadic economic mode of production developed in the ecologic conditions of the steppe, and the political structure built on this economic basis were examined. After explaining the general characteristics of the steppe, the anticyclonic area of the Mongolian Plateau, on which the Türk Khaganate was founded, the amount of precipitation, the essential characteristics of the steppe vegetation and plant varieties, and also the drought and frost events in the steppe were explained. Subsequently, pastoral nomadic mode of production and lifestyle, classification and historical development of the pastoral nomadism, animal breeds raised in the steppe and their distribution according to the climatic characteristics of the regions were examined. Eventually, theories about the formation of pastoral nomadic states in the steppe are discussed.

In the third and last part of the study, the political history of the Türk Khaganate was examined in light of the climatic events that developed in the same period. The volcanic eruptions, which can be observed from historical records in both the West and the Far East, affected the whole world between 536-542. Estimates have been made about how these eruptions might have affected the Rourans and especially the Türks, who were blacksmiths at the foot of the Altai Mountains at that period, as a part of the Rouran Khaganate. We demonstrated by using the Chinese chronicles that, in the background of the Türk Civil War between the years 581-583 and the Eastern Türk Khaganate becoming the vassal of the Sui dynasty, there was a severe drought and famine as a result of a supposed volcanic eruption that had taken place in those years. After years of success during the period of Shibi Khagan and the disintegration of China during Sui Yangdi, the khaganate faced a sudden political collapse, followed by a fifty-year interregnum of Chinese dominance. According to the Chinese

chronicles, this period also coincides with severe drought, massive loss of livestock and famine in the steppe region, thus it is supposed that these conditions had facilitated the collapse of the Khaganate. As many recent studies have shown, we also demonstrated that the drought and famine in 626-630 period was a possible result of volcanic activity in these years. Finally, the climatic events in the background of Kutluk Kaghan's war of independence in 681-683 and his victories against the Toquz-Oghuz tribal confederation and Tang China with the assistance of Tonyukuk were examined.

The Chinese sources we used in this study are Tongdian 通典, Zhoushu 周書, Suishu 隋書, Jiu Tangshu 舊唐書, Xin Tangshu 新唐書, Zizhi Tongjian 資治通鑑, and Gujin Tushu Jicheng 古今圖書集成. Written by the Tang period historian Du You 杜佑 between 766 and 801, Tongdian 通典 describes the period from the beginning of history to the Tang emperor Xuanzong. In our study, this source was used to find traces of the climate crisis in 536.

Compiled by the Tang period historian Linghu Defen 令狐德棻 and completed in 636, Zhoushu 周書 describes major events that took place during the Zhou dynasty. Wei Zheng, Written by Yang Shidu, Kong Yinda, and Changsun Wuji and completed in 629, Suishu 隋書 (Book of Sui) chronicles events during the Sui dynasty. Chapter 50 of Zhoushu, the first part of Chapter 84 of Suishu reports the history of the Türks. In our study, these sources were used to comprehend the effects of the climate disaster between the years 536-542 on the history of the steppe.

Jiu Tangshu 舊唐書 (Book of Old Tang), compiled by Liu Xu 劉昫 and Zhao Ying 趙瑩, and Xin Tangshu 新唐書 (Book of New Tang), compiled by Song period

historians Ouyang Xiu 歐陽脩 and Song Qi 宋祁, completed in 1060 recount the events during the Tang dynasty. Chapters 194 of Jiu Tangshu and Chapters 215 of Xin Tangshu deal with the history of the Türks. In our study, information about the climate disaster between the years 626-630 was obtained from these sources.

Zizhi Tongjian 資治通鑑, which was presented to Emperor Shenzong by the Song period historian Sima Guang 司馬光, is considered one of the most comprehensive sources on Chinese history. The studies on Zizhi Tongjian started in 1065 with the instruction of Emperor Song Yinzong and were completed in 1084,

Gujin Tushu Jicheng 古今圖書集成 is a comprehensive historical encyclopedia consisting of ten thousand chapters, prepared during the Manchu (Qing) dynasty between 1700 and 1725 under the supervision of the Kangxi and Yongzheng emperors. In our study, in order to understand the consequences of the climate disaster such as drought and famine, which took place at the same time as the founding period of the II.Türk Khaganate between 679-685, the part of the work named Bian Yi Dian 邊裔典 was used.

One of the studies based on Chinese sources, Ahmet Taşağıl's 'Gök-Türkler' is full of examples of climate disasters that let the Türk Khaganate, which had a fragile pastoral nomadic economic basis, in a difficult situation. When this study, which was put forward in the period when the definition of 'Late Antiquity Cooling' was not yet made (first edition: 1995), is examined in its entirety, it is deeply understood that the VIth and VIIth centuries were a period of cooling, and the climate crises facilitated the dissolution of the khaganate which was established by the unification of tribes living in Inner Asia.

The first study directly associated the events in the political history of the Türk Khaganate with the climate crises caused by volcanic eruptions is the article 'Circa A.D. 626 volcanic eruption, climatic cooling, and the collapse of the Eastern Turkic Empire' written by Jie Fei, Jie Zhou, and Yangjian Hou and published in 2007. In this article, evidence of drought and famine in China and the northern steppes between 626-630 was found by examining the Tang dynasty chronicles. By combining this information with the data on the volcanic eruption, which is estimated to have taken place in 626, a hypothesis has been developed that the effect of the climate crisis may have accelerated the fall of the Eastern Türk Khaganate.

In 2016, the article 'Cooling and social change during the Late Antique Little Ice Age from 536 to around 660 AD' was prepared jointly by scholars such as Ulf Büntgen, Nicola di Cosmo and Michael McCormick was published. In the article, it was determined that there was a deepening global cooling at certain dates as a result of sudden volcanic eruptions, using a large number of volcanological and climatological data, and the period between 536-660 was defined as the 'Late Antique Little Ice Age'. According to the article, the significant historical events such as the Plague of Justinian, the transformation of the Eastern Roman Empire, the collapse of the Sassanid Empire, the Avar, Slavic, and Lombard migrations in Eastern Europe, the Arab-Islamic conquests, the internal conflicts in China, and the conquest and migration movements towards the environment from Inner Asia, all were related to the sudden climate crises in a global cooling period.

Nicola di Cosmo, Clive Oppenheimer and Ulf Büntgen, co-authors of the article in which the definition of 'Late Antique Little Ice Age' was made, published the article 'Interplay of environmental and socio-political factors in the downfall of the Eastern Turkish Empire in 630 CE' in 2017. In this article, they wrote that after 626

volcanic eruptions, there was a cooling of up to 3 °C, and from Chinese sources, drought and frost called zud occurred in the Türk lands for three consecutive years, and as a result, the livestock in the steppe perished. They also compared these events with drought and zud disasters in Mongolia in 1999-2001 and 2010. The article also emphasized that the climate crisis was not the only reason for the fall of the khaganate and that the decisions taken by the Türk political leadership during the climate crisis also accelerated the state's collapse.

Hayrettin İhsan Erkoç, who also studied the subject in his doctoral dissertation titled 'General Li Jing's Military Thought and the Collapse of the Eastern Göktürk Khaganate,' which he completed in 2015, and published his article about the subject 'Ecologic and Economic Factors in the Fall of the Eastern Türk Qaghanate (627-630)' the following year. In the article, Erkoç underlined that the climate crisis experienced during this period deepened the internal political crisis between the central authority and the affiliated tribes and accelerated the disintegration of the Eastern Türk Khaganate.

Rustam Ganiev and Vladimir Kukarskih, in their article titled 'Climate extremes and the Eastern Turkic Empire in Central Asia' published in 2018, discuss all climate crises and events that took place from the origins of the I.Türk Khaganate until the establishment of the II.Türk Khaganate, and they examined the effects of these crises on the Türk political history. Ganiev and Kukarskih revealed five climate crises in the years 536-545, 581-583, 599-601, 627-630, 679-685, and demonstrated that significant political transformations occurred during all of these crises.

It is evident that a significant number of studies deal with the fall of the Eastern Türk Khanate. In this study, in parallel with Ganiev and Kukarskih's article,

the climate crisis was examined not only about the decline and fall of the first khaganate but in the context of the entire Türk history. Also, unlike the article menioned above, a detailed analysis of the statements about the climate crisis in the Chinese chronicles was used.

Although the Late Antique Little Ice Age was indicated between the years 536-660 in the article mentioned above published in 2016, we assume that this period lasted until the year 700 because we consider that the climate crisis, which is understood to have taken place between the years 679 and 685, can also be evaluated within the period of global cooling.

# 1. LATE ANTIQUE LITTLE ICE AGE

## 1.1.Impact of Volcanic Activities on the Climate

The biosphere, on which life has survived for millions of years, consists of the Earth's crust and atmosphere. The Earth's crust consists of a thin crust on our planet that makes up only one percent of the Earth's volume.

Under the earth's crust is the mantle layer, which, with its thickness of 2900 km, constitutes 67% of the earth's mass and 84% of its volume (Hoşgören, 2015, p.16). The mantle is mainly composed of molten rock called lava.

Just as the mantle layer below the lithosphere is composed predominantly of molten lava, the crust is not a single, unbroken layer. Sürekli aktif haldeki mantonun faaliyeti litosfer üzerinde çatlaklar açar ve yerkabuğunu parçalara ayırır. The activity of the continuously active mantle opens cracks in the lithosphere and breaks up the earth's crust. Each piece that composes the lithosphere is called a tectonic plate, and the earth consists of 7 bigger (Africa, North America, South America, Antarctica, Australia-India, Eurasia, and Pacific) and two dozen smaller tectonic plates (Huggett, 2011, p.90).

The boundaries between the tectonic plates are called faults. Earthquakes and volcanic activities mainly occur on these faults. A volcano is formed when lava and volcanic gases rise to the surface from the magma chamber of the mantle layer and form cracks in the earth's crust.

75% of the world's active volcanoes are located around the Pacific Ocean, on a belt called the 'Ring of Fire', which starts from the east of Australia and runs through

South America, passing through the southern Bering Strait. The most significant volcanic eruptions and earthquakes that have been recorded throughout history took place on the Ring of Fire (Lutgens et al., 2014, p.113).

Volcanic eruptions spew millions of tons of ash, hydrochloric acid, and sulfur dioxide into the athmosphere. While the first two of them descend to the ground after a while under the influence of gravity, sulfur dioxide mixes with water vapor in the atmosphere to form sulfuric acid aerosols. If these sulfuric acid aerosols reach the stratosphere layer of the atmosphere, they can quickly surround the earth with the effect of the earth's rotation and winds and block the sun's rays on a hemispherical or global scale, depending on the size of the explosion (Robock, 2000, p.192; McCormick et al., 2012, p.209).

It is not just the sunlight that is blocked by this sulfuric acid layer. These aerosols, which accumulate in the stratosphere, also absorb the solar radiation and cause the temperature of the stratosphere to rise. On the other hand, due to the absorption of radiation, sufficient sunlight and solar radiation cannot reach the earth's surface with the troposphere, which is the lowest layer of the atmosphere. Therefore large volcanic eruptions cause the troposphere to cool, and the earth's temperature decreases (Lutgens et al., 2014, p.97). This type of cooling that occurs as a result of volcanic activity is called 'volcanic winter' (Santer et al., 2014, p.185).

For they cause sudden crises in the world's climate, caldera and volcanic eruptions have affected life on earth, which has evolved depending on sunlight and heat. It is thought that the explosion of Permian calderas 250 million years ago in today's Siberia caused sudden global-scale warming and the extinction of 95% of the species living on our planet (Sakınç, 2012, p.130). It is estimated that one of the

reasons for this sudden global climate change and the extinction event that followed is the reach of the Permian lavas to the underground coal beds accumulated in the Carboniferous Period; and the resulting greenhouse effect of CO (carbon monoxide), CO2 (carbon dioxide) and CH4 (methane) gases (Demirsoy, 2022, p.21).

It is thought that the Cretaceous–Paleogene extinction event, which took place at the end of the Mesozoic Era (approximately 65 million years ago), occurred as a result of a large asteroid impact on the earth (Alvarez et al., 1980, p.1105-1106). It is a matter of debate whether the intense volcanic activity experienced in the Deccan Plateau in the same period resulted from this asteroid impact, which was determined to have hit the Yucatan Peninsula (Richards et al., 2015, p.6-12). Both the asteroid impact and the volcanic eruptions simultaneously with this impact led to the extinction of dinosaurs, which needed more oxygen and nutrients than the small mammals of the period (Şahin, 2011, p.191; Raup, 2011, p.179).

It is estimated that the Toba Explosion, which took place approximately 74,000 years ago, caused a decrease of 3 to 5 degrees in average temperatures (Rampino & Self, 1993a, p.269). As the biggest eruption in the last 100,000 years, Toba is thought to have caused the Homo Sapiens population to go through a bottleneck in the Late Pleistocene (Rampino & Self 1993b, p.1955).

Therefore, it is possible to argue that volcanic activity is one of the leading causes of global climate change, major species extinctions, and reduction in human population.

### 1.2. Climate Change and Human Communities

Volcanism has long been recognized as one of the potential causes of weather and climate events. Even 2,000 years ago, Plutarch and other Roman historians had

demonstrated that the eruption of Mount Etna in 44 BC blocked daylight, and summer cooling caused crop failures and famines in Rome and Egypt. At the end of the eighteenth century, Benjamin Franklin also found that the Icelandic Lakagigar eruption of 1783 caused the unusual cooling in the summer of 1783 (Robock, 2000, p.191).

Covering up sunlight for several months is lethal for plants whose life depends on photosynthesis. Sulfur-laden clouds not only block out the sunlight, they also cause a sudden drop in average temperatures. If the volcanic winter lasts longer than one season, crops cannot grow, and grazing animals perish.

The impact of these events on the seasonal harvest is evident. The impact of the sudden onset of global cooling due to volcanic winter on sedentary societies depending on the agricultural economic basis and nomadic communities depending on animal husbandry is devastating.

Sudden global climate changes are also thought to facilitate the emergence of plagues and similar epidemic diseases. It is claimed that the 541 plague, also known as the Justinian plague, emerged as an indirect result of the volcanic eruption in 536 (Keys, 2000, p.17-24; Newfield, 2016, p.97).

Therefore, in recent years, historians have commenced to defend the view that global climate changes have decisive effects on the history of states, empires, and nomadic societies. It is discussed that the massive migration movement of the 'Sea People', which devastated Mycenaean and Hittite civilizations and brought an end to the Bronze Age, took place due to climate change, drought, and famine (Cline, 2014, p.142-147). The 'Roman Optimum Warm Period' may have facilitated seasonal harvesting and urban population growth in the Roman Empire and the Han Empire in

China (Lieberman, 2018, pp. 90-97). In the X. Century, another period of global warming called the 'Medieval Warm Period' may have accelerated the rise of the High Medieval Gothic civilization in Northern Europe (Gerste, 2017, pp.53-57). In addition, according to some historians, the main reason for the 17th Century Crisis, the effects of which were seen as the Celali Revolts in the Ottoman Empire (White, 2020, pp.305-307), the Thirty Years' War in Germany, the 1648 Revolution in England, the collapse of the Ming and the establishment of the Manchu dynasties in China, the decline of the Safavids in Iran, might be the beginning of a global cooling period, the 'Little Ice Age' as François Matthes and Gustaf Utterstöm called it. (Gerste, 2017, p.76-79)

## 1.3. Research Studies on the Late Antique Little Ice Age

### 1.3.1. Definition

In 2015, a group of scientists, including Ulf Büntgen, Vladimir Myglan, Fredrik Ljunqvist, Michael McCormick, and Nicola di Cosmo, put the ice core data from Greenland and Antarctic glaciers with analyzes of tree ring samples from the Altai region of Russia and the European Alps together. The result is the confirmation of the hypothesis that volcanic eruptions cause global climate changes, which has been discussed since the beginning of climate history research. According to the article, due to the three volcanic eruptions predicted to have occurred in the years of 536, 540 and 547, an unexpected, long, and worldwide cooling was experienced. Furthermore, this cooling that occurred in the sixth and seventh centuries is supposed to be the catalyst that caused social and political events such as upheavals, migrations, and collapse of empires. For this reason, the period between 536 and 660 has been defined as the 'Late Antique Little Ice Age' by the scientists mentioned above (Büntgen et al., 2016, pp.231-235).

### 1.3.2. Historical Records

#### *1.3.2.1. Mediterranean Records.*

In the Mediterranean basin, four sixth-century historians (Procopius, Cassiodorus, Yohannes of Ephesus, and Zacharias Rhetor) witnessed the sudden appearance of a dust cloud covering the sky for 12 to 18 months. (Stothers & Rampino, 1983, p.6362). Procopius, the official historian of the Byzantine emperor Justinian, wrote the following words in the fourth volume of his 'History of War':

> And it came about during this year that a most dread portent took place. For the sun gave forth its light without brightness, like the moon, during this whole year, and it seemed exceedingly like the sun in eclipse, for the beams it shed were not clear nor such as it is accustomed to shed. And from the time when this thing happened, men were free neither from war nor pestilence nor any other thing leading to death. And it was the time when Justinian was in the tenth year [536-537] of his reign. (Procopius, 1916, trans. Dewing, H. B., s.329).

Roman statesman and writer Cassiodorus, who served as praefectus praetorio in Italy in the year 536, described the phenomenon with the following words in the records he kept:

> The sun seems to have lost its wonted light, and appears of a bluish color. We marvel to see no shadows of our bodies at noon, to feel the mighty vigor of the sun's heat wasted into feebleness, and the phenomena which accompany a transitory eclipse prolonged through almost a whole year. The moon, too, even when its orb is full, is empty of its natural splendor. We have had a spring without mildness and a summer without heat (Rampino, 1988, p.87).

Cassiodorus also wrote that the Ostrogoth king Theodahad instructed the removal of grain from warehouses for distribution to the people of the famine-affected Veneto and Liguria regions. (Arjava, 2005, p.80).

Another Byzantine source of the period, the treatise of John Lydos, also confirmed Procopius: 'The sun became dim... for nearly the whole year... so that the fruits were killed at an unseasonable time..' (Stothers & Rampino, 1983, p. .6362).

The XIIth century bishop Michael the Syrian also recorded the dust layer covering the atmosphere in 536:

> In the year 848 [536-537] there was a sign in the sun the like of which had never been seen and reported before in the world. If we had not found it recorded in the majority ofproved and credible writings and confirmed by trustworthy people, we would not have recorded it; for it is difficult to conceive. So it is said that the sun became dark and its darkness lasted for one and a halfyears, that is, eighteen months. Each day it shonefor aboutfour hours, and still this light was only a feeble shadow. Everyone declared that the sun would never recover its original light. The fruits did not ripen, and the wine tasted like sour grapes (Arjava, 2005, pp.78-79).

Although Procopius noted that the mount Vesuvius 'rumbled', Mediterranean sources who witnessed this natural phenomenon of 'the dimming of the sun, a year-long solar eclipse' do not speak of an apparent volcanic eruption. There is no record of the eruption of volcanoes such as Stromboli, Etna, and Vesuvius in the Mediterranean. However, the way the sources describe the fog cover called 'mystical fog' gives us clues that this phenomenon is of volcanic origin (Newfield, 2016, p.94).

Stothers and Rampino, who first drew attention to this issue in their article published in 1983, drew attention to the fact that similar expressions were used after volcanic eruptions in the records before and after the sixth century. For example, after the eruption of Etna in 44 BC, Pliny the Elder wrote:

> Portentous and protracted eclipses of the sun occur, such as the one after the murder of Caesar the dictator and during the Antonine war which caused almost a whole year's continuous gloom. (Pliny, 1938, trans.Rackham, H., p.243).

Plutarch wrote the following lines about the same event:

> [After Caesar's murder] Among events of divine ordering there was the obscuration of the sun's rays. For during all that year its orb rose pale and without radiance, while the heat that came down from it was slight and ineffectual, so that the air in its circulation was dark and heavy owing to the feebleness of the warmth that penetrated it, and the fruits, imperfect and half ripe, withered away and shrivelled up on account of the coldness of the atmosphere. (Plutarch, 1967, trans.Perrin, B., p.607).

Stothers and Rampino (1983) linked these testimonies of Plinius the Elder and Plutarch to the writings of Benjamin Franklin, who was also a scientist and was the first to make the connection between volcanic eruptions and the fog covering the sky in 1783 (p.6358). According to Franklin, the unusual cooling witnessed in the summer of 1783 was the result of the eruption of Iceland's Laki volcano:

> During several of the summer months of the year 1783, when the effects of the Sun's rays to heat the Earth in these northern regions should have been the greatest, there existed a constant fog over all Europe and great part of North

> America. This fog was of a permanent nature; it was dry and the rays of the sun seemed to have little effect towards dissipating it, as they easily do a moist fog... They were indeed rendered so faint in passing through it that, when collected in the focus of a burning glass, they would scarce kindle brown paper. Of course, their summer effect in heating the Earth was exceedingly diminished. Hence, the surface was early frozen. Hence, the first snows remained on it unmelted. Hence, perhaps the winter of 1783-84 was more severe than any that happened for many years. The cause of this universal fog is not yet ascertained. Whether it was adventitious to the Earth, and merely a smoke preceeding frok consumption by fire... Or whether it was the vast quantity of smoke, long continuing to issue during the summer from Hekla, in Iceland, and from that other volcano which arose out of the sea near the island, which smoke might be spread by various winds over the northern part of the world (Lamb, 1970, p.433).

The similarity of records from the more recent volcanic eruptions with those of the sixth century is also striking. Particularly after the Krakatoa eruption of 1883, the 'Bishop's Ring' phenomenon can be considered, as it was first recorded by Presbyterian pastor Serena Edwards Bishop, who was then in Honolulu. Accordingly, the sky around the sun is not blue, white, or light blue but takes on a color that is not seen under normal conditions, such as brown, pink, orange-pink, although it changes depending on the time and the angle of the sun. The 'Bishop's Ring' was encountered after many more recent volcanic eruptions (Lamb, 1970, p.431). Among the authors who recorded the fog cloud in 536, we can remember Cassiodorus's determination that the "sun turns blue" here. In our opinion, what Cassiodorus witnessed must be the 'Bishop's Ring.'

Another remarkable date in the Mediterranean records is the year 626. Michael the Syrian's writing reminds us of the records of 536:

> In the year A.D. 626 the light of half the sphere of the sun disappeared, and there was darkness from October to June. As a result people said that the sphere of the sun would never be restored to its original state. (Stothers&Rampino, 1983, s.6363).

Although Michael the Syrian wrote his work centuries later, it is understood that in 626, the sun was covered and darkened by dust clouds for months, just like in 536. Other records reinforcing this finding give the information that 'ash fell on Constantinople.' Monk George Hamartolos, who lived in the ninth century, and Michael Glykas, the twelfth-century historian, referring to the year 626, reported ashfall in Constantinople. When the data of cooling, darkening of the sun, and ash rain are considered together, the possibility that these events in 626 occurred due to a volcanic eruption was taken into account. Thus, Stothers and Rampino (1983), based on the data obtained from the Greenland ice cores, suggested that the phenomenon mentioned in the sources may be of volcanic origin (p.6363).

#### *1.3.2.2. Northern European Records.*

Bo Gräslund and Neil Price (2012) attribute the Ragnarök legend, which is told in Nordic mythology and inspired the nineteenth-century German composer Richard Wagner's 'Götterdammerung,' and the related 'Fimbulwinter' narrative to the climate crisis in the years 536-537 (p.437). Accordingly, in the 51st chapter of the Edda poem Gylfaginning, written by Snorri Sturluson in Iceland in the thirteenth century, the mythological king Gylfi visits the gods called Aesir and asks the three gods sitting in a large hall what they know about Ragnarök. They reply as follows:

> First of all that a winter will come called Fimbulwinter. Then snow will drift from all directions. There will then be great frosts and keen winds. The sun will do no good. There will be three of these winters together and no summer between (s.437).

In the chapter of the Edda, Völuspa, where the creation of the world is narrated, Ragnarök begins with the children of the wolf named Fenrir taking the Moon away, attacking the sun, and painting the houses of the gods red with their blood. Then the sun's rays dim and the stars disappear for the next two years (p.437).

Bo Gräslund and Neil Price argue that legends are born and told from the experiences of tribes and societies and that the legend of Fimbulwinter emerged from an actual lived experience and combines Nordic legends with archaeological data. In the archaeological excavations, it was understood that while the agricultural economy had been developing for several centuries in parts of Sweden, such as the Malaren Valley, Uppland, Öland, and Gotland Islands, the same regions entered a rapid collapse process, and the villages were abandoned in the sixth century. Gräslund and Price (2012) report that all 1300 settlements in Öland and Gotland have been abandoned (p.431).

The crisis experienced in the sixth century is not only a local, Scandinavian situation, but it is known that agricultural lands in Northern and Central Europe were abandoned and turned into forests in the same period, and large migrations took place (Gräslund & Price, 2012, p.431). Stothers and Rampino (1983) inform in the Ulster Chronicles that the year 624 was reported as 'extremely dark' (p.6363). Irish annals such as Ulster and Inisfallen also record that there was no bread (hence a famine) in

536 and 537 (Baillie, 1991, p.234). At the same time, death rates due to famine increased in England (Newfield, 2018, p.469).

#### *1.3.2.3. Far Eastern Records.*

Chinese historical sources also regularly record summer frosts, drought, and ubiquitous famine from 535-538. Even snow fell in the summer of 537 (Newfield, 2018, p.7).

Southern Chinese records write that Canopus, the second brightest star in the sky, was not visible at the spring and autumn equinoxes of 536. According to Arjava (2005), this expression is an unusual way of saying that the sky is covered with a cloud of dust (p.82). Indeed, expressions such as 'the sky is covered with unprecedented clouds for a year/18 months and the daylight has faded' are not seen in the Far Eastern sources, as in the Mediterranean sources. According to Arjava (2005), there may be two reasons for this difference; that the sky covered with clouds is not unusual for the Far East, or that the atmosphere covered with dust clouds was an event limited to the Mediterranean basin and its surroundings, so there was no 'dry fog' in the Far East (p.82).

In the Nihon Shoki, which was compiled between 681 and 720, it was reported that in the summer of 536, 'The people were frozen to death and starved to death.' There are similar records in Korea. The Korean source Samguk Sagi, compiled in 1145, describing the history of the Goguryeo, Paekche and Silla kingdoms, states that in the Silla Kingdom in 540, peach and plum trees bloomed in winter and snow fell in the spring of 541. It is written that in the Goguryeo Kingdom, due to the terrible drought in 536, state officials were assigned to deal with the problems of the people,

and this drought was followed by a plague of locusts and famine in 537 (Newfield, 2018, p.451).

It is understood from the reports of frost events in sources such as Cefuyuangui 冊府元龜, Jiutangshu 舊唐書 and Xintangshu 新唐書 that China was also affected by the climate crisis in 626 (another year for which the Mediterranean and Northern European sources pointed to the darkening of the sun) and the following years. Accordingly, in the seventh (August 17 – September 14) and the eighth (September 15 – October 14) months of the first year of the Zhenguan 貞觀 period, frost cases occurred in Guandong, Henan, Longyou provinces, and the regions bordering the Türk Khaganate in the north, the crops were severely damaged. The harvest could not be done, and as a result, famine cases were seen (Jie Fei et al., 2007, p.473). It is understood that the frost cases were repeated in the following year.

Once again, information from Chinese sources confirms Mediterranean sources.

### 1.3.3. Volcanism and Climate Crises of Late Antiquity

Reading the historical records separately or together reveals an unusual situation in the atmosphere and global climate, a climate crisis experienced in 536 and the following decade (Newfield, 2018, p.452). However, the origin of this crisis has been a matter of debate. In addition to historical records, utilizing the data obtained from ice cores and tree rings is helpful to comprehend climate crises in the past.

#### *1.3.3.1. Ice Cores*

Material trapped in ice cores is used to reconstruct past climate. Isotope ratios of gases such as oxygen, hydrogen, argon, and nitrogen allow the calculation of past

temperatures. According to Alley (2010), in many ways, ice cores are the ‘rosetta stones’ that allow the development of a global network of accurately dated paleoclimatic records using the best ages determined anywhere on the planet (p. 1098).

The polar regions, and thus Antarctica and Greenland, are used as reliable sources of ice cores in climate research because these regions are far from the continents due to biogenic or anthropogenic emissions from wind-blown dust, soil, and vegetation.

In a 2007 study by a group of scientists led by L. B. Larsen of the Center for Ice and Climate Research at the University of Copenhagen, 143 samples from the Dye-3 Research Center in Greenland and 76 ice core samples from the GRIP (Greenland Ice Core Project) Research Center were transported to Copenhagen and studied in the laboratory. There are also ice cores cut and examined at the NGRIP (North Greenland Ice Core Project) Research Center. Examination of the Greenland and Antarctic glacier cores together led to the discovery of sulfate layers, which may be evidence of the dense, atmospheric acid layer of 533-34 AD, counted as 'the dust veil' in the late antique sources. The discovery of these sulfate layers is considered as the evidence of massive volcanic eruptions in the equatorial region that caused the darkening of the sun to darken and global-scale cooling (Larsen et al., 2008, p.1).

The same study also compares the traces of the eruption in 536 with the more recent Tambora eruption (1815). Accordingly, the Greenland ice cores show that the dust cover formed due to the 536 eruption contains 40% more sulfate than Tambora, while the Antarctic ice cores show that the same 536 dust cover contains 15% less sulfate (p.4). This result strengthens the hypothesis that the volcanic eruption in 536 took place in the northern hemisphere.

Baillie and McAneney (2014) from Queen's University Belfast have disputed the dating of Larsen and his team. Larsen and his team thought it took place in northern latitudes around 529+2 and in the equatorial belt at 533+4. However, Baillie and Aneney found that the first eruption occurred in 536 and the second eruption in 540-41. According to Baillie and Aneney, dating the second eruption to 540 also explains the slowdown in tree growth in Argentina in the same year (p.13).

Data that could explain the climate anomalies observed in Europe and the Far East in 626 were also found. An analysis of a 404-meter-long ice core removed in 1974 from the Crete research station in Central Greenland (71°07′N 37°19′W) revealed an acid condensation in 623 ±3 years (Hammer et al., 1980, p. p.232). Stothers and Rampino (1983) associated this data with the darkening of the sun, global cooling and ashfall mentioned in Mediterranean sources (p.6363). On the other hand, Jie Fei et al. (2007) suggested that this undetermined volcanic eruption was influential in the collapse of the Eastern Türk Khaganate by associating it with the frost cases mentioned in Chinese sources (p.474).

#### *1.3.3.2. Tree Rings.*

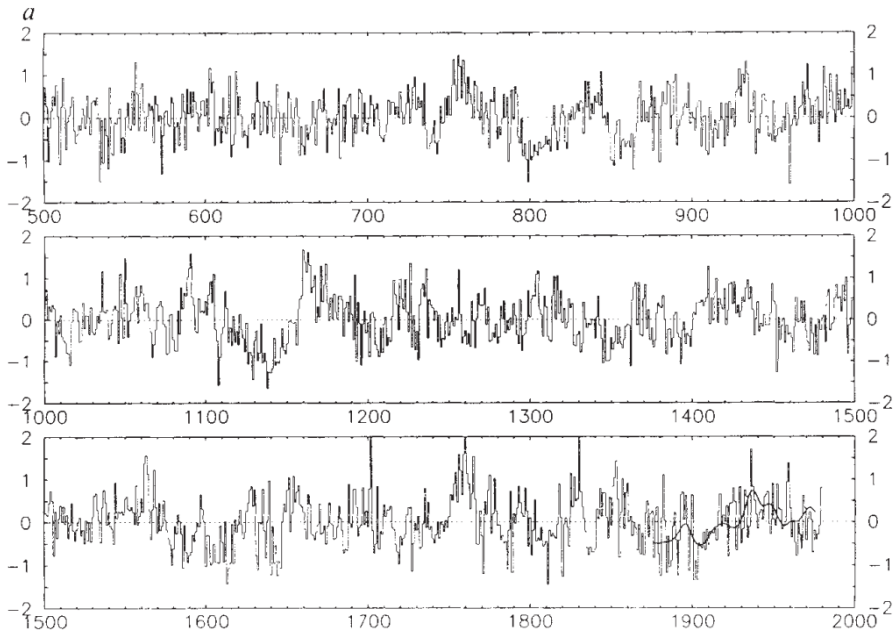
In cold regions, trees grow faster during a relatively warm year. Several other factors also affect the growth of trees, such as nutrition, humidity, and disease. However, a sudden change in climate or weather anomalies immediately affect the growth of a tree, and this negative effect, which interrupts the natural development of the tree, can be noticed in the tree rings on living trees and even on tree fossils (Alley, 2010, p.1096). American astronomer Andrew Ellicott Douglass was the first to determine that chronology could be determined and climate research could be carried out through the study of tree rings. He found that the tree rings reflect the nutrients the

tree receives during growth, and thus, the tree rings indicate the amount of precipitation during the period they were formed since nutrient intake depends on the amount of moisture (Schweingruber, 1988, p. p.257). Tree ring studies are carried out in relatively cold regions of the earth, such as Scandinavia or Siberia, where trees have thinner rings (Le Roy Ladurie, 2011, p.21).

It has been determined that the summer cold, which started in 536 in the northern hemisphere, slowed the growth of trees in many places. A study of scotch pine (Pinus Sylvestris) tree rings in the Torneträsk region in northern Sweden reveals that summer temperatures in the Finland-Scandinavia region dropped sharply twice in the sixth century (Briffa et al., 1990, p.437).

**Figure 1.**

A 1,400-year tree-ring record of summer temperatures in Fennoscandia.

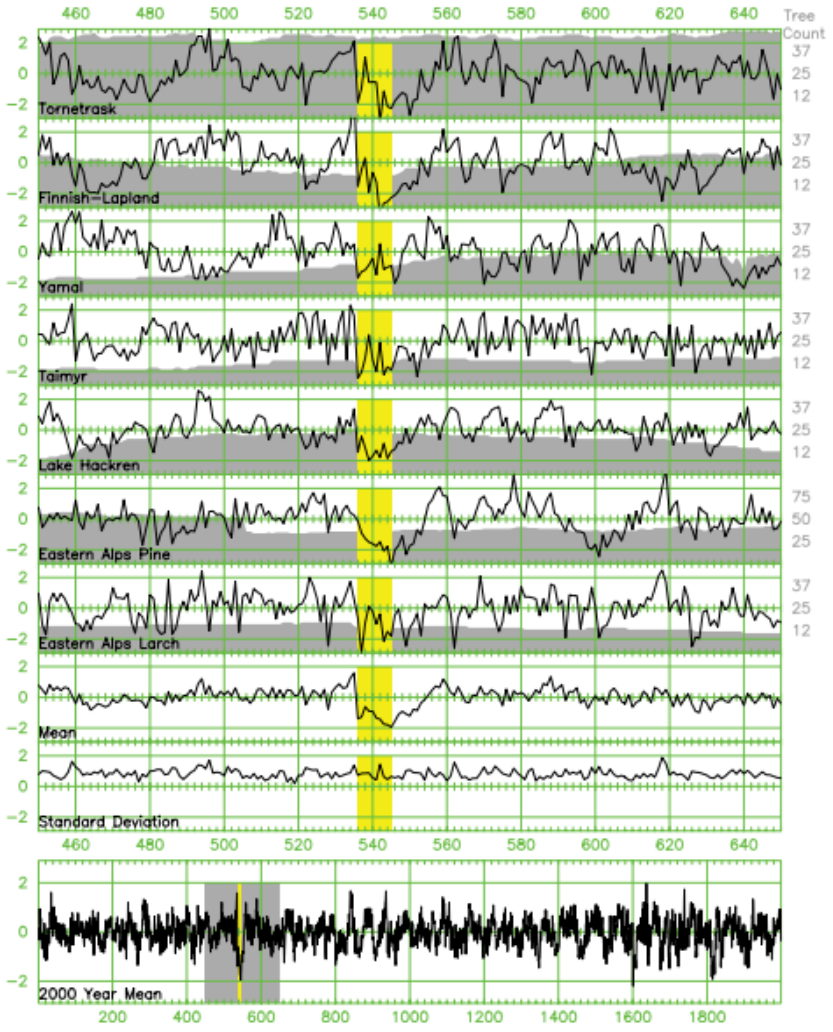



*Note.* Taken from Briffa, K. R., Bartholin, T. S., Eckstein, D., Jones, P. D., Karlén, W., Schweingruber, F. H., & Zetterberg, P. (1990). A 1,400-year tree-ring record of summer temperatures in Fennoscandia. Nature, 346(6283), p.437

Another study conducted on 880 Scots pine (Pinus Sylvestris) specimens from the east of Torneträsk Lake revealed that the cooling around the year 540 adversely affected tree growth (Grudd et al., 2002, p.663). In the same year, a study on 535 specimens from Siberian larch (Larix Sibirica) fossils in the Yamal Peninsula in West Siberia revealed a cooling period that started in 536 and lasted between 550-700 years (Hantemirov & Shiyatov, 2002, p.726). Analysis of Scotch pine (Pinus Sylvestris) samples taken from the area around Lake Hackren in western Sweden revealed that the period between AD 400-900 was not only cooler but also drier (Gunnarson et al., 2008, p.355).

**Figure 2**

High-pass filtered index chronologies for Tornetrask, Finish-Lapland, Yamal, Taimyr, Lake Hackren, and the Austrian Alps (two species).




*Note*. Taken from Larsen, L. B., Vinther, B. M., Briffa, K. R., Melvin, T. M., Clausen, H. B., Jones, P. D., … Nicolussi, K. (2008). New ice core evidence for a volcanic cause of the A.D. 536 dust veil. Geophysical Research Letters, 35(4)., p.2

A combined analysis of samples from Sweden, Finland, Russia, and Austria (Torneträsk, Fino-Lapland, Yamal, Taimur, Lake Hacken, and the Austrian Alps) reveals a sudden slowdown in tree ring formation in 536 (Larsen et al., 2008, p.2).

In addition to this slowdown in growth, anatomical evidence in the form of frost rings has also been found. Frost rings are formed due to the freezing of xylem cells [which carry inorganic substances such as water and minerals in plants] in annual tree rings before they have had a chance to grow. Since freezing causes extracellular ice formation and dehydration of the plant, the weakened outer parts of

the cells are damaged and this damage leaves a permanent, anatomically significant deterioration (LaMarche et al., 1984, p.121).

Another analysis on Siberian pine (Pinus Sibirica) specimens in the Solongotyn Davaa region of Mongolia reveals frost rings from 536 to 536-545, indicating severe cooling, and even frost damage (D'Arrigo et al., 2001, p. 544). The study proves that a severe cooling event took place in the west of the USA and Mongolia in 536 (Larsen et al., 2008, p.3).

According to the article on the Fitzroga Cuprssoides tree ring samples taken from Los Alenens National Park in the Chubut Region on the Argentina-Chile border published by Boninsegna and Holmes (1985), there was a very drastic and continuous slowdown in the growth of trees between 540-550 (p.41). The fact that the data obtained in the Northern Hemisphere is confirmed in this way in the Southern Hemisphere can be shown as evidence of a climate crisis that affected the whole earth in 540.

Like ice cores, tree rings provide evidence that the cooling that began in the sixth century continued with sudden climate crises throughout the seventh century. Analysis of samples from Cirque Peak in the Sierra Nevada Mountains shows a slowdown in tree ring formation in the years 622-623 (Scuderi, 1990, p.75). In the White Mountains of California, frost rings belonging to years 595, 628, and 687 were found on tree rings of Great Basin Bristlecone Pine (Pinus Longaeva) and Colorado Bristlecone Pine (Pinus Aristata), which are thought to have formed as a result of sudden summer cooling caused by volcanic activities (LaMarche et al., 1984, p.122).

### 1.3.4. Possible explosions that may have caused global cooling during the Late Antique Little Ice Age.

In an article published in the journal Astronomy & Geophysics in 2004, Cardiff University scholars Emma Rigby, Melissa Symonds, and Derek Ward-Thompson (2004) discussed the possibility of a comet colliding with earth in the sixth century and causing the atmosphere to be covered with dust clouds and global cooling in 536. They concluded that such a comet is likely to have been larger than the comet that crashed into Tunguska in 1908 and smaller than the comet SL9, which crashed into Jupiter in 1994 (p.26).

However, the comet hypothesis was not widely accepted. David Keys (2000) defended his view that the global cooling and political-social turmoil after 536 could not be the result of an asteroid, meteorite, or comet impact, with the following evaluations:

1. If such an asteroid or comet hits a land where human communities are inhabited, it must have been recorded by people as well as left a trace behind. However, there was no indication of a meteorite/asteroid/comet impact in any historical record or legend in the sixth century, nor was there any geological trace.

2. In this case, it can be thought that the asteroid or meteorite may have fallen into the ocean. The effect of a meteorite impact, which could cover the sky with a dust cloud for a year, must have created huge waves and hit the continental coasts. Especially on the coasts where there are no cliffs and rocks, it can be predicted that tsunami waves would have penetrated kilometers from the coast, just like after major earthquakes. However, there is no record of such an event in the historical chronicle.

Also, there is no archaeological data showing a tsunami of this size in the sixth century either (p. 244-245).

Studies on the relationship between volcanic activity and global cooling in the sixth to seventh centuries began with an article published in the Journal of Geophysical Research in 1983 by Richard Stothers and Michael Rampino of NASA Goddard Institute for Space Studies. According to Stothers and Rampino's (1983) article, not one but at least two explosions, in the years 536 and 626, must have occurred in the mentioned period. The authors of the article proposed the Rabaul caldera, located in the Pacific, on the island of New Britain in Papua New Guinea today, as the possible source of the eruption in 536, adding that if the eruption took place in a remote region like Rabaul and affected the Mediterranean so much, it could have been the largest volcanic eruption in history. (p.6363).

However, more recent studies on the Rabaul caldera revealed that the eruption occurred between 667-699 with 95.4% accuracy (McKee et al., 2015, p.4), and it was revealed that Rabaul could not be the source of the dust cloud mentioned in the records dated 536. Since the El Chichon volcano in the south of Mexico is known to have erupted in the middle of the VIth century, it was thought to be the cause of the 536 event (Tifling et al., 1984), but later research revealed that the volcano erupted between 553-614 and 676-788 (Espindola et al., 2000, p. 93). Haruna volcano, located on the island of Honshu in Japan, is another volcano known to have erupted in the middle of the sixth century (Soda, 1996, p.40). It is thought that Haruna volcano may be the source of the sulfate deposit found in the Greenland ice cores and dated to 529 ±2 years (Larsen et al., 2008, p.3).

Another volcano thought to have erupted in the sixth century is the Krakatoa Volcano in Indonesia. The Krakatoa hypothesis belongs to David Keys, an archeology correspondent for the British newspaper The Independent, who published his book 'Catastrophe: An Investigation into the Origins of Modern Civilization' in 1999. According to Keys (2000), who revealed the shortcomings of the 'asteroid/meteor impact' hypothesis, the sulfate layer that emerged due to the eruption should be sought around the Equator, since the sulfate layer is found both in Greenland and Antarctica. The volcanic eruption can also be sought in Southeast Asia, as the description of 'a sound like thunder' in the Southern Chinese records of these dates may indicate the rumble of an eruption (p. 254). Keys predicts that the eruption took place at Krakatoa Volcano. Krakatoa exploded relatively recently, in 1883, and similarly, dust clouds from the explosion covered the entire Earth's atmosphere. The relationship of these clouds with the red sky depictions seen in the two famous paintings, 'Scream' and 'Anxiety', by the Norwegian painter Edward Munch and the 'Krakatoa Explosion' by William Ascroft has been discussed (Prata et al., 2018, p.1388).

Keys (2000) hypothesized that the Krakatoa eruption in the sixth century is likely to have been much larger than in 1883. David Keys also included in his book the possibility that there were not one but two eruptions, the first in 535 and the second in 540, based on the information that Antarctica had sustained sulfate-laden snow for four years (p.247).

As revealed above, the meteor impact hypothesis did not find much support, and later studies proved that the cooling of the sulfate layers in the ice cores was of volcanic origin. However, it is evident that not a single eruption could have caused a decade of cooling. Moreover, the coldness did not remain constant throughout the period; there were successive cold periods, as can be understood from the tree rings.

Indeed, recent studies have also revealed that there were at least three eruptions, the first two being on 535-6 and 539-40 and the next 547-8 (Newfield, 2018, p.464).

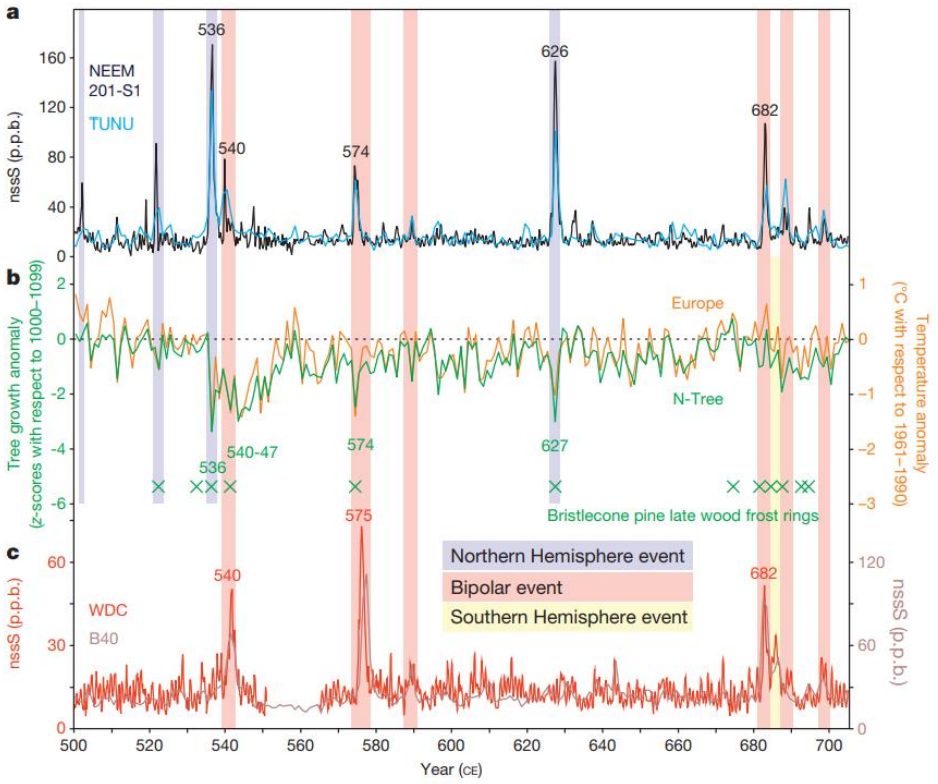
In 2014, M.G.L.Baillie and J.McAneney published an article titled 'Tree ring effects and ice core acidities clarify the volcanic record of the mid-1st millennium. ' In the article, they stated that the Greenland data can only be explained by the eruption of a volcano in the northern hemisphere, closer to Europe than Krakatoa. Therefore, the 536 eruption must have occurred in the northern hemisphere [probably Iceland] (Baillie & McAneney, 2014, p.13).

A group of scientists led by Robert Dull conducted research in the Llopango Caldera in El Salvador, which they supposed was the possible center of the sixth-century eruption. They presented the data they obtained in the article titled "Radiocarbon and geologic evidence reveal Ilopango volcano as source of the colossal ‘mystery’ eruption of 539/40 CE", which they published in the journal Quaternary Science Reviews. (Dull, 2019, p.10-15).

As a result, we have information that at least three eruptions affected the global climate in the sixth century: 536, 540, and 547. The eruption in 536 is estimated to be in the northern hemisphere, the eruption in 540 is over the Equatorial Belt, while the location of the eruption in 547 cannot be predicted (Büntgen et al., 2016, p.232). These estimates are also consistent with the historical chronicles as Byzantine historians recorded the effects such as dust clouds, drought, and famine (that are supposed to emerge due to the eruptions in 536 and 626).

**Figure 3**

Volcanism and temperature variability during the migration period (500–705 CE).




*Note*. Taken from Sigl, M., Winstrup, M., McConnell, J. R., Welten, K. C., Plunkett, G., Ludlow, F., ... & Woodruff, T. E. (2015). Timing and climate forcing of volcanic eruptions for the past 2,500 years. Nature, 523(7562), p.547

It is understood that there were two major volcanic eruptions in the seventh century, the first in 626 and the second in 682. The data about the eruption in 626 are primarily seen in the northern hemisphere, and according to the sources, its effects were felt more intensely in East Asia. While the traces of the eruption in 682 are seen equally in Greenland and Antarctica (Sigl et al., 2015, p.5), thus it is suggested that the eruption occurred over the equatorial belt.

## 1.4. Impacts of the Late Antique Little Ice Age on Sixth and Seventh-Century Societies

It is observed that the climatic conditions in the first millennium AD played an essential role in social organizations in Europe and Asia. Although the information about the extent, scope, possible causes, and consequences of the climate change experienced in this period is still limited, it is remarkable that the sixth century coincided with the rise and fall of civilizations, epidemics, mass migrations, and political turmoil (Büntgen et al., 2016, p.231).

### 1.4.1. The Impact of Global Cooling on the Emergence and Diffusion of the Justinianic Plague

According to Mediterranean chronicles of the period, the pandemic called the Plague of Justinian outbroke in 541, spread to the Near East and Europe during the 540s, and then recrudesced with an interval of 11 years. It is understood that the mass deaths due to the plague, which had a very high lethality, caused the fields to be empty in the entire Mediterranean basin. Consequently, agricultural production was interrupted, the flow of grain to the cities was interrupted, and therefore many people died not only because of the plague but also of famine (Prokopius, 2006, trans. Dewing, H.B., p. 471; Vasiliev, 2017, p.195). It is thought that the plague caused a significant demographic transformation in the whole Mediterranean region and facilitated the Slavic and Arab migrations that took place in the following period (Barford, 2001, p.52; Dols, 1974, p.381).

The synchronization of the outbreak of the plague with the dust cloud and climate crisis reported in 536 has attracted attention, and the connection between the two historical phenomena has been a matter of debate. In recent studies, the emergence and spread of the plague is considered to be one of the consequences of the

climate crisis. According to the hypothesis, the drought that occurred in the years 536-540 disrupted the natural habitats of rodents carrying Yersinia Pestis bacteria as parasites and caused them to spread around and come into contact with humans (Newfield, 2016, p.97). Under normal conditions before, the plague had spread in a closed habitat and had been transmitted only among rodents. Nevertheless, with the pressure of famine caused by climate change, rodents are thought to leave their habitats and infect people. Therefore, the plague spread to the entire Near East, North Africa, Mediterranean, and Northern Europe due to the mobility and mass migrations on the trade routes.

The climate crisis of 536-540 was influential not only in the emergence and spread of the plague. It was stated above that clouds full of sulfuric acid prevent the passage of radiation and sunlight through the stratosphere layer. It is understood that because of the climate crisis, cold and dry winters lead to bad harvests, bad harvests to drought, drought to famine, and famine inevitably lead to malnutrition of people and the collapse of their immune systems (Sigl et al., 2015, p.6; Newfield, 2016, p.90; Laiou & Morrison, 2020, p.52). It is possible to think that people who have already lost their body resistance are malnourished and even sometimes not fed at all, thus catching the disease easier when they starve, have it more severe, and lose their lives.

Prokopius wrote that the plague spread from the Egyptian port of Pelusium in the autumn of 541 to Alexandria and the rest of Egypt, then to Palestine and finally Constantinople in the spring of 542 (Prokopius, 2006, trans.Dewing, H.B., p.453). Thus, it is estimated that the plague arrived primarily at the ports by vessels carrying grain, then spread rapidly to the interior regions (Mitchell, 2020, p.557).

According to the testimony of Procopius, in the capital, a thousand people died a day at first, then five thousand, and finally ten thousand people. (p.465).

Undoubtedly, it can be thought that the numbers given by Procopius may be exaggerated and symbolic to express the gravity of the situation. According to recent calculations by Stathakopoulos (2016), 80,000 people, who make up one-fifth of Istanbul's population, must have died due to the plague alone (p.141). It is estimated that one-third of the entire empire's population was lost (Laiou & Morrison, p.51; Cline & Graham, 2017, p.401). Justinian himself also caught the plague.

Although it was thought that the plague originated in Africa for a long time, recent studies show that the plague originated in Inner Asia. (Morelli et al, 2010, pp.1140-1143; Rasmussen et al, 2015, pp.571-582; Damgaard et al, 2018, pp.1-5; Wagnera et al, 2014, p.4-5).

### 1.4.2. The Impacts of the Global Cooling on the Political Events of the Period

#### *1.4.2.1. The Byzantine Empire and the Mediterranean World.*

As a result of the financial reforms carried out during the reign of Anastasius I, who ruled between 491-518, the treasury of the Eastern Roman Empire was full, and according to Gregory (2011), ‘paved the way for the golden age of Justinian to follow’ (p.116). On the other hand, during the reign of Anastasius, the Eastern Roman Empire relinquished its claim on the previously Roman lands in the west and did not interfere with the establishment of Germanic kingdoms on the Western Roman territory after the fall of Rome in 476. During the reign of Anastasius, the Goths invaded Italy, the Franks founded a kingdom in Gaul, which would later be called France, the Vandals conquered North Africa, and the Bulgarians and Slavs commenced to enter the Balkan peninsula. As a part of his minimalist policy, Anastasius recognized the Gothic king Theodoric and the Frankish king Clovis as legitimate rulers (Vasiliev, 2017, p.137).

On the contrary, Iustinianus, who ascended the throne in 527, claimed his right

on all ancient Roman territory, including Western Rome, thus aimed to reach the imperial borders of the first and second centuries (Vasiliev, 2017, p.162). This project is known as 'Renovatio Imperii.' Iustinianus first started this policy by regulating Roman law, giving a ten-man legal council under the presidency of Tribonianus, the foremost legal member of the period, the task of compiling all Roman laws published from Hadrianus, and this compilation, referred to as Codex Iustinianus, was published in 529 (Gregory, 2011, p. 130). On the other hand, a policy of intimidation was conducted against various religious groups, particularly the Monophysites, but the repression in the empire led to the Nika Revolt in Istanbul in 532. Although the rebels came very close to overthrowing Justinian, they were defeated by the arrival of Belisarius, and after this attempt, the power and authority of Justinian increased even more.

Shortly after the Nika Revolt and the peace treaty called "Eternal Peace" with the Sassanian Empire, in September 533, Justinian sent the Eastern Roman army under the command of Belisarius to Africa, and the Vandal Kingdom there was destroyed within a year. Encouraged by the rapid success in North Africa, Justinian sent his army to Italy, this time intending to overthrow the Gothic sovereignty (Levtchenko, 2007, p.85). Although the Eastern Roman army advanced rapidly in the early years of the war by capturing Sicily in 535, then Naples and Rome in 536, it encountered severe resistance in the following years, and the Italian Wars could only end in 555 (Ostrogorsky, 2011, p.65).

**Figure 4**

Map of Eastern Roman Empire during the reign of I.Justinian.

*Note*. Taken from Louth, A. (2008). Justinian and his legacy (500-600). Shepard, J. (ed.). The Cambridge history of the Byzantine Empire c.500-1492. Cambridge: Cambridge University Press. p.110

By utilizing the state treasury that was filled during the reign of Anastasius, Justinian carried out the Renovatio Imperii policy with wars and conquests and also with large construction projects, as in the Hagia Sophia. Nevertheless, his conquests would not be permanent. In addition to the short duration of the Eastern Roman domination in Italy, the Balkan peninsula was exposed to Lombard, Gepid, and Slavic migrations in the second half of the sixth century. Slavic raids, which started at the beginning of the sixth century, increased in the 530s and intensified in frequency in the following decade. Despite the efforts of Justinian, strengthening of the frontiers, and fortification of the Danubian limes, no year was noted without a Slav raid (Barford, 2001, p.53). In the 550s, the Slavs united with the Kutrigurs, and their raids

reached the walls of Istanbul (Stathakopoulos, 2018, p.74). p.74). The northern part of the Balkan peninsula was also in havoc during the same period. The Lombards, after they defeated the Gepids together with the Avars, left the Pannonian Plains to the Avars and migrated to Northern Italy in 568 under the leadership of their king Alboin (Christie, 1998, p.67).

The reasons for the failure of the Renovatio Imperii policy have been a matter of debate. It is evident that the Justinian administration's intolerant attitude and repression policy against Christian sects had negative consequences. On the other hand, it can be claimed that the East and West Mediterranean were so separated that they could never reunite again and that the empire's resources did not allow such an ambitious project to be realized. In addition to these reasons, in recent years, the economic and demographic damage caused by the 536-540 climate crisis and the Plague of Justinian has begun to be argued (Mitchell, 2020, p.561).

Especially the massive migration movement in the second half of the sixth century draws attention. It should be underlined that this migration has been directed towards a region that has been depressed demographically due to the famine caused by the 536-540 climate crises and the plague epidemic. Although many fortifications were built in the Balkan peninsula, the Eastern Roman Empire could not prevent Slavic, Lombard, and Avar raids due to the decrease in the army. Justinian also played a role in the decrease in the number of the Byzantine army, as he reduced the number of mercenaries to overcome the demographic crisis caused by the famine. According to Ostrogorsky (2011), “even the strongest fortifications could do nothing when they lack sufficient military units” (p.66).

As a result, the Eastern Roman Empire, which had a dominant economic, cultural and military position in the Mediterranean region, became questionable in just

50-100 years after the Renovatio Imperii policy of Justinian, and the period began to be called the 'dark age of Byzantium' (Gregory, 2011, p.160). Although internal conflicts, expensive campaigns against the Goths and Persians were also considered to be influential in the emergence of this crisis; it is beginning to be widely accepted in recent years that the climate crisis of 536-540 and the events such as the Justinian plague, the demographic collapse of the Eastern Romans, the Slavic and Avar migrations, which increased the effects of this crisis, were the determinants.

#### *1.4.2.2. The Sasanian Empire and Islamic Conquests.*

It is understood that the Sasanian Empire was affected by both the climate crisis at the beginning of the Late Antique Little Ice Age and the plague epidemics as much as the Eastern Roman Empire, and these natural factors were influential in the collapse of the empire.

Matloubkari and Shaikh Baikloo (2022) point out that mild climatic conditions prevailed during the establishment of the Sassanid State (p.73).

Heraclius, son of Carthage exarch, arrived in Constantinople in 610 and became emperor by overthrowing Phocas, but he could not prevent the rapid advance of the Sassanid army in the first years. Advancing at full speed, the Sassanids captured Antioch in 611, Damascus in 613, and Jerusalem in 614; moreover, they carried the True Cross, which has a profound spiritual importance for Christians, to their capital (Stathakopoulos, 2018, p.90). Sassanid progress continued in the following years. The Iranians not only captured Egypt, the essential grain source of Constantinople, in 619 but also extended to Libya (Daryaee, 2009, p.33). As a result of these successful campaigns, the borders of Iran reached their broadest limits since the Achaemenid dynasty. On the other hand, in the hands of Eastern Rome, a few states remained in Carthage, Constantinople, and Anatolia (Beckwith, 2009, p.119).

Matloubkari and Shaikh Baikloo (2022) attribute the Iranian army's capture of Anatolia, Syria, Palestine, and Egypt to the climate crisis and the relapse of the pandemic during the East Roman - Sassanid wars between 602-628 ( p.72). As a matter of fact, it is estimated that a quarter of the Anatolian population perished due to the plague epidemic at the beginning of the seventh century (McMichael, 2017, p.158). This situation facilitates us to comprehend the reasons for the rapid advance of the Sasanian army.

It is frequently reminded the cooperation of the minorities of Eastern Rome, who were offended by the internal political conflicts or the religious oppression of the state, with the Iranians. The cooperation of the local people, such as in Jerusalem, may have helped the Sasanians, but it is understood that natural factors also facilitated the Iranian advance.

However, the plague epidemic spread also to Iran in the following years. This period is also when Heraclius, with all the financial support of the church, established a new army of fast-moving horse archers (Gregory, 2011, p.161) and attacked. In this new war that started in 622, Eastern Rome took advantage of the alliance with the Türks and dealt a blow to the Sassanid armies both in the Caucasus and in Khorasan. It is noteworthy that the plague epidemic weakened the Sasanian Empire in 627, when Hüsrev Perviz suffered heavy defeats against the Türk-Eastern Roman alliance and was finally defeated by the Byzantine army at the Battle of Nineveh. It is stated in the sources that the plague epidemic that started in 627 caused the death of nearly one hundred thousand people in the Sassanid capital of Ctesiphon, among them the Iranian ruler Shireveyh, who deposed his father, Khosrow Parviz, and signed peace with Heraclius (Hashemi et al., 2016, p.2). Although the figures may be thought to be exaggerated, it should be considered that the plague has dealt a heavy blow to Iran,

which the long-lasting East Roman-Sassanid wars have already weakened. Moreover, the plague relapsed, and according to estimates, 25 thousand people died in the plague epidemic called Amvas in 638-639 (Hashemi et al., 2016, p.2).

In our opinion, a climate crisis, just like in the years 536-540, must have had an effect on the spread of the plague epidemic again at the beginning of the seventh century. As a matter of fact, we pointed out that the Greenland glaciers have a layer of sulfuric acid dating back to 623 (Hammer et al., 1980, p.232).

Considering the plague epidemic triggered by the climate crisis, which relapsed in the seventh century, together with the long-standing wars, it can be understood that the Iranian plateau was experiencing a severe demographic crisis. In our opinion, this demographic crisis can explain the rapid progress of the Arab-Islamic armies in both Mesopotamia and the Iranian plateau after the battles of al-Qadissiyah and Nahavand. As a matter of fact, Hugh Kennedy (2007) also states that 'while Yazdgard retreated from Ctesiphon, which was going to be captured by the Arabs, behind the Zagros Mountains, he traveled through a land ravaged by famine and plague' (p.72).

# 2. STEPPE NOMADISM

## 2.1. Inner Asian Steppe Geography

With an area of approximately 8 million km2, Inner Asia is one of the driest geographic regions in the world, having a continental climate as the region is far from the maritime influence (Vasary, 2007, p.24). The characteristic features of the continental climate are the low amount of precipitation per square meter and the high temperature differences between day and night and summer-winter. This climate separates Inner Asia from subcontinents such as China, India, and Indochina, where monsoon rains from the oceans shape vegetation, and from Siberia in the north, covered with taiga forests and defines its borders (Lattimore, 1941, p.29). As a result of the lack of precipitation and arid climate characteristics, steppe vegetation is dominant in the north of Inner Asia. There are also eserts are in the arid central and southern parts of Inner Asia. The famous oases, which have become the centers of a distinctive civilization throughout history, are located near the water sources passing through these deserts.

### 2.1.1. Formation of Inner Asia

Inner Asia took its present appearance with the climatic changes resulting from the movements of the tectonic plates. 65-50 million years ago, the Indian plate moved to the north by 15-20 cm a year and integrated with the Asian plate about 50 million years ago. (Molnar-Stock, 2009, p.4). This collision of the two great plates in the early Cenozoic Era led to the emergence of the Hindu Kush, Pamir, Tengri (Tian Shan) and Himalayan orogeny and the uplift of the Tibetan Plateau as a whole (Molnar-Tapponnier, 1975, pp.420-423).

These orogenies, acting as natural barriers, caused Inner Asia to be closed to air circulation and precipitation masses from the oceans; thus, the climatic characteristics and vegetation of the region changed radically during the Cenozoic era. In addition, the global climate crisis experienced in the Eocene-Oligocene transition about 33 million years ago and the slowing of the water circulation on the earth during the Late Cenozoic Ice Age triggered by this crisis were also effective in the drying of Inner Asia (Barbolini et al., 2020, p.3).

It is thought that Inner Asian water resources were more abundant at the end of the Ice Age, when the world had a generally milder climate. However, the increase in the average temperature of 8°C after the last ice age, about 11,700 years ago, caused a significant decrease in the Inner Asian water resources, and today's Inner Asian deserts emerged while the steppe belt expanded (Baumer, 2012, p.40). In this process, the waters of the Paratethys Sea, which stretched from the Danube Basin to the Aral Sea, were withdrawn 9.75 – 7.65 million years ago, and today's Black Sea, Caspian Sea, and Aral Sea were separated from each other (Palcu et al., 2021, p.6). Endorheic basins in place of today's Gobi and Taklamakan Deserts have also dried up due to climate change (Lu et al., 2019, pp.253-254). As a matter of fact, the remains of crustaceans seen in field studies in the Gobi Desert demonstrate that the region was covered with water layer before major climate changes (Taşağıl, 2019, p.77). Inner Asia gained its present appearance approximately with the end of the last ice age.

### 2.1.2. Eurasian Steppe Belt

The Eurasian steppes, the largest steppe area of the earth, extend from the Danube coast in Hungary to the Amur basin in the east of Mongolia, approximately 800 km in the north-south direction between the 48°-57° north parallels, and it

stretches for about 8000 km in the east-west direction between the 27° - 128° east meridians (Hurka et al., 2019, p.10). The Altai mountain system, which extends with the Tengri and Pamir mountain ranges in the south, divides this steppe into two regions (Lebedynsky, 2003, p.19-20). Yablonovy-Khangai-Tannu-Ola-Sayan-Altai-Tarbagatay-Tengri-Pamir mountain ranges, which divide Inner Asia into two from the Hindu Kush to the Stanovoys in the southwest-northeast direction, also form the dividing line between the cloud masses from the Atlantic and Pacific systems (Vasary, 2007, p.25). The part of Inner Asia in the east of this line consisting of the mountain range is higher than the west. Therefore, it is seen that the name 'High Asia' is used for this region consisting of Mongolia, East Turkestan, and Tibet plateaus in some sources (Pelliot, 1931, p.1-2).

### 2.1.3. Mongolian Plateau

The Mongolian plateau is higher than the Dzungaria Basin, where it is separated by the Altai Mountains, and also higher than the Kazakh steppes to the west of Tarbagatay and the Tengri (Tian Shan) Mountains. While the elevation of the Kazakh steppe descends to the sea level around the Caspian Sea, the average elevation of the Mongolian plateau is over 1600 meters (Krader 1955, p.301; Taaffe, 1990, p.21).

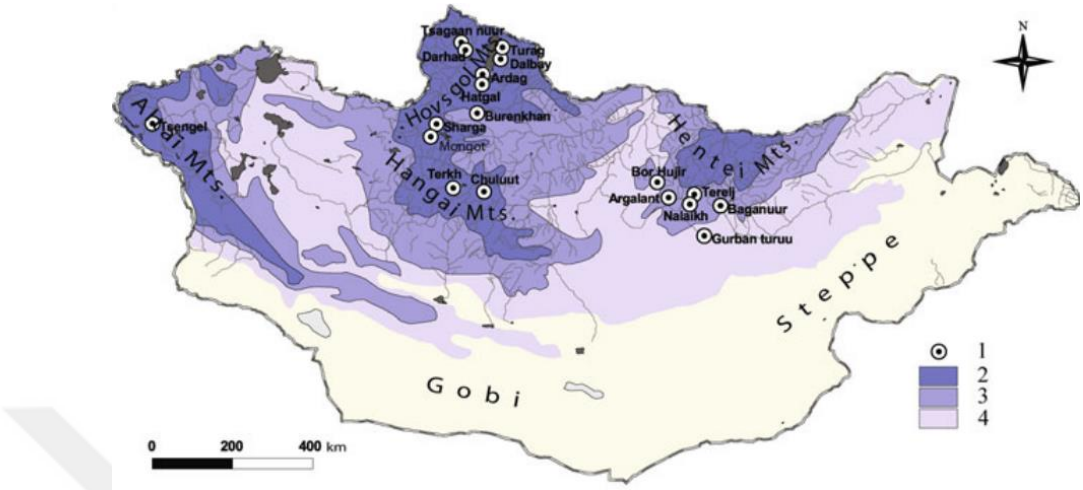
Anticyclones (high pressure) occur continuously in the winter seasons on the Mongolia plateau, which is located between 80–120° East latitude and 40–60° North longitude. In fact, Mongolia is the center of anticyclonic weather activities in East Asia (Zhi et al., 2019, p.3). The formed anticyclones cause cloudless, clear air, arctic polar vortex, and strong and dry winds, causing the air in the region to get drier and colder during the winter months (Ioannidou & Yau, 2008, p.1-3). For this reason, the

most severe steppe winters are in Mongolia due to its interior location, constant high-pressure, clear skies, and freezing, windy weather (Taaffe, 1990, p.35). Day-night and summer-winter temperature differences are very high; The average temperature, which is 20°C in June, drops to -24°C in January, and the annual average temperature is 0.1°C (Shinoda et al., 2009, p.64). The speed of dry winds due to anticyclones is also extremely high; the speed of strong winds blowing in the Gobi region reaches 140/160 km per hour in winter. Such fast-blowing winds, which turn into snowstorms combined with snowfall in winter, cause serious damage to the steppe animals (Goulden et al., 2011, p.93).

Another reason that separates the Mongolian Plateau from the west of Inner Asia is that the Arctic permafrost covers the surface of this region along with Eastern Siberia. Although the frozen layer beneath its soil is warmer than the permafrost further north, with temperatures ranging from -2°C to –0.05°C, the Mongolian Plateau, located within the 'Siberian Permanent Permafrost Zone,' is in this respect, has more Siberian features than Western Inner Asia. (Goulden et al., 2011, p.96). Areas with permafrost layers make up two-thirds of the territory of present-day Mongolia, the main regions being Hentei-Hövsgöl-Hangay and Altai Mountains and the areas around them (Sharkhuu-Sharkhuu, 2012, p.449). As a result of these differences, the east of Inner Asia is drier than the west, and it is affected more dramatically by climate changes (Baumer, 2012, p.18).

**Figure 5**

Permafrost map and monitoring sites of Mongolia: 1- Permafrost monitoring sites, 2- Continuous and discontinuous permafrost, 3- Islands of permafrost, 4- Sporadic permafrost.




*Note*. Taken from Sharkhuu, N., & Sharkhuu, A. (2012). Effects of Climate Warming and Vegetation Cover on Permafrost of Mongolia. Eurasian Steppes. Ecological Problems and Livelihoods in a Changing World, p.449.

In summary, East Inner Asia has a continental climate where climate extremes are not rare due to its high altitude, high-pressure, dry and cold winds caused by high-pressure, and the temperature difference between day and night is very high (Taeffe, 1990, p.21; Hurka et al. 2019, p.9). For this reason, while the human communities living in Western Inner Asia adapt to climate changes more easily, Eastern Inner Asia, where the harsher climate conditions prevail, has continuously migrated outwards as a result of the climate crises experienced throughout history in this region (Baumer, 2012, p.18).

### 2.1.4. Inner Asian River System

The rivers make life, and therefore the pastoral nomadic mode of production, possible even under the most adverse conditions in these arid Inner Asian steppes. The main rivers feeding the Eurasian steppes are as follows (Taşağıl, 2021, pp.19-36):

- The Kherlen River, which arises from Burhan Haldun Mountain and joins the Amur River and empties into the Pacific Ocean, feeds the Mongol-Manchu grassland steppe in eastern Mongolia,
- The Tola River, originating from the Khentii Mountains and joining the Orkhon River, feeds the grassland steppe in Northern Mongolia,
- Orkhon River, which arises from the Khangai Mountains and joins the Selenge River and flows into Baikal, passes through the forest steppe in Northern Mongolia,
- The Tamir River, which joins the Orkhon River, feeds the valleys of the Hangai Mountains, where it was born,
- Selenge River, which is formed by the combination of Delger, Ider and Orhun rivers and empties into Lake Baikal, feeds the forest steppes of Northern Mongolia and Buryatia,
- The Irtysh River, which originates in the Altai Mountains and joins the Obi and empties into the Arctic Ocean, feeds the forest steppes of East Kazakhstan and Southern Siberia,
- The Ili River, which arises from the Tengri (Tian Shan) Mountains and empties into Lake Balkaş, forms the Yedisu Basin.

- The Chu River, which arises from the Tengri (Tian Shan) Mountains and its waters mix with the soil in the Central Steppe, and the Talas River to its west feed the grassland steppe in Southern Kazakhstan,
- Oxus River, which takes its source from the Tengri (Tian Shan) Mountains and flows into the Aral Sea,
- The Volga (Idil) and Ural (Yayık) rivers flowing through the Southern Russian steppe into the Caspian Sea,
- The Don River, which empties into the Black Sea, feeds the Ukrainian steppes.

### 2.1.5. Steppe Typologies

The Eurasian steppes are classified in several ways. Classification according to vegetation is forest steppe/grassland steppe/semi-desert steppe (Lebedynsky, 2003, p.20).

The northern part of the steppe belt is covered with forests throughout Eurasia. Forests called 'taiga,' mostly made up of coniferous trees, stretch for about 10,000 km from Scandinavia to the Sea of Okhotsk in the Pacific Ocean and expand southward in Lake Baikal and the Selenge Basin (Taeffe, 1990, p.25). The forest steppes are mostly steppes with abundant water resources, on the border of these taiga forests in the north of the Eurasian steppe belt and the forested areas at the foot of the mountain range. From east to west, the Orkhon, Selenge, Onon river valleys in the north of present-day Mongolia, the foothills of the Tarbagatay and Altai Mountains, the foothills of the Tien Mountains in the Yedisu region, and the north of the Don steppes in Eastern Europe are steppes bordering the forest where water is abundant. In the forest steppes (mostly oak (Quercus robur) in the west, birch (Betula Verrucosa) and poplar (Populus tremula) in Western Siberia, and coniferous hybrid (Larix) in Eastern Siberia and Mongolia), tree communities are encountered (Archibold, 1995, p.208).

Grassland steppes form most of the Eurasian steppes. The steppe, which begins from the Hungarian Plain in the west, progresses to the south of Ukraine and Russia, then to Kazakhstan, and reaches the Altai-Pamir mountainous system. In the east of the Altai Mountains, the Mongolian steppe extends to the Khingan forests in Manchuria in the northeast and the Yellow River in the southeast. The climate and vegetation of this great steppe system present a homogeneous appearance almost everywhere at first glance, but plant varieties vary depending on environmental conditions such as rainfall in various regions, elevation, and soil type (Archibold, 1995, p.205). In general, the diversity and richness of grass cover increase in direct proportion to the distance from the Central Asian deserts (Taaffe, 1990, p.34). In addition, the dry and continental climate of the East Inner Asian steppes reduces the diversity in vegetation relatively (Archibold, 1995, p.208).

Semi-desert steppes arise in regions where the marine influence decreases with distance and the air masses from the oceans are cut off by high mountain ranges; thus, the climate becomes arid. Semi-desert steppes are mostly located in the south of grassland steppes due to the effect of latitude. In semi-desert steppes, the day-night and summer-winter temperature differences are relatively higher.

Sandstorms are characteristic events of these regions where grass diversity is reduced, and water resources are less than other steppe types. The continuation of the semi-deserts are the plantless, sandy, or stony deserts, which are the inevitable result of the arid climate. For instance, Kızılkum and Karakum deserts were formed in the west of Inner Asia, the Taklamakan in East Turkestan, and the Gobi deserts in Mongolia (Golden, 2011, p.16). Three-quarters of the Gobi Desert, located in the easternmost part of this belt and is the northernmost desert in the world, is covered with sparse shrub and grass cover and has areas suitable for pastoral nomadic life

(Goulden et al., 2011, p.98). The Taklamakan Desert, which receives less than 5 cm of precipitation per year with its dunes reaching a height of 100-130 meters, is one of the driest regions in the world (Taeffe, 1990, p.38).

At the foot of the Pamir, Tengri (Tian Shan), Kunlun Mountains, and around the desert belts exist several oases suitable for agriculture-based economic systems. The valleys of Harezm, Zerafshan, Fergana in West Turkestan, and Tarim Basin in East Turkestan have been the cradle of agricultural communities since early times. Oasis cities such as Urgench, Khiva, Bukhara, Samarkand, Shash (Tashkent), Kashgar, Kucha, Aksu, Karahoca, Turfan, Hami, Dunhuang were founded in this fertile belt consisting of isolated oases. Sencer Divitçioğlu (2000) likens the steppe belt covering Inner Asia to an inner sea such as the Mediterranean, the oasis cities around the steppe to the port cities around this inner sea, and the horses to the ships (p.231).

Danish Turcologist Kaare Grønbech (2007) analyzed the steppes of Inner Asia by latitudinally dividing them into three regions. According to this classification, from west to east, firstly, there are fertile South Russian steppes, in the east of this region comes Middle Asia with less fertile but occasionally arable oases, and in the easternmost part of the steppe belt rises the Central Asia proper, which comprises the Dzungarian and Mongolian plateaus (p.45).

Similarly to Grønbech, Lavrenko (1970) proposed to study the Inner Asian steppes in two sub-regions, the Black Sea-Kazakhstan steppe and the Central Asian (Dahuria-Mongolia) steppe, each of which he divided into five parts:

Black Sea-Kazakhstan Steppe Sub-region

A1) Eastern European Bloc: From west to east; It consists of the Balkan-Messia forest steppe, the Eastern European forest steppe, and the Black Sea steppe.

A2) West Siberia-Kazakhstan Bloc: From north to south; It consists of the West Siberian forest steppe and the Transvolga-Kazakh grassland steppe.

Central Asian Steppe Sub-region

B1) Dahurian-Mongolian Block: From north to south; It consists of the Khangai-Dahurian forest steppe, the Mongolian grassland steppe, and the Northern Gobi desert steppe.

B2) Manchuria – Northern China Bloc: Consists of Manchurian forest steppe and Shanxi-Gansu forest steppe and grassland steppe (pp.1734-1747).

On the other hand, Sochava (1979) suggested examining the Eurasian steppes (in order from west to east) in three parts: the European part, the Volga-Siberia-Kazakhstan part, and the Mongolia-Chinese part (p.103-110).

### 2.1.6. Steppe Vegetation

In the west of the Eurasian grassland steppe, tulip grass (Stipa) from the Poaceae family, especially Stipa Capillata and Stipa lessingiana, as well as grass balls (Festuca), especially Festuca sulcata, are dominant (Archibold, 1995, p.208; Cheng&Nakamura, 2007, p.175).

In the steppes to the east of the Altai Mountains, grasses such as Stipa krylovii, Agropyron cristatum (grassberry) and Cleistogenes squarrosa from the Poaceae family, wormwood Artemisia (especially Artemisia adamsii) from the Asteraceae family, iris from the Iridaceae family, Thermopsis genera from the Fabaceae family occupy a widespread place (Wallis de Vries et al, 1996, p.113-118; Shinoda et al, 2010, p.64). Dwarf trees of the genus Caragana are also common in Mongolia.

On the semi-desert steppes, thin and long grasses of the genus Leymus / Aneurolepidium from the Poaceae family, sometimes up to 2 meters in length, are often seen in clusters (Archibold, 1995, p.209).

The roots of grasses grown in the steppe have a depth ranging from 30-90 cm to 1.5-1.8 meters (Archibold, 1995, p.217). Although root depth tends to extend deep into the soil in arid regions, 90% of the root mass is concentrated in the 15 cm region just below the surface; in some breeds, the root does not spread to the depth of the soil but the sides. It is no coincidence that steppe plants have evolved in this way; thanks to this shallow and broad root structure, the plant can efficiently absorb water from seasonal precipitation throughout the entire growing season (Weaver & Darland, 1949, p.335). The steppe vegetation is thus dependent on seasonal precipitation; it can only grow when it rains. In cases where precipitation is irregular, not seen at all, or when the hail falls instead of rain during the rainy season, the plant cannot renew itself because it is not fed from another water source and needs rainwater. Therefore, drought is fatal to the Inner Asian steppe vegetation.

### 2.1.7. Precipitation Regime and Seasons in the Steppe

Annual precipitation in East Kazakhstan steppe is 493 mm in Yedisu region (Almaty), 526 mm in Semey west of Altai Mountains and 263 mm in Pavlodar in Northeast Kazakhstan (Cheng & Nakamura, 2007, p.173). In Mongolia, the annual rainfall in the Tola Valley is 270 mm. (Wallis de Vries et al., 1996, p.112).

Annual precipitation in the Dzungarian steppes south of the Altai Mountains ranges from 172 mm to 240 mm. Average annual precipitation in Mongolia is 230 mm (Goulden et al., 2011, p.93).

In the Eurasian steppes, most of the precipitation falls in summer. The rate of summer precipitation in Mongolia is 70% (Wallis de Vries et al., 1996, p.112). The cloudless sky due to the high pressure in the winter also means less snowfall. The share of snowfall in the total amount of precipitation falling on the Mongolian plateau is less than 20% (Batima et al., 2008, p.68).

The long winter on the Mongolian plateau begins with a decrease in temperature in October, and the average temperature in January reaches -23°C. The scarcity of winter precipitation is accompanied by very strong winds that sometimes completely destroy the vegetation on the soil (Wallis de Vries et al., 1996, p.112). Because of these conditions, grazing animals can only meet 40-60% of their daily nutritional needs in winter by grazing; they lose weight due to nutritional deficiencies (total weight loss reaches 34% of the animal mass), and during the months of March and April, when the animal feed of the steppe people begin to deplete and pregnant animals are more vulnerable to food deprivation, are the months when the livestock loss is the highest (Batima et al., 2008, p. p.73). Barfield (2011) recalls a Mongolian proverb: 'Sheep get fat in summer, stay strong in autumn, get weaker in winter and die in spring' (p.114).

In the Mongolian steppes, grasses begin to grow each year in April-May, after a short continuous spring drought accompanied by occasional dust storms, and this growth continues until September (Wallis de Vries et al, 1996, p.112). The development of the steppe vegetation at the beginning of spring is vital for the recovery of weakened animals during the winter, the calving of animals and the ability of females to produce milk for their young (Batima et al, 2008, p.73). After the animals, which have weakened and weakened in the winter, gain strength by feeding

on the grass grown by these rains at the end of spring, the preparations of the nomads to go to the summer camps begin (Barfield, 2011, p.115).

### 2.1.8. Drought and Frost (Yud) Events in the Steppe

The growing season on the Mongolian plateau is very short; it lasts only from May to September, and the productivity of grasslands depends on summer rains and temperature. While dry summers and drought reduce the yield of grasslands in the mountainous regions by 12-48%, the decrease in the yield of semi-desert steppes reaches a much higher rate, such as 28-60%, in the same drought situation (Batima et al., 2008, p.73).

Drought is a severe disaster for the living organisms on the steppe. Drought reduces grassland vegetation; it causes a decrease in plant diversity, drying up water sources and increasing pests. Also, due to drought, shepherds cannot prepare winter fodder for their flocks. Summer drought also deprives animals of their much-needed resistance to the cold winters, when they usually weaken from nutritional deficiencies (Batima et al., 2008, p.74).

Zud, a term of Turkish origin (Mongolian: зуд) (Barfield, 2011, p.138), is the name given to the covering of the steppe with snow or ice cover that prevents animals from reaching the grass in very cold and snowy winter conditions (Goulden et al., 2011, p. .95). The zuds are divided into six classes according to the weather conditions and their effects. The main types of zud are (Batima et al., 2008, p.76):

Tsagaan (White) Zud: Caused by excessive snowfall preventing the animals from reaching the grass. If the snow cover covers a relatively small region, famine can be prevented by leaving the area. A serious disaster may occur in the snow layer covering a large area.

There are two types of tsagaan zud: If heavy snowfall occurs in early winter, the zud lasts longer. If it happens at the end of winter, the duration of the zud cover will be short as the weather warms up towards spring. Tsagaan zud is the most severe and common type of zud.

Khar (Black) Zud: Occurs when there is no or very little snowfall in winter in grassland areas where there are no wells. Both animals and humans suffer from thirst. Black zud is usually seen in the semi-desert steppes around the Gobi Desert.

Turner (Iron) Yud: If a cold airwave follows warming of 3°C-7°C above the average temperature in winter, the snow layer first melts and then freezes again. In this case, an ice layer forms on the soil that prevents animals from grazing.

Khuiten (Cold) Zud: It occurs when the air temperatures fall below the usual level (5C-10C more than the monthly average temperature). Extreme cold and freezing winds keep grassland animals from grazing by pushing most of their energy to maintain body temperature.

Khavsarsan (Combined) Zud: It is the occurrence of the at least two phenomena explained above in the same season or even in the same order.

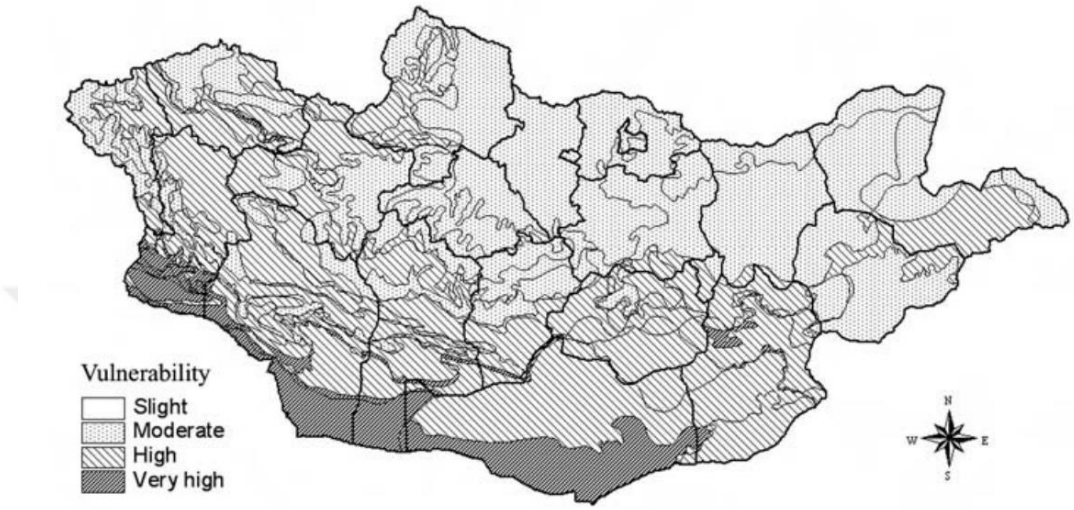
Tuuvarin Zud: Geographically common, white, black, iron, or cold zuds are accompanied by an increased number of animals, and this animal existence migrates and consumes resources.

Worse than the zud disaster for steppe animals and human communities whose lives depend on the pastoral nomadic economy is the overlapping of summer drought and winter zud (Batima et al., 2008, p.76; Sternberg et al. 2010). Particularly vulnerable to adverse impacts of this event are the eastern Altai Mountains, the western Hangai Mountains, and the Great Lakes depression in this region, the most

adversely affected area is the semi-desert steppes in the north of the Gobi Desert (Batima et al., 2008, p.77).

**Figure 6**

Areas vulnerable to black and white zud in Mongolia.




*Note*. Taken from Batima, P., Natsagdorj, L., & Batnasan, N. (2008). Vulnerability of Mongolia's pastoralists to climate extremes and changes. Leary, N., Conde, C., Kulkarni, J., Nyong, A., Pulhin, J. (Ed.). Climate change and vulnerability, 2, London: Earthscan, p.78.

In the event of global climate change, drought and frost events are more frequent, regardless of whether this climate change occurs as warming or cooling. Studies conducted at the beginning of the twenty-first century have revealed that climate change increases climate anomalies. The droughts and floods caused by climate change today can help us understand what happened in the past. For instance, the zud event between 1999 and 2002 was accompanied by drought. In the summer of 2002, the precipitation started very late, in the middle of summer, and there was only 160 mm of precipitation in total (Goulden et al., 2011, p.94). It is estimated that during the drought that lasted for three years and the zuds that lasted for three consecutive winters, approximately 12 million animals, which corresponds to 25% of

all animal wealth in Mongolia, lost their lives, and about 12,000 shepherd families lost their entire herds and fell below the poverty line (Goulden et al., 2011, p.95; Batima et al., 2008, p.77).

## 2.2. Outlines of the Steppe Economy

### 2.2.1. Sectors of the Steppe Economy

The absence of farming has been emphasized due to the very cold and very dry climate in the Inner Asian steppes (Sinor, 1990a, p.5). Agriculture is more difficult in the higher eastern part of Inner Asia, where the winters are longer and harsher, and the soils are covered with a layer of permafrost. Moreover, the scarcity of precipitation due to high pressure increases the incidence of drought events. Khazanov (1994) pointed out that the Mongolian steppe experiences drought in 3.5 to 6.5 of every ten years (p.45).

Despite these adverse conditions, there is evidence of irrigated and moist agriculture, especially in forest steppes, where water resources are more abundant. As will be noted in the following chapters, the ancestors of the Inner Asian pastoral nomads were sedentary communities based on agricultural production in earlier times. Apart from this, irrigation channels belonging to the Xiongnu period were found in archaeological excavations in the forest steppes such as Orkhon, Selenge, and Tola valleys on the southern foothills of the Altai Mountains (Ögel, 2020, p.90-91). Lattimore (2010) wrote that in the Türk and Uyghur periods, the oasis cities in the Tarim Basin were influenced by the transition to a semi-agricultural, semi-pastoral nomadic mixed economy in 'steppe oases' such as the Orkhon Valley (p.97). Golden (2017) also states that many nomadic communities throughout Eurasia continue to practice reduced forms of agriculture in addition to animal husbandry (p.21).

Although the pre-Islamic Turks had a mixed hunter-farmer-pastoral nomadic economic system, the phrase 'they wander in pursuit of pasture and water' about the steppes has become a cliché in Chinese sources (Sinor, 1990a, p.7). According to Sı Maqian 司馬遷's Shiji 史記, where this expression was first used, the Xiongnu, who 'used to move around for water and grass,' 'had no cities, no permanent place of residence, and no occupation of agriculture' (Otkan, 2018, p.58). However, the archaeological findings prove that agriculture was practiced during the Xiongnu period. Centuries after Shiji, it was written '其俗畜牧為事，隨逐水草，不恒厥處 Where there is water and grassland, they migrate, they could not stay in the same place for a long time' for the Türks in Suishu. (SS, 84, p.1864). However, it is stated above that agriculture was practiced in the Orkhon Valley. According to Taşağıl (2020a), the reason for these contradictions in Chinese chronicles is obvious: The Chinese must have recorded what they used to see in the frontier regions close to China (p.25).

### 2.2.2. Classification of Pastoral Nomadism

Iaroslav Lebedynsky (2003) analyzed the Eurasian pastoral nomadism by dividing it into three categories.

1. Type 1 - An entire nomadic population moves with their herds constantly in search of pasture. They do not have a specific location. Camps are temporary; burials are scattered; there are no permanent graves. The only resources are obtained through livestock and warfare. This system fits perfectly into the cartoonish picture of the sedentary historians about nomads and nomadic life, but the real picture is very different. In fact, this is not the ordinary lifestyle of the nomads except for some exceptional cases that took place in limited periods, such

as the migration of the Huns to Europe. This type of nomadism can be classified as 'camping nomadism' or 'migrant nomadism.'

2. Type 2 - Population settles on a particular territory; this territory often has natural boundaries such as rivers, mountain ranges, or ecological areas. Each group (tribe, tribe) has its own pastures; These are the summer pastures and winter quarters where the herds and people usually traverse by following predetermined paths. The choice of pastures and roads depends on environmental factors. The nomads of the Ukrainian-Russian steppes spent the winters on the shores of the Black Sea or the Sea of Azov and retreated in the summer to the interior of the steppe, whereas Altai and Pamir nomads followed a 'vertical' path between plains and mountain pastures. In this nomadic system, which can be called 'regional,' camps, especially winter quarters, may turn into permanent settlements, cemeteries, and even necropolises may develop nearby. These settlements are home to a complex population of nomads (including the elderly and the poor), foreign captives, and artisans of various origins. They become centers of economy and crafts, as well as military headquarters and command centers.
3. Type 3 - In this third type, the characteristic features of the second type are even more definite. This is the type of nomadic community that, in some cases, has also dominated sedentary communities and has been able to establish relatively stable 'empires.' A significant part of the nomads settle in previously established (i.e., conquered) cities, the nomadic elites adopt a semi-nomadic way of life. The economy consists of various sectors. If this development is not interrupted, the nomads eventually become entirely sedentary and may develop into a fully settled aristocracy, as in the Hungarian case (pp. 22-23).

The pastoral nomadic economy in the Eurasian steppes is self-sufficient. Nutrition, accommodation, clothing, transportation, and even fuel needs are entirely met with materials produced from animal products (Lattimore, 1938, p.12). Dairy products, yoghurt made from milk and milk, kumiss obtained by fermenting cheese and milk, fresh-cut, dried, or frozen meat, animal wool and skin, clothes, blankets, carpets, tent felts, ropes made from animal manes and intestines. A pastoral nomad living in the steppe has everything he needs at a basic level to survive (Roux, 2001, p.49; Kurat, 2016, p.79). One can withdraw into the steppe by completely severing its ties with the societies (Sinor, 1972, p.174). It also happens that the pastoral nomadic mode of production is considered an autarkic system since a nomadic community can survive without any economic cooperation or division of labor with its neighbors, other nomadic communities, or residents (Divitçioğlu, 2000, p.243). According to Lattimore (1938), this self-enclosed, relatively poor pastoral nomad is the 'pure' nomad. As its economy diversifies and its dependence on foreign countries increases, so does the vulnerability of the nomad. Poverty increases the determination of the steppe nomad to struggle (p.15-16).

However, this poverty has its limits. The equestrian steppe life is based on the search for water and grass (Sinor, 2005, p.9). It is not possible for animals to endure hunger and thirst, even for a short time (Sinor, 1972, p.178). Thus, aside from wars and conflicts, the biggest disaster for the pastoral nomadic economy, as mentioned earlier, is climatic changes, the freezing of pastures called 'zud,' or weather events such as snowfall in summer when herds graze on the highlands. Another common disaster is epidemics among animals. These disasters cause animals to perish en masse, impoverish pastoral nomadic communities, and even face the danger of famine since animals are the main food source (Kurat, 2016, pp.80-81).

Unless there is a natural disaster, the number of animals raised in the steppe may increase continuously (Kurat, 2016, p.80). Since the producers and the consumers are the same person in the steppe and commercial relations between pastoral nomads are very rare, the animal economy of the steppe tends to give a surplus under normal conditions (Sinor, 1990a, p.9). Nevertheless, the surplus that can be stored in settled agricultural societies and used for the benefit of the community is not an advantage for the pastoral nomad of the steppe because overgrazing of animals damages the steppe vegetation and renders the steppe unproductive (Lattimore, 1938, p.4; Wallis de Vries et al., 1996, pp.117-118). Herds grazing on the same pasture for a long time not only harm the plants. The weight of the herds can dehydrate the steppe soil by compacting the soil and accelerating the absorption (infiltration) of rainwater (Rauzi & Smith, 1973, p. 128).

For these reasons, the steppe vegetation damaged by overgrazing cannot sustain more than a certain limit. Faced with the depletion of their resources due to overgrazing, steppe people inevitably have to spread over large pastures in order to avoid the disaster of famine and maintain the self-sufficient structure of their economy (Sinor, 1972, p.180). In this way, pastoral nomadism, which is expansionist in nature, makes a sharp difference from the agricultural mode of production, which requires the concentration of human communities in a particular region; A nomadic community with the same population as a settled agricultural community spreads over an area a hundred times larger than ten (Krader, 1978, p.98).

The constant need for pasture by steppe horses had also a strategic result: The steppe armies consisting of horsemen could not fight for a long time in geographies that do not have large pastures, they kept their campaigns in such different ecological regions as short as possible and tended to return to the steppe without their horses

dying (Alofs, 2015, p. .289). As a matter of fact, according to Sinor (1972), the main reason for Batu's withdrawal from Hungary in 1242 was that the grazing capacity of the pastures in the Pannonian Plains could not sustain the Mongolian army for a prolonged period (p.182).

The main reason for conflicts between pastoral nomadic communities is often the inability to share or violate pastures (Golden, 2017, p.27). Even the routes followed during seasonal migration between highlands and winter quarters are predetermined, and violating a route belonging to another tribe may cause conflict. Likewise, the shrinking of grasslands due to sudden climate crises results in pastoral nomads who are not prepared for this situation infringing on the pastures of other tribes to graze their animals, which is a cause of conflict. According to Di Cosmo (1999), these crisis and conflict situations are ideal environments for state formation in the steppe (p.14), which will be discussed in the following chapters.

### 2.2.3. Steppe Livestock: Five Steppe Animals

The pastoral nomadic economy in the Eurasian steppes is based on the production of five animal breeds, which the Mongols call 'tabun kosiyun mal': horse, camel, cattle, sheep and goat (Meserve, 2000, p.29). The fact that animal husbandry is mainly based on the breeding of these five animal breeds, from the age of the Xiongnu in the third and second centuries BC (Ercilasun, 2019, p.199; Baykuzu, 2020, p.36; Taşağıl, 2020a, p.233) to the Pechenegs in the ninth and tenth centuries (Kurat , 2016, p.79) and the Mongols (Vladimirtsov, 1987, p.38; May, 2021, p.32).

Especially horse and sheep have been the most important animals raised (Khazanov, 1994, p.46; Soucek, 2009, p.42). The statement '突厥興亡, 唯以羊馬為準 - The rise and fall of the Turks depends only on the presence of sheep and horses'

(JTS 62, p.2360) is an important truth that the Tang ambassador Huan Zou 還奏 told Tang Taizong in 627. reflects. The presence of the other three animals increases in places where the amount of horses and sheep decreases due to the difference in their dietary habits (Taşağıl, 2021, p.45).

Pig, which sedentary agricultural communities have raised since very early times, is an important source of food but is not an animal suitable for steppe conditions and nomadism due to its physiognomy (short legs, clumsiness) (Krader, 1955, p.315; Barfield, 1993, p.5). As a matter of fact, it was emphasized in Chinese sources that the Xiongnu did not raise pigs (Eberhard, 1996, p.94). After describing the abundance of horses, sheep, goats, mules, camels, and cattle, the Papal ambassador Johannes of Plano Carpin, who went to Mongolia centuries later, reported that he saw very few pigs (Carpinili, 2022, trans. Özcan, A.T., p.13).

#### *2.2.3.1. Horse.*

Regardless of the importance of other animals, it was the domestication of the horse that made pastoral nomadism possible (Golden, 2011, p.10). Thanks to the mobility acquired with the horse, pastoral nomads were able to manage large herds of sheep and cattle, numbering up to tens of thousands (Kafesoğlu, 2014, p.272; May, 2021, p.37). In addition, the horse is the only animal among the five steppe animals that can be used for war (Sinor, 1972, p.179). Despite dozens of different types of products (silk, precious stones, jewellery, etc.) imported from the residents, it was the main export product of the steppe people (Divitçioğlu, 2000, p.239).

Evolving to be able to spot the predators around it from a distance thanks to its 300-degree viewing angles and to quickly move away from them thanks to its strong legs, the horse adapted and spread to the Eurasian and North American steppes in the

Paleolithic Age. The climate crisis at the end of the Paleolithic Age caused the extinction of horse species in North America, and only the wild horse species in the Eurasian steppes remained (Baumer, 2012, p.84).

The frozen horses found in the archaeological excavations in the Pazyryk kurgan revealed that there were two types of horses in Inner Asia in the second and first centuries BC as well as today: Tall horses, probably brought to the region from West Turkestan, which are called 'Turkmen Horse' today, and the shorter, 'Mongol' or 'steppe' horses which are the native horse breed of Eastern Inner Asia (Ögel, 2020, p.65).

Although Mongolian-steppe horses, whose length rarely exceeds 1.5 meters (Alofs, 2015, p.277), are shorter than other horse species, they are better adapted to the harsh conditions of the high steppes in the east of Inner Asia. They have long hair, thick neck, and thick feet (Baykuzu, 2020, p.36), and they can survive without food during the winter, which can be lethal for other horse species (Barfield, 1993, p.140). In addition to being resistant to freezing cold, they also have the ability to graze by scraping the thick layer of snow with their hooves, unlike other horse breeds (Sinor, 1972, p.178; May, 2021, p.35). As a matter of fact, due to this situation, Papal ambassador Johannes of Plano Carpini and the embassy delegation, who were going to go as far as Mongolia to present the letter of Pope Innocentus IV to the Mongolian grand khan, were advised to leave their horses and ride Mongolian horses in Kiev (Johannes of Plano Carpini, 2022, trans. Özcan, A.T., p.102).

As Johannes of Plano Carpini also emphasized, the Mongolian-steppe horses were able to scrape the snow layer with their hooves, resulting in other animals following the horses to eat the grass under the snow in winter (May, 2021, p.35).

#### *2.2.3.2. Sheep and Goat.*

The most common animal of the Eurasian steppes is undoubtedly the sheep. It can be said that the sheep, which is the most raised animal in all Eurasian steppes from the easternmost part of Mongolia to the Caspian Sea, is the basis of the Eurasian pastoral nomadic economy (Taşağıl, 2021, p.43). Especially in the steppes of the eastern part of Inner Asia, the ratio of sheep to the total number of animals is higher than in the cattle, and they are also raised on unproductive pastures (Ögel, 1993, p.9). According to Barfield's (1993) research, sheep constitute 60% of the animals raised so far on the Mongolian Plateau (p.140). The main reasons why sheep and goats are the most widely grown animals in the steppe is that they can reproduce faster and feed on more grass species (Barfield, 1993, p.139). In addition to consuming a wide range of plants, including grasses that other animals cannot digest, sheep can consume grasses under the snow layer up to 15-17 cm in winter, just like steppe horses (Khazanov, 1994, p.46). For the lambs, dry grass collected in summer is kept near the dormitories (Radloff, 1956, p.435).

Throughout history, the pastoral nomads of Inner Asia covered their tents with felt made of sheep's wool, made their clothes from sheep's skin and wool, fed on cattle meat, and made firewood (dung) from sheep's dung. Sheep is the main animal and upon which steppe pastoralists' self-sufficient and somewhat autarkic economies rise. Because of these qualities, there is even a narrative in Central Asia that 'the sheep descended from heaven' (Tolstov, 1962, p.221).

#### *2.2.3.3. Cattle and Camel.*

It is understood that the importance of cattle and cattle is less when compared to cattle, which occupy such an important place in the steppe economy. Cattle raising is difficult in the relatively arid cattle and steppes due to the difficulty of finding water and grass for the animals in winter. Instead, cattle breeding has developed (Yıldırım, 2020, p.196). Therefore, the number of cattle increases in the steppes and river valleys in the forest belt, and on the other hand, it decreases gradually in the arid regions. Camels, unlike cattle, are numerous in arid regions; While it is more than 10% in semi-desert and desert regions, their rate decreases to 2% in forest steppe (Krader, 1955, p.309). Therefore, horse/cattle and camel breeding are inversely proportional. Where horses and cattle are raised more, cattle are less, and where cattle are raised more, horses and cattle are raised less (Taşağıl, 2021, p.45).

#### *2.2.3.4. Ratios of the Steppe Animals.*

The number of horses and cattle is high where water resources and pastures are most abundant (Barfield, 1993, p.140), and they are less adapted to mountainous areas and arid regions. According to the studies conducted by Lawrence Krader (1955) in the mid-twentieth century, the proportion of horses and cattle is less than 10% in the extremely arid regions of southern Mongolia, such as Kenimekh, Gobi, and Susamyr. However, the ratio of both animals in Mongolian meadows and forest steppes is over 10% (p.313).

In the forest-steppe belt, which is mostly located in the north of the grassland steppe, the number of cattle is higher than the number of horses and sheep. Buryatia, which is full of forest steppes and much more humid than Mongolia, is an example;

according to the records kept at the beginning of the nineteenth century, 50% of the livestock in Buryatia consisted of cattle, 23% of sheep, and 21% of horses (Krader, 1955, p.310). Since this steppe near Baikal is more humid, cattle became the main animal of Buryat livestock; also, in comparison to be made in terms of yield per animal, it is seen that cattle provide larger amounts of meat, milk, and hides than sheep. Consequently, the total number of animals in the forest steppe is less than in the grassland steppe (Krader, 1955, p.320). There is no need for large herds of many animals where yield is obtained from a single cattle.

In the Mongolian steppe, where sheep constitute the majority of the livestock, the per capita animal rate is higher than the pastures of Buryatia, Pamir Mountains region, and Turkestan (p.320).

### 2.3. Life on the Steppe

One of the most distinctive features of the pastoral nomadic life is that the permanent settlements of cities, towns, and villages have been replaced by obas consisting of steppe tents. The existence of tents made entirely of animal material is a phenomenon that facilitates seasonal mobility or migration in the steppe, thanks to its ease of transportation. The accommodation of pastoral nomads in tents has been one of the main reasons for the negative evaluations of many historians from settled societies. Gumilev (2008) argued that the steppe tent is superior to the adobe and stone houses of the first and middle ages in terms of carrying practicality, ease of establishment, and warmth (p.89).

The cloth tent in the Middle East was replaced by gray or white felt made of sheep wool in Inner Asia (Patai, 1951, p.407). Most steppe tents have wooden doors and have much more furniture than a Bedouin tent. In these tents, there are items such

as wooden tables and wooden beds, unheard of among Middle Eastern nomads (Patai, 1951, p.407). In today's Mongolian 'Ger's, a great deal of wood is used as in the past. These wood materials are brought to the grassland steppe from 100 km or even more. Apart from Ger, the Mongols also had woolen tents that they called 'maikhan' (Lattimore, 1938, p.9).

There is a round hole in the middle of the tent ceiling, from which the light enters, and because the stove is right under this hole, the smoke also comes out from here. This hole, which is called 'Tüynük' in today's Turkmen Turkish, 'Tunduk' in Kyrgyz Turkish, 'Şanirak' in Kazakh Turkish, also carries a religious meaning in Tengrism; it is thought that the hole provides communication with the sky through the smoke. The fire, which descended from the sky to the ground through lightning, returns to the sky as smoke through the ventilation hole and the chimney at the top of the tent (Roux, 2002, p.153).

Among Turkmens of Khorasan, the weight of the felt cover, sufficient for an average (62 pole) tent, was 132 kilograms. This amount of felt wool was obtained by shearing approximately 190 sheep (Andrews, 2019, p.185). The size of the steppe tents varied according to the social position or wealth of the host family or person (Johannes of Plano Carpini, 2022, trans. Özcan, A.T., p.12). It is recorded in travelogues that especially the tents of the rulers or ceremonies were very large. Ibn Fadlan wrote that 1000 people could fit in the tent of the Oghuz rulers (Ibn Fadlan, 2017, trans. Şeşen, R., p.30). Johannes of Plano Carpini stated that more than two thousand people fit in the great ceremonial room of Güyük Han (Johannes of Plano Carpini, 2022, trans.Özcan, A.T., p.116).

The number of roof poles expresses the size of steppe tents. In the nineteenth century, most Turkmen tents were made with 62-64 poles (Andrews, 2019, p.185). Tiny tents were not suitable for family life, and a family of at least 7-8 people lived in an average tent. A well-built tent frame could last up to fifty years if properly maintained. The felt cover covering the tent, on the other hand, could be used for five to ten years depending on the climatic conditions, the meticulousness of the tent owners, the soot, and smoke coming out of the tent (p.217).

It is understood that the tradition of transporting tents by cars in the steppes of Inner Asia has continued since ancient times. According to Marco Polo's travel book, the Mongols carried their tents in four-wheeled chariots carried by oxen or camels (Marco Polo, 2019, trans. Erdüden, I&Ergüden, Z., p.146). Ibn Battuta also saw four-wheeled carts pulled by camels and oxen during his travel to Dasht-i Kipchak (Ibn Battuta, 2019, trans. Cevik, M., p.242). Researches by Andrews (2019) show that at the beginning of the twentieth century, Turkmens also had their tents carried by camels. They would fold the cage walls, put them on either side of the camel so as not to hinder its movement, and on top of that, they would put the roof ring. (Of course, this is the ring of an average-sized tent, the rings of very large tents are likely to have been carried by the car pulled by the animal, not by the riding animal itself.) Andrews gives the weight of this load as 245 kg (p.216). The tent's felt cover, door, and the rest of the load were loaded onto another camel, which averaged 220 kg. Since the camels had to go 16 hours a day, large weights were not loaded on one camel, but were shared among the camels.

The pattern of nomadic movements has remained constant throughout the history of the steppe (Krader, 1955, p.321). At the beginning of spring, steppe people take their flocks to the highlands to prepare for winter. Animals graze and calve on

the grass-sprinkled pastures throughout the spring. If a raid is to be made, it is arranged with horses that are strengthened by feeding with freshly sprinkled grass from the spring (Sinor, 1972, p.179). At the beginning of autumn, the offspring are grown, and they return to the winter quarters at a faster pace. Winter is a difficult season in the steppe due to the feeding difficulties of the animals and therefore, winter accommodation is vital for the steppe nomads. They are settled in mountain valleys and depressions in order to be protected from storms and to find enough grass (Taşağıl, 2021, p.42).

Krader (1955) gives examples of Kalmykian and Kazakh seasonal migration cycles. The Kalmyks living in the pastures in the north of the Caspian Sea used to walk 15-20 km a day on their way from the winter quarters to the summer camps. At the beginning of summer, the animals would slow down their speed to graze on; they would travel 10-15 km a day and reach the highlands. At the beginning of autumn, the animals were well fed, and the cubs born in the highland had grown so that they could travel faster, 25-40 km a day, and reach the winter quarters before the winter came (p.321).

The Kazakhs in the south of the Altai, on the other hand, used to leave the winter quarters in May, and it used to take them a 52 km road in 6 days (about 10 km per day). When were approaching the summer camps, they were slowing down for the animals to graze, cover the 30 km distance in three weeks, and were reaching the summer camps in July. After staying here for a month and a half, they would return to their winter quarters in the same way (p.322).

The basic food sources of the steppe nomads, whose economy was primarily based on animal husbandry, consisted mainly of animal food, as mentioned above

(Lebedynky, 2003, p.24). The most consumed meat was undoubtedly mutton, but it is also known that horse meat was eaten. In addition, the meat of the hunt animals was also eaten. Ibn Battuta wrote that the Turks did not eat bread (Ibn Battuta, 2019, trans. Çevik, M., p.243). Kurat (2019) informs that some nomads living on the steppes in the north of the Black Sea never ate bread, and they were afraid of eating bread because it was thought to be harmful to the body (p.104).

In this respect, it is understood that the pastoral nomads of the steppe consume more protein-containing food compared to the sedentary agricultural communities. However, due to the difficulties in storing animal food and possible drought and frost, animal herds are perished and therefore famines occur.

### 2.4. The Origins and the Development of the Pastoral Nomadism

In the nineteenth century, under the influence of Social Darwinism, nomadism was thought to be a social evolution step/stage that was more advanced than hunter-gatherer but more backward than agriculture. Nevertheless, in the late nineteenth century, it was thought that such a difficult task as the domestication of animals could only be accomplished in sedentary societies. Indeed, a breakthrough like the domestication of animals can only come about after a long trial and error process and technical know-how. At the very least, the necessary feed must be produced and stored to feed the animals to be domesticated. For this reason, it was emphasized that primitive agriculture developed before nomadism (Lattimore, 1951, p.59; Phillips, 1965, p.17; Di Cosmo, 2002, p.21).

The turning point in the emergence of the pastoral nomadic mode of production was the domestication of the horse, and thanks to the mobility of the horse,

the vastness of the Eurasian steppes ceased to be an obstacle for human societies (Barfield, 1993, p.133; Golden, 2011, p.10; Baumer, 2012, p. 84).

However, when and where the horse was first domesticated has been a matter of debate. Although wild cattle and tigers are frequently depicted on wall frescoes found in neolithic settlements such as Çatalhöyük in Anatolia, horses are not seen. The horse, which is more difficult to control because it can move faster than cattle and sheep, was undoubtedly domesticated later (Anthony, 2007, p.266).

It has been debated why people who had already domesticated cattle and sheep might have needed to domesticate the horse. David Anthony (2007) is of the view that the horse is considered 'an inexpensive source of meat suitable for winter rearing.' Accordingly, it was difficult for the Neolithic communities living in northern latitudes to raise cattle and sheep in winter conditions without forage storage, as cattle could not reach the grass under the snow cover and sheep could not break the ice that covered the pastures with the occasional freezing of snow. Horses that could break the ice with their hooves, thus drinking the water under the ice, scraping the snow cover with their hooves, and feeding on the grass underneath, could be raised regardless of summer or winter (p.266).

As a matter of fact, the area where the horse was first domesticated was not the Fertile Crescent in the Near East or the Yellow River basin in China, where Neolithic culture was born, but the Eurasian steppes located in more northern latitudes. The archaeological data reached point out to the Southern Russian steppes. The discovery of many horse skeletons in archaeological excavations in Dereivka was seen as evidence that the horse was probably domesticated in southern Russia around 4000 BC (Di Cosmo, 2002, p.25). Taşağıl (2021), on the other hand, is of the opinion that

the horse was domesticated in the steppes of Northern Kazakhstan around 3200 BC (p.56).

Domesticated so early, the horse was still being bred to help the agricultural economy. It is estimated that the horse was used as a pack animal in this region, as a counterpart to the cattle in Mesopotamia (Bacon, 1954, p.50). Therefore, the horse was not used as a riding animal for a long time after it was domesticated, and when it was moved from the Eurasian steppes to the Near East two thousand years later, horse-drawn units, not cavalry units, began to be seen in the armies of states such as the Sumerians, Hittites, and Assyrians (Phillips, 1965, p.43).

The invention of the wheel and chariots accelerated the transition to pastoral nomadism. Benefiting from the mobility provided by carts pulled by horses or cattle, some may have begun to adapt to a nomadic life. They may have left the sheltered environment of the river valleys and spread to the vastness of the steppe with their herds of animals (Barfield, 1993, p.133).

Although horses were ridden during this period, it is thought that early riders had limited equestrian skills. As can be seen from the pig bones found in the Dereivka settlement, a semi-nomadic life was still being led. At this time, the nomadic animal husbandry mode of production had not yet developed. People lived in permanent villages that they established along rivers flowing at the borders of the steppe. In Andronovo, which is one of the transition cultures from primitive sedentary to nomadism, the spread of sheep breeding and the shepherds' need to go to the highland as the number of sheep increased, it began to move from permanent settlements to portable nomadic tents (Yıldırım, 2020, p.196).

The first true riders that enabled advanced nomadism in the Eurasian steppes appeared probably in the middle of the second millennium BC (Khazanov, 2015, p.190; Barfield, 1993, p.132). There are several inventions that were milestones in the development of equestrianism. The first of these was the bridle, which allowed the rider to steer and stop the horse. Initially, organic materials such as wood or bone were used. In fact, with the use of bronze bits, which were invented for use in horse carriages, from 1200 BC, the dominance of the rider on the horse increased (Drews, 2004, p.74). Around 900 BC, the saddle was invented, which allowed the rider to have complete dominance over his animal, and also the bridle and the bit were developed, and thus the horse was now definitely used as a riding animal (Barfield, 1993, p.134). The last significant step in the development of equestrianism was the addition of stirrups to the saddle at the beginning of the fourth century, allowing the rider to move comfortably on the horse (Baumer, 2012, p.85).

While equestrian technology was being developed, the invention of another technology, mounted archery, in the ninth century BC, which allowed the nomadic warrior to shoot the enemy from afar, even while retreating, was a crucial turning point in the military history of the steppe. Thus, steppe nomads had a strong military force just at the time of their transition to a mobile economic system (Barfield, 1993, p.134).

Although horse riding accelerated the transition to pastoral nomadism, it is difficult to say that it made it necessary. According to Lattimore (1951), the separation of the nomadic economy and the settled economy began not with the development of horse riding, but with the differentiation of the use of the horse (p.58). Unlike barn-fed horses, hay was not collected for pasture-fed horses. This resulted in the need for more and more pastures as the number of horses increased, and the

society living in the steppe became more active. Initially, the distinction between the steppe and China was not very clear. Agriculture was also practiced in the steppe, and those living along the Yellow River in China were also raising animals. There is no information in the historical records that the peoples who flocked to China in ancient times were 'horsemen.' It is understood that the raiding people fought with the infantry units. From a certain point, it is seen that the horse riders are mentioned; according to Lattimore, this turning point is the fourth - third centuries BC (p.61).

According to Lattimore (1951), the transition from sedentary agriculture to the nomadic economy in the steppes of Mongolia took place in the following order:

1- The abandonment of the primitive agriculture-based economy on the banks of the rivers and transition to a steppe-like economy,

2- Ending the hoarding of grain and even straw, ensuring that animals are fed entirely from pastures,

3- Increased mobility as it was not possible to stay longer on depleted pastures,

4- Increased need for control over horses as herds move from pasture to pasture,

5- Development of horseback riding techniques; complete control of horse herds and facilitating control over herds thanks to horse riding (s.58).

According to Lattimore (1951), the equestrian steppe culture was not first invented by a single tribe and spread to the world. As this new technology was accepted by the many human communities living in isolation along the borders of the steppe, a common culture was formed (p.63). It is understood that the farmers on the borders of China, the forest hunters of Siberia, and the inhabitants of the steppe, who live and practice agriculture, switched to a completely nomadic life in order to benefit

from the Inner Eurasian pastures, and after a while, the cultural differences between them disappeared and they were united in animal husbandry nomadism (Barfield, 1993, p. .135).

Lattimore (1938) is of the opinion that the peoples speaking Ural-Altaic languages living in the Eurasian steppes today migrated from Siberia. According to this hypothesis, the wooden materials used in the ger tents show the forest origin of the people who set these tents, although such tents are perfectly adapted to the steppe conditions (p.9). Elizabeth Bacon (1954) also points out that the circular yurt tents are different from the Near Eastern nomad tents; she adds that cultural phenomena such as shamanism, haircut, and clothing style among Ural-Altaic language peoples also indicate the migration from Siberia to Inner Asia (p.49). Indeed, recent archaeological studies prove the Siberian-steppe ties.

### 2.5. Theories of State Formation in the Steppe

Although it is known that there are nomadic communities in various geographies of the world, the Inner Asian pastoral nomads have played an important role in history due to the vastness of the geography they live in, their expertise in horse riding, and being neighbors with great settled civilizations (Soucek, 2009, p.1). The most crucial point that makes the difference is the political organization of the Inner Asian pastoral nomads reaching the imperial level.

Kafesoğlu (2015), by utilizing the historical and social information obtained by the Orkhon Inscriptions, listed the layers that make up the steppe social structure from bottom to top as Ogush (Family) / Urug (Family union) / Bod (Tribe) / Bodun (Tribal union) / Il (State, empire) (p. 219). Accordingly, the family as a self-sufficient social unit is the basis of the pastoral nomadic steppe society. The fact that the family

is the smallest unit is common in many social orders. However, when the hierarchical structure is examined, it is seen that the Eurasian pastoral nomadic society system differs from the sedentary agricultural societies not only in economic but also in sociologic aspect. The mode of production based on animal husbandry has led to the necessity for people to live dispersed in the steppe, therefore a looser organization has emerged compared to sedentary agricultural societies. The inability to feed animals above the carrying capacity of the pastures in the steppe made it impossible for large groups to live together. (Sinor, 1972, p.180; Eberhard, 1995, p.163; Golden, 2017, p.22). Therefore, pastoral nomadic families sharing the same pasture and living together are mostly not populous (Taşağıl, 2021, p.51).

The basis of unity is not living together in a certain region or city, but blood ties. This blood ties forms the ‘urug’, which is translated as the union of families, and the union of the urugs creates the ‘boy’ (lit.tribe), which is also an organization based on ancestry.

According to the research conducted by William Irons (2019) on Yomut Turkmens living in the northeast of Iran at the beginning of the twentieth century, the smallest settlement of nomads is called 'oba'. It is a limited piece of territory where the members of the oba family group can set up camp and graze their animals, while those other than the oba can perform the same activities only with the permission of the people living here. The union formed by the tribes to reconcile and recognize the rights on each other's lands and to solve the common problems was called the 'il'; however, Irons emphasizes that both the 'oba's to the 'il's and the 'il's are loosely connected to each other (p.56).

Political formations that are only loosely connected to each other under natural conditions and whose economies are introverted can unite to create larger organizations. As a matter of fact, the tribes unite under certain conditions and form the political organization in the form of the union of tribes called 'bodun'. This federative structure is evident in some bodun names. It is generally accepted that the word 'Oguz' is formed from the suffixes 'ok' and 'uz' and means 'tribes' (Golden, 2017, p.217). The names of the bodun, which indicate the number of founding elements in the form of "Nine Oghuzes, "Ten Arrows", also point to this unified, federative structure (Kafesoğlu, 2015, p.222). The main tribe, which generally organizes the bodun, gives its name to this federation of tribes (Giraud, 2007, p.87).

Taşağıl (2021) draws attention to the fact that the 'boys' (tribes) continued their existence despite the disappearance of the states and dynasties in the Inner Asian and Turkic history (p.15). Although the peoples speaking Inner Asian languages such as Turkish and Mongolian continued their existence, the fact that the tribes persisted in their political structures facilitated the establishment and collapse of states by creating centrifugal forces.

Kradin (2002) based the fact that decentralization is inevitable in the steppe and that steppe states based on pastoral nomadic economy were so easy to establish and collapse for the following reasons:

1. Economic independence of the tribes from the center,

2. The main power sources (incursions, division of the booty, foreign trade) were unstable and depended on developments in the non-steppe world.

3. The general armament (all steppe people are horse riders and good archers) made it difficult to subjugate by force against the affiliated tribes.

4. The tribes that were disturbed by the ruler’s/kaghan's policy,

- could migrate to other parts of the steppe by leaving their pastures due to the mobility provided by horse riding,

- could leave the confederation by cooperating with an agrarian-established state,

- had the opportunity to overthrow and replace the tribe which they were subjugated to. (p.375).

It is a debated issue that this federative structure, which is not seen in sedentary agricultural societies and arises from the geographical conditions of the Inner Asian steppe, has been carried to other parts of Eurasia by migrations from the steppe. Hyun Kim Jim (2020) hypothesized that the Huns carried the medieval feudalism and even the strong dynastic tradition based on sacred origins as a source of legitimacy from Inner Asia to Europe (p. 157-159).

According to Kafesoğlu (2015), the state in the Eurasian steppes arose from the close cooperation between the 'bodun', which are tribal unions (p.61). The reasons for bringing these 'bodun' together are being debated. Various theories explain why 'bodun' living independently of each other in natural conditions unite to form an 'il,' in other words, the state.

Most of the information about the steppe states is mainly obtained from what historians of the surrounding settled civilizations wrote about steppe nomads, such as China, Rome/Eastern Rome, Russia, Iran/Islamic world, and India. Therefore, theories have been developed that deal with state formation in the steppe in the context of the steppe's relations with settled civilizations. The common feature of these theories is

that they consider the history of nomadic and settled agriculturalists in terms of interdependence (Rogers, 2012, pp.214-215).

Sencer Divitçioğlu (2000) suggested the definition of 'stepocracy' for the political structure specific to the steppe. Divitçioğlu examined the conditions necessary for the establishment of the steppe empire, which he called 'stepocracy', in six stages:

1. Existence of a particular nomadic tribe uniting other tribes into a confederation.

2. The ruling tribe's usurpation of wealth from subordinates, establishment of a tax-tribute relationship.

3. Lack of self-sufficient economic structures to support the member tribes of the federation.

4. Possession of a sufficient amount of horses and a united nomadic army that enables the raids to realize the capital transfer from sedentary neighbors.

5. The distance of the headquarters of the ruling tribe from the neighboring sedentary state. In this way, military attacks against the steppe state would have been prevented. Also, the dispersed situation of the oasis kingdoms that prevent them to resist nomadic attacks, and on the contrary, the need of the protection of the steppe state against marauders.

6. The higher cost of the army to be established by the sedentary Chinese state to prevent nomadic raids than the damage that these raids (s.232).

Thomas Barfield (2009) discussed the steppe states in the context of their relations with China in his work called 'Perilous Frontier.' According to him, the history of the steppe empires established on the Mongolian Plateau is synchronized

with the political history of China. According to this hypothesis, pastoral nomadic tribes did not aim to conquer China until the Mongols and Manchus but to acquire the riches of China through raids. For this reason, the existence of powerful dynasties that ensured prosperity in China was also necessary for the steppe empire, which chose to benefit from them in the raid-tribute relationship. As stability was established in China, powerful nomadic states were established in the steppe, and when the stability in China deteriorated, fragmentation began in the steppe (p.16-26).

Barfield's theory considers the pastoral nomadic polities of the steppe to be parasitic (p.20). On the other hand, there are studies suggesting that it will be possible to prove the opposite of this hypothesis. Drompp (2005) opposed this theory and gave the Türk example (p.102). According to him, the Xiongnu Empire, which ruled from 209 BC to 155 AD, was synchronized with the Qin-Han dynasties, which ruled China from 221 BC to 220 AD, and indeed was an important period of prosperity for China; but there are 37 years between the establishment of the Türk Khanate (552) and the Sui dynasty's unification of China (589). Moreover, contrary to Barfield's theory, the Türk Khaganate was established and strengthened in a period when China was divided, and weakened after Sui Wendi achieved Chinese unity. After the Tang domination was established over all of China, firstly the Eastern and then the Western Türk khaganates collapsed and came under Chinese rule. In addition, the importance given to the Silk Road trade and the relations of the Türk Khaganate with the Eastern Roman and Sasanian empires reveal that the prototype of a steppe empire focused solely on the goal of 'seizing the wealth produced by China' is incompatible with historical facts (p.104).

Radloff (1956), who lived among the Kazakhs for a while, observed that the Kazakhs roamed the steppe 'in total freedom' and did not try to unite as a force or to

form an orderly state (p.421). According to Radloff, it was the pressure of a common enemy or common interest that united various steppe groups and tribes. The expression 'common interest' here means that either the neighbors of the tribes were better off than they were or the nomadic tribes were in a state of severe poverty. However, he wrote that for two hundred years, since there was no external enemy threatening the Kazakhs or an economic unbalance that caused conflict with their neighbors, each tribe was accustomed to living in isolation on their own pastures (p.422).

Akdes Nimet Kurat (2016) confirms Radloff with his writings on the Pechenegs. According to Kurat, the basis of the strong bond of solidarity among the tribes living in the steppes was the feeling of hostility towards foreign peoples. The fear of foreigners attacking and expelling them from their homeland or usurping their flocks at any moment tied all steppe nomads tightly to the tribes they belonged to (p.89).

Peter Golden (2017) also writes that the sense of belonging in the steppe was oriented towards tribes (p.23), and conflicts occurred between tribes due to the problem of grazing land. According to Golden, it was the desire to exploit the non-steppe world or the threat from the same outside world that brought these tribes together. This external pressure in the form of desire or threat accelerated the process of statehood, and when this pressure disappeared, the central authority quickly weakened (p.27).

According to Barthold (2017), who also referred to Radloff's observations mentioned above, the conventional pastoral nomadic life in the Inner Asian steppes did not require a political organization. Living under the tribal structure in natural

conditions provided sufficient contentment for the pastoral nomads of the steppe. The unification of an entire tribe, or even a few tribes, by a founding military leader, in other words, the establishment of a state was taking place under only extraordinary conditions. At this point, Barthold states that the authority and personal qualities of the founding leader (khagan, etc.) were substantial and that the tribes either joined the newly established state without any serious resistance or they fought for a long time (p.5-6).

Di Cosmo's (1999) approach has parallels with Barthold. According to him, the state formation in the steppes is not the result of a natural evolution or an event that occurs in response to the state development in agricultural societies, but the response of the nomadic communities living in the steppes to the crisis situation they are in (p.14). According to this point of view, every time an empire emerges in the Eurasian steppes, a chain of events occurs where violence and turmoil gradually increase in the central region from which the state arises.

If the crisis is deep enough and a considerable number of people are affected by it, it can lead to the formation of alternative political power centers that are opposed to the existing tribal aristocracy. Although not all crises inevitably lead to the formation of states, serious crises are often encountered before the formation of states (Di Cosmo, 1999, p.16).

According to Di Cosmo (1999), although nomads have been accustomed to using weapons since childhood, it is not true that they were in constant warfare. Armed conflicts usually consisted of small raids and small-scale struggles of neighboring tribes. Nevertheless, crisis situations required each man to be a professional soldier to fight against either other hostile nomadic communities or

settled societies. Although many men already had military experience as they participated in activities such as hunting, protection of the tribe, and raiding, conflicts were limited except in crisis situations. But in times of crisis, war became a regular and professional activity for the vast majority of the male population (p.17).

In our opinion, Di Cosmo's 'state of crisis' theory, when combined with Radloff's observations on Kazakhs, can explain the establishment of great steppe empires based on pastoral nomadic economies in Mongolia. As mentioned in the previous chapters, the geography of Mongolia is an area of high pressure at an average elevation of 1600 meters above sea level, and besides the low annual precipitation, drought and yud events in the region are more severe. However, in the western steppes, especially in the southern Russian steppes, water resources are more abundant and the climate is more humid. It can be emphasized that the steppe-based states established in these regions were semi-nomadic, while the tribes did not choose to found a 'confederation of tribes,' thus a state. For instance, the Pechenegs, confirming Radloff, Barthold, and Di Cosmo, each had to organize tribes under their own leaders and did not establish a state, but these tribes came together only in times of war (Taşağıl 2014, p.289). Particularly, sudden climate crises confirm Di Cosmo's 'state of crisis' theory.

When the information on the geography, climatic characteristics, and the vegetation of the steppe, the characteristics of pastoral nomadism, the dependence of the economic structure on the existence of animals, the decentralized and confederative structure of the states established in the steppe, are evaluated together with Di Cosmo's 'state of crisis' theory, it can be concluded that the steppe societies are affected by the climate crisis more severely than agricultural societies. The climate crisis, which caused a major demographic crisis in the Eastern Roman Empire during

the Late Antique Little Ice Age, but did not cause it to collapse, may have facilitated the collapse of the Rouran Khanate, which was a nomadic steppe confederation, and the establishment of the Türk Khaganate, for the same reasons we have mentioned above. The continuation of the climate crisis during the sixth and seventh centuries must have also caused the deepening of the internal political crises of the Türk Khaganate.

# 3. CLIMATE CRISES DURING THE HISTORY OF THE TÜRK KHAGANATE

## 3.1. The Impact of the Climate Crisis on the Establishment of the Türk Khaganate

### 3.1.1. The Impact of the 536-545 Climate Crisis on the Türks' Appearance on the Stage of History

The ancestors of the Türks, according to Zhou-shu 周書, were originated in the country of Sou which was located in the north of the Xiongnu (ZS 50, p.908). According to Sui-shu 隋書, they lost a battle against Taiwu, the Tuoba Wei ruler who reigned between 424-452, and settled on the foothills of the Altai Mountains as a group of 500 tents to serve as blacksmiths for Rourans (SS 84, p.1863). Taşağıl (2019) states that the connection of the Türks with the Chu-chu family from Ping-liang is a rumor (p.16). It has been emphasized that the Altai Mountain region is not the first homeland of the Türks (Golden, 2017, p.135). Nevertheless, the emphasis on the foothills of the Altai Mountains, where the ancestors of the Türks settled, is significant. Then, when the legendary tales about the ‘mother wolf’ of the Türks, which are also mentioned in these sources, are examined, we once again encounter that the Ashina tribe settled in the northwest of Kao-chang. In addition, when the archaeological information is examined, it is revealed that the southern skirts of the Altai Mountains have been home to the Türks for 450 years (Taşağıl, 2019, p.12).

The first information about the Türks in Chinese sources is this expression in Tongdian: '後魏末，其酋帥土門，部落稍盛，始至塞上通中國 - at the end of the

Late Wei period, the tribe of chieftain Tumen [Bumin] gradually increased its power, reached the cities, established connection with China' (TD 197 2a, p.5402).

Although the expression '突厥 Türk' is not mentioned here, the sentence is written in the beginning of the chapter about the Türks of Tongdian. The Gray Wolf legend is placed before this sentence, and the Türk - Rouran relations are explained after. Liu Mau-Tsai (2019) states the date 534 in parentheses next to the phrase 'at the end of the Late Wei period' (p.16). Indeed, in 534, the Wei 魏 dynasty split into two, and the Eastern and Western Wei states emerged (Balcı, 2021, p.171).

If we accept Liu's proposition as accurate, at around 534, Bumin 𐰉𐰺𐰚𐰇 (Chinese: Tumen 土門) was the head of the Ashina clan. According to the expression '其後曰土門，部落稍盛，始至塞上市繒絮，願通中國' in the ‘突厥 Türks’ chapter of Zhou Shu, the increasingly powerful tribe of Bumin was initially arrive in the markets on the Chinese border to buy silk, and he wanted to establish (commercial) contact with China (ZS 50, p.907). Klyashtorny (2018) speculates that, since China's border with the steppe is the shores of the Yellow River, the Türks first arrived in the Yellow River region peacefully and probably exchanged their horses for silk and grain (p.116).

The second appearance of the Türks in Chinese chronicles is in 542, eight years later. This was also the first date when the name '突厥 Tu-jue/Türk' appeared definitively (Taşağıl, 2019, p.18). However, instead of the peaceful silk-trading tribe of Bumin here, this time a different Türk image is portrayed, crossing the Yellow River and raiding North China. This information is in the biography of Yuwen Ce 宇文測, the duke of Guangquan in Zhou-shu 周書. Accordingly, '每歲河冰合後, 突厥

即來寇掠, 先是常預遣居民入城堡以避之- Türks [crosses south by taking advantage of this freezing] every year when the river [Yellow River] is frozen/covered with ice, and they were plundering everywhere' (ZS 27, p.454). According to the text, the raids could not be stopped, and the people living in the region took refuge in the castles to not be harmed by the Türk raids. Yuwen Ce, who was appointed as the governor of the province, placed dry woods and guards in various places in order to return the region to its safe state before the Türk raids and set the woods on fire when the Türk troops approached. The Türks, who thought that a large army was approaching, retreated in a hurry, leaving behind their herd animals and significant weights, and did not raid this region again (ZS 27, p.454).

Some conclusions can be drawn from these two pieces of information in years 534 and 542. The Türks were initially portrayed as traders who came to the Chinese border to trade in silk, not as the usual raiders. In their second appearance, commerce was replaced by flock. Of course, this record does not mean that the Türks did not continue the silk trade in other regions, but it is obvious that a more aggressive policy was adopted toward northern China. During this period, the Türk military force was too small to be stopped by armed force and required to resort to deception, and on the other hand, it was too small to retreat, thinking that a large army was approaching; in any case, it is not as big as the Türk armies of the later times (Taşağıl, 2019, p.19). In addition, as understood from the text, these raids were repeated for a few years before 542.

However, the real question here is why the Türks started raiding instead of continuing to deal with trade alone. Klyashtorny (2018) attributes this policy change to the hypothesis that 'the border guards in North China were not encouraging this trade but obstructing the Türks' (p.117). However, there is no such expression in the

parts of Chinese chronicles recounting this period. Ganiev (2014), on the other hand, explains this difference by tying it to the climate change experienced between the years 534-542 (p.5).

The previous chapters reveal that there have been at least one or possibly several volcanic activities, although the locations have not yet been determined. In the intervening eight years, a climate crisis has been experienced, as confirmed by the data obtained from ice cores, tree rings, and testimonies of the period, such as the records of Procopius. The way in which the Türks and the Türk raids in 542 are mentioned in Chinese texts also reveals the cooling experienced. In the biography of Yuwen Ce, the factor facilitating the Türk raids is narrated as the "freezing of the Yellow River during the winter seasons for several years." This situation, which has not been seen before in the chapters on Türks in Chinese sources, must indicate a cooling that resulted from the 536 crisis. Liu Mau-Tsai (2019) states that the Lien Valley, where the Türks raided, was near Shenmu in the north of modern-day Shaanxi province (p.47).

It can also be emphasized that the Türks were not the only steppe community that raided North China in those years. Since the beginning of their history, the Rourans had struggled with the Xiongnu-originated Tuoba Wei dynasty (Tabgachs) and raided North China in large numbers (Sinor, 1990b, p.293; Rogers, 2012, p.224). Although the good relations that Anagui temporarily established with both Western and Eastern Wei states after the dissolution of the Tuoba Wei State in 534, Bei Shi writes that after 538, Anagui organized many plundering expeditions against both Tabgach states (Yıldırım, 2015, p.48).

After 536, the raids of the Tuyuhuns towards the Western Tabgaç State intensified. In fact, in 542, just like the Türk raids in the same year, the Tuyuhun raids were forced to retreat with the measures taken by the Eastern Tabgach military governor. (Tok, 2021, p.78). From this, it can be concluded that the raids were not regular, and the Tuyuhun troops were not in great numbers.

Therefore, it is understood that after 536, steppe tribes made small-scale but continuous raids to the north of China. While it is not unusual for steppe people to raid China, this intensification, as the pieces of information given by the chronicles make apparent, may have been due to the climate crisis.

### 3.1.2. Climate Impact on the Fall of the Rouran Khaganate

Between 534, when information about the Türks first appeared, and 542, when they were mentioned for the second time, a great famine perished thousands of peasants in Northern China (Newfield, 2018, p.470). In the same period, Tabgach State was divided into two as Western and Eastern Wei dynasties due to a civil war. While the Rouran khagan Anagui initially had good relations with the Western Wei State, he decided to establish kinship relations with the Eastern Wei afterward.

Yuwen Tai 宇文泰 (also called Heita 黑獺, lit. 'Black Otter'), of Xianbei origin, who had great power and influence as the prime minister of the Western Wei State, which had a great struggle against the Rouran Khaganate, initially offered an alliance to the Rouran Khagan Anagui. However, upon Anagui's alliance with the Eastern Wei, he decreed that he should cooperate with another power in the steppe. Although he also thought of getting closer with the Toles (Tiele 鐵勒 or Tegreg) tribes, the Toles tribe union is a very scattered power, and as a result of the unsuccessful attempts of rebellion against the Rourans, some Toles leaders took refuge in the Eastern Wei

capital (Klyaştorny, 2018, p.117). Eventually, Yuwen Tai decided to contact the Türk chief Bumin in 545. The messenger that he chose for this task was Annopantuo 安諾槃陁, a Sogdian from Qiuquan (ZS 50, p.908).

It is not likely to be a coincidence that Yuwen Tai chose an emissary of Sogdian origin to contact the Türks. Masao Mori (2020), based on the prediction of the Western Wei that it would be easier to establish relations with the Türks by sending an ambassador of Sogdian origin; he inferred that even in that early period, there were Sogdians around Bumin, and Turkish-Sogdian cooperation existed from the beginning of the Türk Khaganate (p.133).

It is reported that the Western Wei ambassador Annopantuo was greeted with joy at the Türk headquarters, which was still at the foot of the Altai Mountains. According to Zhou-shu, the Türks rejoiced by saying '今大國使至, 'The ambassador of a great state has come, our country will develop.' (ZS 50, p.908). Of course, this meant diplomatic recognition for the Ashina tribe. The following year (in 546), Bumin confirmed his cooperation with the Western Wei by sending an ambassador accompanied by some gifts from the steppe.

It appears that establishing diplomatic relations with the Western Wei encouraged Bumin. Just as the Eastern Wei-Türk connection was established, the Töles tribes were preparing to revolt against their Rouran rulers. Bumin defeated the still scattered Töles forces by making a sudden attack (Chavannes, 1903, p.222). According to Gumilev (2008), the Töles, who were shaken by this unexpected attack, did not see any harm in uniting with the forces of Bumin, since their goal was not to challenge the Türks, but the Rourans (p.34). As a matter of fact, after the raid, the Töles tribes recognized the superiority of Bumin and joined the Türks.

In fact, the expression '鐵勒 Tiele - Töles tribes' should be understood as the group of tribes stretching from the Kherlen River in the east to the Caspian Sea in the west (Taşağıl, 2020, p.60). However, it is not difficult to guess that not all Toles tribes participated in the revolt movement against the Rourans. Ögel (1957) is of the opinion that the Toles marching on Rourans came from the Tarbagatay Mountains, and Bumin, located on the foothills of Altai on the road between Tarbagatay and Gobi, interfered with this march. According to Taşağıl (2021), the Töles who participated in the revolt are likely to be the tribes around the Tola River and south of Lake Baikal (p.21).

In Zhoushu, it is reported that the number of Töles who participated in the revolt with the expression '五萬餘落' is over 50,000' (ZS 50, p.908). Although it is not apparent what is meant by the number '五萬 -50,000' here, it is possible to understand that '50,000 families' or '50,000 people' are meant by this expression (Taşağıl, 2019, p.21). The population of the revolting Töles, which can be considered significant in steppe conditions, undoubtedly means a sudden and extraordinary growth of the military power under Bumin's command. For this reason, Taşağıl (2019) considers the victory over the Toles as a turning point in the Türk history (p.21).

As the number of his supporters increased by now, Bumin thought that he could make bolder moves against Rourans and requested to establish kinship with the khagan Anagui by marrying his daughter. According to Chavannes (1903), Bumin's request can be taken as 'as a seek of reward for suppressing the Töles revolt against the Rourans' (p.222). In any case, this demand reveals that the Türks began to see themselves as equivalent to Rourans. Enraged, Anagui asked Bumin through his envoy, '爾是我鍛奴，何敢發是言也? - You are our blacksmith slave; how dare you speak like that?' Bumin, who was very angry with this reply, had the Anagui's

ambassador killed; then sent an envoy to Chang'an to convey his request to establish a marriage bond with the ruler of Western Wei (ZS 50, p.908).

Already seeking allies against the Northern Qi State (which had replaced the Eastern Wei State with a dynastic coup in 550 BC) and the Rourans, and having established diplomatic ties with the Türks five years ago, the Western Wei state accepted Bumin's request and sent the Chang-luo princess. As a gesture of gratitude, the following year, Bumin sent 200 horses to condolences on the death of the Western Wei emperor Wei Wendi 魏文帝 (ZS, p.908).

Due to the scarcity of information in the sources, the current status of the Rourans is difficult to predict. Convinced, however, that he was strong enough with the participation of Töles and the Western Wei alliance, Bumin attacked the Rourans in the spring of 552. In the battle to the north of Huai-huang 懷荒, the Rourans were decisively defeated and Anagui committed suicide on the battlefield, and the remaining Rourans took refuge in the Northern Qi State (ZS 50, p.909).

The Battle of Huai-huang 懷荒 in 552, which historical chronicles do not provide detailed information about, is in our opinion one of the most decisive and crucial battles in Turkic history. As a result of the battle, the Rouran khagan committed suicide, the ruling clan had to take refuge in the State of Qi, and the steppe confederation that the Rourans had managed to maintain for nearly 200 years was definitively dissolved. On the other hand, Bumin took the title of 'Il (or illig) Khagan' (Chinese: Yili Kehan 伊利可汗) and established dominance in the Eurasian steppes, during the reign of his successor Mukan Khan, the Türk Khanagate became a nomadic empire that stretches from the Caspian to the Pacific Ocean and united all the nomadic

steppe tribes of Eurasia. became an empire. Considering that the Türks were the first state in history to bear the name "Turk", the importance of this victory is evident.

In our opinion, in order to understand the reasons for the defeat of Rouran, it would be helpful to speculate about how the parties based on the pastoral nomadic mode of production were affected by the global climate crisis 536-545.

As the sources reveal, between these years (534-552), the Türks lived in the forest steppes with abundant water resources on the southeastern foothills of the Altai Mountains. Ögel (1957) discussed the possibility that the Türks were seasonally migrating between the Khangai Mountains and the city of Hami (p.117). However, it is debatable to what extent the Türks were leading a pastoral nomadic lifestyle during this period. Thierry (2010) argues that the Türks were 'semi-sedentarized' in this region. According to this hypothesis, the blacksmithing activity, the supply of materials such as wood and coal for iron production, and the permanent control of the workers in this business make it inevitable to conclude that the Turks were at least partially sedentarized (p.60).

It was stated that the Töles tribes who joined Bumin were probably mainly the tribes living around the Tola River, south of Lake Baikal and north of the Tengri Mountains. The common feature of these areas is that they are regions with dense forest steppes and possess more water resources than grassland steppes.

We have demonsrated in the previous chapters that the proportion of cattle is higher in regions with abundant water resources. Therefore, we can deduce that both Türks and Töles, who joined the Türks had more cattle when the 536-540 climate crisis occurred.

The area where Rourans lived between 534-552 is controversial. According to Ögel (1957), although the Orkhon Valley is under the rule of Rourans, there is no record of them living there. According to the expression in Wei-shu: 'they constantly congregate in the north of Dunhuang and Changye', it can be concluded that the center of gravity of the Rouran Khaganate was near the Chinese border (p.118). The mentioned regions are between the Gobi Desert and the Yellow River basin. In this case, it is possible to think that the ruler tribes of Rourans mainly lived in grassland and semi-desert steppes.

Kradin (2005) also gives the information that Rourans were spread to various steppes in Mongolia in the summer, and in the winter they moved to the semi-desert steppes south of the Gobi Desert; they were dispersed into the valleys of the Khentii and Khangai Mountains, and during climate crises such as drought and zud, they used to leave behind their cattle herds and carts (p.150).

When we compare the economic situation of the two sides, it is evident that the proportion of cattle in herds of both Türks and Töles tribes was higher during the climate crisis between 534-545, since they mainly were located in the forest steppes with abundant water sources of the Altai, Tengri, Tarbagatay, and the Tola Valley regions. In addition, partial agriculture was carried out in these areas. On the other hand, the ratio of sheep in herds of Rourans, who predominantly lived on grassland steppes, must have been higher than Türks and Töles tribes. In any case, the economy of the Türks in 534-545 must have been more diverse compared to the Rourans living around the Gobi. Therefore, we suppose that the leading tribes of the Rourans were more heavily affected by the zud and drought events between the years 534 and 545, compared to the Türks.

Though, under Anagui's leadership in the 540s, the power of Rourans seemed irresistible. According to Bei Shi, the strengthening of the Rourans was partly due to the dissolution of the Tabgach State, its loss of power due to the civil war, and the inability to raise an army against the steppe (Yıldırım, 2015, p.49). We can add the fact that the climate crisis between the years 534-and 545 affected not only the steppe but also China.

According to David Keys (2000), the drought caused by the climate crisis between 536 and 545 must have caused significant damage to the horse and sheep herds, thus causing more damage to Rourans than Türks, who were supposed to have more cattle (p.30). This hypothesis agrees with the information we have presented above (the ratio of animal species in the steppes where Türks, Töles tribes, and Rourans lived, the impact of zud and drought on the different types of animal herds, etc.). In addition, we should not ignore the fact that the Türks had the whole Töles power with them this time. Before the battle at Huang-huai, Anagui's power was greatly diminished.

It is evident that the impact of the climate crisis cannot be the only reason for the collapse of the Rourans and the victory of the Türks. The internal crisis of Tabgaç, the support of the Western Wei statesman Yuwen Tai, the relations that seem to have been established between the Sogds and the Türks, the superiority of arms provided by the blacksmithing, and the diplomatic moves of Bumin are various issues that are supposed to have facilitated the Türk success. Masao Mori (2019), for instance, argues that the Türks defeated the Rourans thanks to the weapons they produced from iron (p.30). Gumilev (2008) is of the opinion that Bumin's marriage to the princess Chang-luo, daughter of emperor Wendi, gave him legitimacy and increased the authority of the Türks over other nomadic tribes (p.36). Here, we have also revealed

that the 536-545 climate crisis, in addition to all these factors, constitutes an accelerating background.

## 3.2. The Impact of the Climate Crisis in the Türk Civil War

### 3.2.1. The Effect of Climate in the Ascension Period of the Türk Khaganate

It is understood that Bumin Khagan died shortly after the end of the Rouran rule in 552 and the establishment of a new steppe confederation. Even in this short period of time, the political structure of the Türk Khaganate was formed.

After Bumin, firstly Kara, and after his death, Mukan 𐱃𐰇𐰾 Khagan (Chinese: Mugan Kehan 木桿可汗 or Muhan Kehan 木汗可汗 also called Qijin 俟斤) came to power. It took him about twenty years between 553-572 to unite all the nomadic-nomadic communities in Inner Asia under the rule of the Ashina tribe (ZS 50, s.909).

The first significant achievement of the Mukan period was the decisive destruction of the danger arising from the Rouran power, whose remnants had taken refuge in the Northern Qi State. For this reason, Mukan Khan first maintained a friendly relationship with the Western Tabgach State. Although he tried to solve the Rouran problem diplomatically with Northern Qi, as the support did not cease, he began a raid campaign against this state. The remnants of the Rouran dynasty took refuge in the Western Tabgach State after this attack, but the emperor Wei Gongdi 魏恭帝, who had close relations with the Türks since the beginning, handed over all the Rourans to the Türks at the request of Mukan. With the murder of as many as three thousand Rourans over the age of 16 in front of the Qing-men's gate in Chang'an, the

possibility of this state getting back on its feet has ceased as of 555 (Taşağıl, 2009, p.25).

In the same year, it is seen that the Türk forces embarked on great conquests all over Inner Asia. While an expedition was organized against the Khitans 契丹 of Xianbei 鮮卑 origin in the east and they were forced to join the Türks, at the same time, the Kyrgyz people of the north of Lake Baikal obeyed Mukan of their own accord. In addition, the Proto-Mongol Kumoxi 庫莫奚 and Shiwei 室韋 tribes who live in the west of the Khitans were also attached to the Türks. Thus, the Türk dominance was assured both in the east of the Mongolian plateau and in Southern Siberia. Again in the same year, the battles with the Akhun State, which held the oasis cities on the Silk Road in Western Turkestan, resulted in the Türk victory. The following year, an expedition was launched on the Tuyuhuns, passing through the Western Tabgach territory.

While these developments took place in the eastern part of Inner Asia, in the west, Istemi Yabgu agreed with the Sasanian Shahinshah Khosrow Anushirvan to organize a joint attack against the Akhuns and to share the Akhun territory between the two states. Thus, in 557, the Sassanids attacked from the west, and the Türks from the northeast defeated the Akhuns; moreover, the Oxus river became the natural border between the two empires. The control of the silk trade between the East-West and the oasis cities in Sogdiana, Fergana Valley, and Tarim basin passed to the Türks (Beckwith, 2009, p.115).

Thus, within five years after Mukan Kagan ascended the throne, he had succeeded to unite all of the nomadic steppe tribes speaking Turkish, proto-Mongol, and proto-Manchu languages in Inner Asia to the Türk Khaganate, and the Silk Road

became an internal trade route after the collapse of the Akhun State in 557 (Taşağıl, 2019, p.33). Thus, the Khaganate had reached the status of a world empire. According to Drompp (1989), before the Mongols, the Türk Khaganate became the first steppe empire that managed to dominate the entire Eurasian steppe, which Grønbech classified as three regions from west to east (South Russia, Central Asia, Central Asia) (p.138). ). Sinor and Klyashtorny (1996) emphasized that, for the first time in history, a nomadic empire shared borders with three great settled civilizations (Rome, Iran, China) when the Türk Khaganate became the dominant power in Inner Asia. Kradin (2002) similarly underlines that the Türks succeeded in establishing the first steppe empire across Eurasia (p.381).

The strengthening of the Türk Khaganate has also changed the situation in relations with China. It was not the Türks who wanted to establish kinship bonds anymore, but the Chinese states. Although he did not agree at first, Mukan agreed to send his daughter, the princess Ashina (Chinese: Ashina Huanghou 阿史那皇后), a bride to the State of Zhou in 568 after a snowstorm (to be mentioned later) affected him. With this marriage bond, a permanent garrison was established in Chang'an where more than a thousand Türks lived, and the Zhou State also sent one hundred thousand balls of silk annually.

The Türk Khaganate maintained its power during the reign of Taspar 𐱅𐰇𐰼𐰰 Khagan (or Tatpar Khagan, Chinese: Tuobo Kehan 佗缽可汗), who ascended the throne after Mukan Khagan died in 572. According to Suishu, the rulers of the Northern Zhou and Qi states feared the hundred thousand soldiers under Taspar; competed to establish good relations with the Ashina dynasty; they were trying to flatter the Türks by emptying all that was of priceless value in their treasury. Taspar

Khagan was also saying, "但使我在南兩箇兒孝順，何憂無物邪 - Do I need to be worried as long as my two sons in the south continue to be respectful and obedient to me?" (ZS 50, p.911).

In general terms, it is evident that the 30 years between 552-581 was the period of prosperity for Türks.The rise of the newly-established khaganate can be explained by several reasons. First of all, in this period, the khagans succeeded in connecting all the tribes in Inner Asia to the khanagate. The fact that there were two separate states in northern China, and the constant conflict between them, was in favor of the Türks. Thus, both states could be kept under constant pressure. The mutually beneficial (symbiotic) relations with the Sogdians and the Türk monopoly of the silk trade also facilitated the enrichment of both wings (West and East) of the state.

On the other hand, it is possible to observe that the world climate started to emerge from the crisis that commenced in 536.

There is no record of drought or zud events in this period in Chinese sources. However, there is some evidence that the period was a 'Little Ice Age.'

At the beginning of the spring of 564, the Türk-Zhou joint forces attacked the State of Qi and besieged Qinyang. However, it had snowed for days during this time, and an area of 567 km2 was covered with one-meter thick snow. Due to the thickness of the snow, the two Chinese armies could not fight in the open field. As the Zhou army approached the Qinyang walls, the Qi troops came out and defeated the Zhou. This time, on his return, Mukan Khagan organized a massive loot, and on the way back, as the Yellow River was completely frozen, they laid felt rugs to prevent slipping while passing over it. Although the Türks benefited from these raids, their

horses were exhausted, and they had to march in groups with infantry (Taşağıl, 2019, p.30).

In the second month of 568, while Mukan Khagan was negotiating with the envoys from the Zhou State, a ten-day snowstorm started, and all the tents in the camp were destroyed. Mukan thought of this unusual situation as a punishment from Heaven for not keeping his word and accepted his daughter's marriage to the Zhou State. The Türks wanted the convoy accompanying the Ashina princess to slow down, citing that their horses were fatigued, while the Zhou envoy thought that the Türks would refrain from sending the princess (ZS 9, p.144).

In our opinion, both events during the Mukan Kagan period and the information obtained from tree rings and ice cores demonstrate that the whole period was colder than today. Although the entire period was a period of cooling, it is understood that the phenomenon that directly affected the lives of the steppe tribes was not the cooling itself but the sudden climate crises triggered by factors such as volcanic eruptions.

### 3.2.2. The Impact of the 581-583 Climate Crisis on the Disintegration of the Türk Khaganate

The year 581, when Taspar Khan died, was the year when the problems began to accumulate for the Türk Khaganate. Taspar had willed Daluobian 大邏便 to succeed him on the throne. However, since Daluobian's mother was of foreign origin, the Türk state council determined Taspar's son Anluo 庵邏 to ascend to the throne. When the discussions failed to resolve, Kara Khagan's son Shetu 摄图 supported An-luo and Anluo became the khagan.

However, Daluobian, who thought he was treated unfairly, got enraged, and because he did not recognize Anluo's leadership, and thus internal order could not be maintained in the khanagate. Thereupon, the state assembly had to convene again, removed Anluo from his post and decided that Shetu should be the khagan. Although Anluo himself respected this replacement, Daluobian did not recognize the reign of Shetu either, who came to the throne as Ishbara 𐱃𐰋𐰀𐰼 Khagan (Chinese: Shabolüe Kehan 沙缽略可汗), and withdrew to the north with his tribes, furthermore, he commenced to use the title of 'Apa Khagan (Great Khagan, Chinese: Abo Kehan 阿波可汗)'. As a result, a split emerged within the khanagate. And besides, Tardu, who was ruling the west of the khaganate, also came into conflict with Ishbara (Taşağıl, 2019, s.42-43).

While conflict arose within the Ashina dynasty, political unity began to be ensured in China. The State of Zhou ended the State of Qi in 576. Yang Jian 楊堅, one of the generals who contributed significantly to this success, established his own dynasty, which would be named Sui 隋, in Chang'an, in place of the Zhou State, with the palace coup he carried out in 581 (Skaff, 2012, s.31). Despite the coup, Ishbara wished to maintain good relations with the new dynasty, and therefore he sent an envoy to Chang'an in November 581. Nevertheless, the intrigues of the princess Qianqin of Zhou origin against the Sui and the repatriation of the Türk garrison that had settled in Chang'an during Mukan's period led to tensions in Sui–Türk relations from the very beginning (Taşağıl, 2019, s.44).

Chinese sources write that in this period, a high-level ambassador and officer named Changsun Sheng 長孫晟 (or Zhangsun Sheng, cf. Xiong, 2009, p.669) began

to take advantage of the splits in the Türk dynasty with his spying activities. Changsun Sheng, who came to the Türk camp with the Qianjin 千金 princess from the Yuwen 宇文 family, who was sent to Ötüken during the reign of Taspar Kagan, and managed to approach Ishbara with her archery skills, became aware of the tensions of Ishbara - Apa and Ishbara - Tardu in the future due to the close relationship she established with him. He informed Sui Wendi that these internal conflicts should be utilized regularly (Taşağıl, 2019, p.46).

However, initially, the Türk power seemed unshakable. In the spring of 582, great raids under the command of Ishbara began, and Tardu also joined these raids. After defeating the Sui forces in Mayi, the Türk army of about 100,000 soldiers captured Yan'an and approached the capital Chang'an. Just when the Türks had captured the seven major cities in the north of China, and there was no considerable resistance against them, Zhangsun Sheng's intrigues began to yield results. As a result, Tardu withdrew his troops, and Jan-kan, who would later ascend to the throne as Qimin Kaghan, gave misinformation about an alleged Töles rebellion to Isbara Kaghan (Taşağıl, 2019, p.48-49). Thus, the Türk raids in the spring of 582 gave great fear to the Sui State but could not break its power.

After these raids (in the summer of 583), Sui Wendi ordered the preparation of a long edict to improve morale in his army. The edict contains information about the climate crisis affecting the Türks at that time.

At the beginning of his edict,  Sui Wendi accounts for the past. He states that the split and the struggle between the Zhou and Qi states was the main reason for the rise of Türks. Then recounts his time and his actions. Afterwards, he informs that the Türks were not a united and invincible force as seen from outside, that there was a

power struggle between the five leaders, and that the affiliated tribes such as Tuyuhun and Khitan were full of hatred against the Türks.

Therefore, Sui Wendi states that contrary to common belief, the Türk power had some critical internal weaknesses, and by the declaration of such an edict, he tried to give morale to his people and army. According to us, the most significant point of this edict is about the impacts of the climate crisis: (Liu Mau-Tsai, 2019, p.71):

> 每冬雷震, 觸地火生, 種類資給, 惟藉水草。去歲四時, 竟無雨雪, 川枯蝗暴, 卉木燒盡, 饑疫死亡, 人畜相半。舊居之所, 赤地無依, 遷徙漠南, 偷存晷刻。
>
> [In normal conditions] Every winter, the skies rumbled, and lightning struck the ground. Tribes used to live on water and grass. Nevertheless, there was neither rain nor snow for a whole year last year, so the rivers dried up, and the locusts fled. Plants and roots of trees were burned. Half of the people and animals died and perished from starvation and epidemic diseases. The fertile lands on which they lived dried up, burned, and became uninhabitable. Therefore, they migrated to the south of the desert to survive for a while (SS 84, p.1867).

In these lines, we see an apparent description of the drought event that we have argued about in the previous sections. According to the information obtained by Sui Wendi and accounted in his edict, although there is regular rainfall every year on the Mongolian plateau, there was no rainfall in 582, and the vegetation was severely damaged by thirst, the water of the rivers decreased, and the soil dried up. These expressions in the edict of Sui Wendi reveal an ideal description of drought. As demonstrated in the previous sections, the inevitable consequences of severe drought

events are epidemics, animal herds that weakened during the long winter, damaged vegetation due to the loss of adequate nutrition, and locust infestation.

According to Ganiev and Kukarskih (2018), the climate anomalies and drought experienced in the Türk territory between 581-583 years may be the result of volcanic activities, the traces of which are observed in the glaciers of the Southern and Northern hemispheres as sulfur dioxide layers pointing to the years 574-575 (p.6).

In our opinion, the expressions in the edict of Sui Wendi also demonstrate how deeply the Sui elite had observed the steppe geography and the climatic conditions there. According to him, the Türks had no chance of surviving such a disaster, and the best time to attack them was:

> 斯蓋上天所忿，驅就齊斧，幽明合契，今也其時。故選將治兵，贏糧聚甲，義士奮發，壯夫肆憤，願取名王之首，思撻單于之背，雲歸霧集，不可數也.
>
> The skies drove them under our arms; this is the ultimate punishment from the skies. Therefore, now is the time to harmonize the earthly and the otherworldly and do something against the Türks!

Sui Wendi decided to take advantage of adverse conditions in the steppe. About a year after the great Türk campaign under the commandment of Ishbara, in June 583, Sui Wendi organized a massive offensive against the Türks. According to Taşağıl (2019), Sui Wendi's edict encouraged his commanders and improved morale in the country. Consequently, unlike the previous year, the Türk armies were defeated, and Ishbara Khagan had to abandon his armor and retreat to the steppe (p.50).

The reasons why the Türks achieved great success in the summer of 582 but suffered a heavy defeat against the Sui army just one year later is a matter of debate. First of all, the Türk army was unprepared this time. Tardu, who had just declared the independence of the western whig of the khaganate, withdrew his support from the army. Thus the number of soldiers under the command of Ishbara was substantially reduced. However, when the narrative in Suishu is scrutinized, it can be easily understood that the main reasons that facilitated the Türk defeat were the unfavorable natural conditions such as drought and the famine as a result of the drought:

> 沙鉢略率阿波, 貪汗二可汗等來拒戰, 皆敗走遁去。時虜飢甚, 不能得食, 於是粉骨為糧, 又多災疫, 死者極眾。
>
> Isbara appeared before him with two khagans, Apo and Tanhan, and others, but all the Türks were defeated and found salvation in fleeing. Since there was hunger and famine at that time, and they had a shortage of food, they were grinding bones, making flour, and eating them. On top of that, when an epidemic broke out, most of the soldiers died (SS 84, p.1867).

When we look at the plot as a whole, we believe that it can be argued that the following picture was encountered in the years 581-583: It is evident from the sulfur accumulation in the data obtained from the ice cores that volcanic eruptions took place within these years, the location of which could not be determined. As a result of these eruptions, there was no precipitation for at least one season, and a great drought was experienced in the Mongolian plateau; due to the dried vegetation, the herds of animals perished and the pastoral nomads living in this region, depending on the Türk Khaganate, faced a great famine.

In our opinion, even the grand campaign of Ishbara in 582 may have been organized due to the drought and famine events. It has been noted that in each winter cycle on the Mongolian plateau, animals become weaker due to malnutrition. The failure of the steppe vegetation to regenerate due to the lack of rainfall in the summer of 582, the inability of the animal herds to feed or breed, or the inability of the female animals to produce enough milk for their young must have caused a greater disaster in the winter of 582-583 and the loss of herds en masse. According to us, it is possible to think that the forces of Tardu, who wintered in the fertile Yedisu basin in West Turkestan, were not affected by this crisis as much as the Eastern Türks living in the Mongolian steppe; but as stated, Tardu is not mentioned in the wars with the Sui in 583. In other words, Tardu's troops in better condition did not come to their aid, and the Eastern Türk army suffered a great defeat.

In our opinion, the crisis of 582-583 can be seen as one of the turning points in the history of the Türk Khaganate. Since the defeat of the Rouran Khaganate in 552, and the consolidation of the Türk domination in the vast Eurasian steppe, the khaganate had not suffered a significant defeat against China, managed to maintain its integrity, and seemed invincible. However, just after the defeat in the years 582-583, all of a sudden, the khaganate entered the process of disintegration between various political centers.

The beginning of this disintegration can be traced back to the disobedience of Apa Khagan to Anluo, who believed that he was the legitimate heir of Taspar Khagan and felt mistreated. As stated above, Apa Kagan never fully obeyed Ishbara Kagan. After the Türk defeat in 583, the conflicts flared up again. Upon the advance of the forces affiliated with Ishbara Khagan, Apa Khagan took refuge in the Tardu-controlled area in the west, the Tengri Mountains region. Thus, the Türk civil war

escalated with the Tardu-Apa-Tanhan alliance on one side and Ishbara on the other. As the alliance against him grew day by day, Ishbara felt he needed to cooperate with the Sui dynasty and had to accept the Sui vassalage with a ceremony held in the Türk headquarters (SS 84, p.1869). On the other hand, when the territory controlled by the alliance against him extended as far as Ötüken, Ishbara moved to the south of the Gobi Desert, taking permission from Sui Wendi.

Sui Wendi, who had an interest in the growth of this civil war within the Ashina dynasty, decided to support Ishbara because he did not want the forces loyal to him to be annihilated. Ishbara Khagan, who was given an army under the command of the Qin region prince Kuang, defeated Apa Khagan and managed to dominate the territory of the eastern khaganate again.

Even though Ishbara accepted the Chinese vassalage and he wrote in a letter to Sui Wendi these expressions: ‘竊以天無二日, 土無二王, 伏惟大隋皇帝, 真皇帝也- There can be no two rulers on earth, just as there can be no two suns in the sky, and that the Sui emperor is the only true ruler.’ (SS 84, P.1869), it is understood that Türk raids were not ceased, and were conducted in 586. In our opinion, there may be several different explanations for these raids, despite the improved relations between Ishbara Khagan and the Sui. First of all, it is possible to think that Ishbara did not fully enter under the Sui domination as acclaimed in the sources, and acted independently from China. The possibility that Ishbara Khagan may not have fully established her authority in the Türk country should also be considered; it is possible to assume that the groups that flocked to China were those that were not under the control of Ishbara.

However, another possibility is that the adverse climatic conditions, which commenced in 581 on the Mongolian plateau and were partially effective in the disintegration of the country with the Türk defeat in 583, continued. In the records, there are several statements about drought and famine in these years as well. As a matter of fact, in May 587, Isbara Khagan decided to go hunting in the mountains in Northern China in order to overcome the problem of famine and food shortages, and asked permission from the emperor since this region was under the control of Sui. Since the region had not been raided for several years due to the Ishbara - Sui vassalage treaty, and the Chinese people hadn't had a tradition of hunting, the number of hunting animals had increased a lot. In Suishu, it is stated that Ishbara Khagan hunted eighteen deer in one day. Sui Wendi, in addition to giving hunting permits in his own territory, sent food to Ishbara Khagan, and the food was received with joy (SS 84, p.1870).

As mentioned above, hunting is an important part of the nomadic steppe economy. However, the act of going to the mountains of Northern China to hunt in May, when steppe grasses began to grow under natural conditions with precipitation and the herds grazed, and to ask permission from the emperor for this move, and to receive the food sent by the emperor with joy, these all can be considered as the indications of a severe famine in the Mongolian plateau as of 586-587.

Sui Wendi succeeded in unifying China in 589, after 350 years of turmoil and internal conflict following the disintegration of the Han dynasty (Skaff, 2012, p.31).

### 3.3.The Impact of Climate Crisis on the Fall of the Türk Khaganate

Unlike Qimin Kagan, who remained utterly loyal to the Sui dynasty during his rule and even wanted to adopt the Chinese customs, his son Shibi 始畢 Kağan started

to follow a more independent policy from 609 onwards. Shibi first strengthened the Türk army and succeeded in tying to himself the proto-Mongolian tribes in the east, such as the Khitans, Shi-wei, and Tatabis, which broke away from the khanate (JTS 194a, p.5153).

### 3.3.1. The Decline and Fall of the Sui Dynasty

The years when Shibi Khan began to act independently coincided with the period when the Sui dynasty began to lose power. Goguryeo 고구려 (Chinese Gaogeli 高句麗 or Gaoli 高麗 for short) was one of three states (the others are Silla and Paekche) established on the Korean peninsula (Ebrey et al., 2008, p.103). The unification of China by Sui Wendi in 589 posed a threat to the Kingdom of Goguryeo, which had established its dominance over the territory of today's Manchuria and North Korea. For this reason, the Goguryeo rulers had come into contact with the Türks since they regarded the khaganate as the most powerful state in the north from this date on. Even though the Korean peninsula had preserved its independence since the collapse of the Han dynasty and the Liaoning region, which connects the peninsula to the mainland, had always remained away from Chinese political influence, Sui Wendi decided that the region should be seized (Xiong, 2006, p.216). Because, as Eberhard (1995) stated, the Türk-Korean alliance meant the encirclement of China from the north (p.195). Sui Wendi, who wanted to prevent the formation of such an alliance, prepared for a campaign on Korea but was defeated (Kim, 2012, p.68).

Wendi accepted the situation, but her son Sui Yangdi 隋煬帝, who came to the throne in 604 and aimed to regain the lands that the Han dynasty had centuries ago, initiated to prepare plans to seize Goguryeo with the thought that he would easily

conquer the Korean peninsula (Seth, 2011, p.43). Being aware of Yangdi's plans, the Goguryeo Kingdom sent an envoy to the Türks in 607 and offered an alliance against the Sui dynasty, but this alliance proposal was rejected by Qimin Kagan, who did not want to enter into an alliance against China (Taşağıl, 2019, p.77). It did not go unnoticed by the Chinese that Korean ambassadors visited the Türk headquarters with the offer of cooperation, and they reported this situation to Yangdi. The news of a possible Türk-Korean alliance constituted an excuse for Sui Yangdi to take action against Goguryeo (Xiong, 2012, p.217). Moreover, after Qimin's death in 609, his son Shibi Khagan, who, unlike his father, took an uncompromising attitude towards the Sui dynasty, caused Yangdi to speed up the preparations for a campaign on Goguryeo (Wright, 1979, p.143).

However, Sui Yangdi's expedition to Korea had cost greater expense and human costs than anticipated. Sources write that Yangdi gathered over one million soldiers for this expedition (Kim, 2005, p.34). On the other hand, as Adshead (2004) states, Goguryeo, with its light cavalry units and strongly fortified cities, was a powerful militarist state. The territories the Goguryeo Kingdom was located in were also challenging to conquer due to the geographic obstacles (p.40).

Apart from these problems, the fact that the war did not have popular support, especially in northeastern China (present-day Hebei), caused serious trouble for Sui Yangdi. The mobilization of all human resources for the Korean campaign, the conscription of tens of thousands of villagers, the sending of tens of thousands to the shipyards to be employed in the construction of warships by corvée, and the heavy working conditions there caused great discomfort, human mobilization led to the decline of the agricultural workforce, and this caused famine and flood disasters. (Cao, 2010, p.75; Deng, 2013, p.33). As a result of these troubles, the villagers started to

revolt in Shandong and Hebei regions as early as 611 under the leadership of two deserters, Wang Bo and Liu Badao. Yangdi, who ignored the danger of rebellion and underestimated the resistance of Goguryeo, initiated his first expedition to Korea in 612.

Dividing his forces into two, Yangdi himself headed towards the city of Liaodong and sent his two generals of Xianbei origin, and navy to the Goguryeo capital Pyongyang. However, the Sui army was defeated in front of Pyongyang by General Ulji Mundok, who has been regarded as a national hero in Korea since this war until today. Ulji Mundok raided the Sui army, passing over the Salsu River, and after the raid, only 2700 out of 355,000 Sui soldiers survived (Seth, 2011, p.43; Kim, 2005, p.34).

Despite this apparent failure, the army of Sui Yangdi, which was sent on an expedition to Goguryeo again the following year, began to disintegrate. Yang Xuangan, one of the Sui generals, revolted and attacked the eastern capital of the Sui state, Luoyang, and although the rebel general was defeated and executed in time, this first rebellion triggered other uprisings (Wechsler, 1979, p.152). However, ignoring the growth of the rebellions, Sui Yangdi launched his third campaign against Koguryo in 614 (Ebrey et al., 2009, p.76).

### 3.3.2. Recovery of the Türk Khaganate

Although Shibi Khan pursued an independent policy, he did not directly attack the Sui dynasty. The event that changed the situation also caused the intensification of the Türk raids, and the collapse of the Sui dynasty took place in 615. The bureaucrat Pei Ju 裴矩, who managed the Türk policy of the Sui dynasty in place of the deceased Changsun Sheng, told Sui Yangdi that the power of the Türks originated from the

Sogdian advisers in their court and that if these people were eliminated, the Türks could easily be defeated. Pei Ju's target was the Sogdian statesman Shi Shuhuxi, who was very close to Shibi Khan. Pei Ju offered to meet this Sogdian statesman in Mayi under the pretext of discussing the trade between the two states and had Shi Shuhuxi killed as soon as he arrived in Mayi. Shibi Khagan, furious that his advisor was killed in a trap, cut the tribute he paid to the Sui State and started the raids again.

In the autumn of 615, Sui Yangdi moved to inspect the northern borders with Empress Xiao. Having heard of this information, Shibi Khagan designed a sudden raid and started the expedition with a force of one hundred thousand cavalries. Yicheng 義成 Princess from the Sui family in the Türk headquarters hurriedly sent an emissary to announce this raid plan to Yangdi, and Yangdi, who learned the press, took shelter in Yanmen Castle (Taşağıl, 2019, p.79).

During this raid, which was very successful for the Türks, 39 of the 41 bastions of Yanmen Castle were captured by the Türks, and the arrows shot by the Türk soldiers reached Yangdi. As a matter of fact, Fan Angui, one of the commanders defending the castle, died in this way in front of the emperor (Xiong, 2012, p.64). Yangdi was frightened by these unexpected events, hugged Prince Gao, and started to cry (Taşağıl, 2019, p.79). Meanwhile, 17-year-old Li Shimin was among the Chinese army officers who rushed to aid Yanmen Fortress (Eberhard, 1995, p.196; Baykuzu, 2016, p.10).

All the Sui state officials were under the siege of the Türks with the emperor, and remedies were considered to break the siege. Among the solution suggestions, there was also the idea of secretly sending an emissary to the Yicheng princess in the Türk headquarters and asking her for help. Consequently, the Yicheng princess once

again helped the dynasty she came out of, and in the message she sent to Shibi Kağan, she wrote that there was a rebellion in the north even though there was no such event, and upon this news, Shibi Kagan immediately lifted the siege of Yanmen. Therefore, Yicheng Princess saved the emperor from being captured by the Türks. Although he was saved from the Yanmen Siege thanks to Yicheng, Sui Yangdi's prestige was further lost after this event (Xiong, 2012, p.65), and he went to the southeast Jiangsu region instead of the capital Daxing (Wright, 1979, p.148).

Sui Yangdi is recorded in historical chronicles as a prodigal emperor (Eberhard, 1995, p.196; Xu, 2006, p.159). The Grand Canal (Da-yun-he 大運河) project between Luoyang-Hangzhou and Luoyang-Zhengzhou, which would be very effective in ensuring the commercial, political and cultural integration between north and south in the Chinese geography in the following centuries, was implemented during his reign (Cao, 2010, p. .74). Millions of workers were employed in the canal's construction, which was completed in six years. However, these big projects and expenditures cause considerable discomfort (Grousset, 1942, p.85). On top of the labor-intensive projects such as the palace constructions in the Grand Canal and Luoyang, and the costly trips to the provinces, the unsuccessful campaigns against Goguryeo and the unstoppable Türk raids were added. As a result, the weakening of the empire brought internal disturbances to the surface.

In particular, the loss of prestige caused by Sui Yangdi's last-minute escape from being captured by the Gök Turks in Yanmen Fortress accelerated the disintegration, and in 617, riots broke out all over the country (Wright, 2011, p.68; Taşağıl, 2019, p.80). These disturbances, which started as small-scale and local revolts of deserters during the Goguryeo wars, grew with the participation of the wealthy landlords and state officials who witnessed the dissolution of the Sui state,

and after a while, the local officials began to revolt or took over the revolts ( Graff, 2003, p.161). Peasant rebels Dou Jiande 竇建德 and Gao Kaidao 高開道 in Hebei, landlord Li Mi 李密, who had also participated in Yang Xuangan's movement, in Henan, Li Mi's main rival, probably of Sogdian origin (Graff, 2003, p. .163) Sui general Wang Shichong in Luoyang, Zhu Can 朱粲, who led the rebellion in his region when he was a local clerk, and peasant revolutionary Du Fuwei in Anhui, Luo Yi 羅藝, Sui state general in Youzhou (present-day Beijing), peasant leader Liu Wuzhou 劉武周 The strategic border city of Mayi' in the north of Shanxi, Xue Ju 薛舉, while a cavalry officer in Gansu, killed the governor of Sui in the region and opened the doors of the grain warehouses and formed an army with the support of the peasant mass (Liu Mau-tsai, 2019, p.119). In addition, Liang Shidu 梁師都 revolted in the north of Shaanxi (Wechsler, 1979, p.162). Liang Shidu established the 'Liang' state and declared himself emperor (Graff, 2003, p.164). As expected, a struggle for dominance began immediately between these powers.

Those in the north among the rebels decided that in order to gain power, it was necessary to get support from the Türks. First of all, Liang Shidu contacted Shibi Kagan and declared his devotion. Thereupon, he received the wolf-headed sovereignty flag and was given the title of Tardu Bilge Kagan (Chinese: Dadu Pijie Kehan 大度毗伽可汗) by the Türks (Liu Mau-Tsai, 2019, p.117; Taşağıl, 2019, p.80). Liu Wuzhou, the leader of the rebellion in northern Shanxi, also sent an envoy and obeyed Shibi Khagan. After capturing Yanmen Fortress, where Sui Yangdi was besieged, and then Fengyang, the northern palace of the Sui dynasty, he donated the

loot to Shibi Khagan, who in return was given the wolf-headed sovereign banner and the title Dingyang Khagan (定杨可汗). (Liu Mau-Tsai, 2019, p.120).

Thus, we see a reversal of the situation in the Sui Wendi period, when China benefited from the conflict within the Ashina dynasty. Between 615 and 617, the Türk Khaganate took advantage of the internal turmoil and disintegration of the Sui Empire and spread its influence to all of Northern China through its vassals, to whom it distributed titles.

Another of the Türks' anti-Sui vassals was Li Yuan, who in fact was a relative and childhood friend of the emperor Sui Yangdi, and decided to revolt and seek support from the Türks at the insistence of his son Li Shimin.

### 3.3.3. The Tang - Türk Wars

In 616, when the Türk raids increased, the then 50-year-old Sui general Li Yuan was assigned to the city of Taiyuan 太原. Li Yuan took Li Shimin with him, leaving his other children, Li Jiancheng and Li Yuanji, behind. Li Yuan, in his headquarters in the strategic city of Mayi (today's Shuozhou), taught his soldiers to ride horses and shoot arrows like the Türks, and established an army of 2000 people in the Türk sytle, and this army even managed to stop some small Türk raids (Taşağıl, 2019, p.80).

However, Li Yuan's generals failed to stop the more extensive Türk raids. As a matter of fact, when Li Yuan wanted to stop the raids on Mayi, the Türk army besieged him and his forces in the city of Qinyang; Li Yuan, who was imprisoned in the castle, only made his soldiers sound the drums and gave the impression that the aid forces were coming, enabling the Türks to lift the siege and narrowly escaped

being captured. According to Taşağıl (2019), if the founders of the Tang dynasty had not escaped this danger, the Tang dynasty, which was one of the most prosperous dynasties in Chinese history, might not have been established (p.81).

The outbreak of revolts against the Sui dynasty in 617 put Li Yuan in a difficult position. According to Wang Zhenping (2009), he now had to fight the rebel leaders who rebelled against the Sui dynasty in the south as well as the Türks in the north, and the Taiyuan headquarters seemed to be stuck among these forces (p.240).

In May 617, Li Shimin informed his father, Li Yuan, that together with Liu Wenjing 劉文靜, who would play a crucial role in the founding of the Tang dynasty, that he should rise up as well (Xiong, 2009, p.178), while Li Yuan initially refused to rebel against his cousin. (Fitzgerald, 1971, p.52). However, after a while, at the insistence of his son and both of his advisers, Liu Wenjing and Pei Ji, he decided to join the rebellion against Sui Yangdi and applied to the Türks for support. Thus began the Jinyang 晋阳 Revolution.

Li Yuan sent Liu Wenjing to the Türk heaquarters with gifts and asked Shibi Kagan to support the revolutionary army he would establish (JTS 194a, p.5153). As stated in the Zizhi Tongjian, Li Yuan wrote a letter to Shibi Kagan in such a respectful and condescending way that Jack Chen (2011) considers the tone in this letter as 'Li Yuan's declaration of vassalage (Chen 臣) to the Celestial Turks' (p.20). According to Graff (1992), in this letter that Li Yuan had to adopt a very modest attitude towards the khagan in order to get the Turkish support he needed (p.35); he asked the Türks to support him in seizing the throne by helping his revolutionary army. He also requested the khagan not to pillage Northern China during the campaign. Shibi Khagan decided to support Li Yuan, whom he thought would be successful and sent

him 500 soldiers and 2000 horses twice in a row (JTS 194a, p.5153). The fact that the number of soldiers was not high was due to the request of Li Yuan, who was scared of the possible pillage could be done by the Türk forces (Taşağıl, 2019, p.82; Baykuzu, 2016, p.9).

Consequently, the Tang army, which became more assertive with the support of the Türk military and reached 25,000 people, defeated the last Sui army of 20,000 under the command of Song Laosheng in the Battle of Huoyi 霍邑 on September 8, 617 (Wechsler, 1979, p. 159). With no other force remaining to defend the Sui capital, the Tang army advanced in two directions to Daxing, Li Shimin captured the northern banks of the Wei River, while Li Yuan sent his eldest son Li Jiancheng to the Tong Gates. Li Yuan's nephew, Li Xiaogong, advanced south and captured the Sui region of Sichuan, while defeating another rebel, Zhu Can (Xiong, 2009, p.304).

Li Yuan thus captured the Sui capital Daxing with the Türk support and renamed it Chang'an 长安, then dethroned Sui Yangdi and replaced him with 13-year-old Yang You as the puppet ruler, and eventually was proclaimed as emperor Tang Gaozu on June 18, 618 (Jian & Zhu, 2006, p.270).

In the meantime, Chuluo Khagan died of poisoning and was replaced by Il Khagan, the third son of Qimin Kagan. In Jiu Tangshu, it is emphasized that Yicheng Princess, who was of Sui origin, was very influential in the accession of the Il Khagan to the throne. Hence, as soon as Il Khagan came to the throne, he married Yicheng Princess, just like the other khagans before him (JTS 194a, p.5154). As the Yicheng Princess, who is understood to be influential enough to interfere with those who would ascend to the throne in the Türk dynasty from the narration in the sources, harbored resentment against the Tangs who had replaced the Sui dynasty, and

regularly reminded the Türks of her family's support to Qimin Kagan. Thus, from the beginning of the Il Khagan's reign, Yicheng was encouraging him to challenge the Tangs (Taşağıl, 2019, p.88).

Meanwhile, the Tang State was putting an end to the turmoil around it and reuniting China step by step. Li Shimin defeated Dou Jiande and Wang Shichong at the Battle of the Hulao 虎牢 (Tiger Cage) Gates, following his earlier strategy of attacking from the flanks after wearing down the enemy with continuous and rapid hit-and-run tactics against Xue Rengao and Liu Wuzhou. with this victory, Li Shimin consolidated the Tang rule in Northern China. In the same year, Li Xiaogong defeated the Liang state king Xiao Xian in Jiangling and added Southern China to the Tang Empire (Graff, 2003, p.177).

In 622, Li Shimin commanded the troops fighting against the raids of the Türks and Liu Heita, a Türk vassal, on the Ordos Plateau. Changsun Wuji 長孫無忌 (or Zhangsun Wuji, see Xiong, 2009, p.669), son of the famous diplomat-general of the Sui period, Changsun Sheng, assisted Li Shimin in his struggle against the Türks. Changsun Wuji, who is of Tabgach descent, remained Li Shimin's childhood friend as well as his closest and most trusted adviser throughout his rule, even his sister married Li Shimin and became empress Wende 文德 in the following years. According to Wechsler (1979), Changsun Wuji and Li Shimin were so close that even after Li Shimin became emperor, he remained the only person with unrestricted access to his side (p.194).

In 624, the Il Khagan initiated massive raids against the Tang State. By this time, the Tang State had succeeded in taking control of most of China. The issue of how to respond to the Turkish raids was discussed in the Tang state council. Although

Zheng Yuanshu recommended a pacifying policy against the Turks, Feng Deyi said, "If we surrender to the Turks without resisting them, we will demonstrate our weakness and be invaded the following year. On the contrary, we should hide our weakness, attack the Turks and ask for peace after success' and this proposal was accepted by Tang Gaozu (Wang, 2009, p.249).

During the Türk raid in the 7th month of 624 B.C., Li Shimin used a tactic to open the distance between Il Khagan and Tuli Khan's troops, thus having a tete-a-tete meeting with Tuli. After the meeting, Li Shimin and Tuli became brothers by making the "Oath of Incense" (xianghuo xiongdi 香火兄弟) and the Tuli army withdrew (Baykuzu, 2016, p.64). Wang Zhenping (2013) argues that the acquaintance between Li Shimin and Tuli dates back to 617 years ago (p.25).

During the Türk raid at the end of the summer of 624, the Tang Army was left behind due to heavy rain, and Li Shimin found himself facing the Türk army with only one division. He took the risk and confronted the Türk army with only 100 horsemen and requested to fight the Khagan one on one, and if his request were not accepted, he would fight to the death with 100 of his men. Then, this time, he approached Tuli and reminded him of the brotherhood oath they had made. Il Kagan was stunned because that was the first time he heard about this oath and began to suspect Tuli. For this reason, he decided to withdraw, saying that they just aimed to renew the agreement with the Tang prince (JTS 194a, p.5156).

Two years after this event, Li Shimin, who was understood to have caused jealousy in the palace with his long-term victories, carried out a coup and seized the administration of his state. In this coup that took place in front of the Xuanwu Gate in Chang'an on July 2, 626, Li Shimin had his elder brother Li Jiancheng and his brother

Li Yuanji killed, whom he had received intelligence that they were preparing a conspiracy against him. While Li Shimin personally killed his brother with an arrow during this conflict, Li Yuanji was beheaded by one of his generals, Yuchi Gong (Bingham, 1950, p.94).

Three days after this palace coup, known as the 'Xuanwu Gate Incident' in Chinese history, Li Shimin was declared Tai-zı 太子 (crown prince), and two months later, Emperor Tang Gaozu abdicated by leaving his throne to Li Shimin. Proclaiming his father Tai-shang-huang 太上皇 (honorary emperor), Li Shimin took the title Taizong 太宗 and became the emperor of China (Wechsler, 1979, p.186).

This event, which is of great importance in Chinese history, also had significant results in Türk history. First of all, Li Shimin was a commander who spent years on the fronts from 617 onwards and contributed significantly to the consolidation of the Tang dynasty. It is understood that the Li 李 family was familiar with steppe war tactics, both because of their Xianbei/Turkic origin (Chen, 2020, p.14; Yıldırım, 2017, p.56; Gelber, 2007, p.58) and because they had fought many times with the Türks. It may also be remembered that Changsun Sheng's son, Changsun Wuji, who knew the Türks very well during the Sui period, was with Li Shimin as his closest advisor during all his struggles. In summary, an extremely successful commander who knew the Türks and their weaknesses very well came to the throne of China.

However, it is understood that the strong side as of 626 was the Türks. Li Shimin had just ascended to the throne, and Li Jiancheng and Li Youji's supporters in the palace and the army were offended by the recent coup (Tang Chi, 2020, p.194). Therefore, Li Shimin had not yet consolidated his authority. Moreover, although the

Tang army had some success, the intensified Türk incursions into North China for several years could not be stopped, and Il Khagan gathered his army of more than a hundred thousand men and reached the Wei River in Chang'an, probably planning to take advantage of the recent disorder in Tang China, the Xuanwu Gate Coup.

At this point, we see that Tang Taizong, just like he did two years earlier (in 624), showed courage and went to the Türk camp with only six statesmen on his side. According to the sources, the Türks were surprised, dismounted, and greeted Tang Taizong. A little later, the Tang army appeared, which Tang Taizong instructed to follow him, seemingly crowded. With this move, Taizong wanted to show the Turks that he was ready for war. However, since the forces called from other regions by the edict had not arrived yet, there was no force in Chang'an that could resist the Türks.

With the peace treaty made on the banks of the Wei River on September 26, 626, in which Taizong sacrificed a white horse in its honor, the two countries agreed not to attack each other (Tang, 2020, p.203). According to sources, Taizong did not find it surprising that the Türk army had returned without engaging in combat. Because the army, although crowded, was very irregular, and there was multi-headedness among the Türk chiefs. It is stated that while the khagan was on the other side of the river, his subordinates came into contact with Tang Taizong (JTS 194a, p.5158). In our opinion, this is an indication that Il Khagan could not maintain his authority in the country, and that there was great dissatisfaction among the tribes against him. This event can also be regarded as a harbinger of the uprisings that would occur in a short time.

It is reported that there had been heavy snowfall during the few winters prior to 627. Although the detailed explanations about the climate crisis belong to the year

627 and later, it is understood that the crisis started beforehand and had been continuing with increasing its effect. The issue that Tang Taizong noticed even during the Wei River Treaty, which caused the dissatisfaction of the tribes and the disorganization of the Türk army, must have been the climate crisis that commenced to demonstrate its consequences.

As a matter of fact, in the spring of 627, reports began to come to the Tang palace that there was a great ecological disaster in the Türk Khaganate. Due to the unusual snowfall, the thickness of the snow reached several meters, which made it impossible for the herds to graze, resulting in mass deaths among the steppe animals. The inevitable result was the onset of a great famine among the steppes whose lives depend on livestock, which was reported to Tang Taizong by General Yuan Shou 還奏 as follows:

> 頻年大雪，六畜多死，國中大餒，頡利用度不給，復重斂諸部，由是下不堪命，內外多叛之.
>
> Most of the animals died because of the snow falling every year. Famine broke out in the country. The incomes of Il Khagan began to be insufficient for his expenditures. He imposed heavy taxes on the tribes. The tribes subject to Il Khagan began to be unable to tolerate this situation. Those around him are leaving Il Kagan (JTS, p.5159).

The word '頻 pin' at the beginning of the expression '頻年大雪' used here gives the meaning of 'repeat.' Although a specific number (2, 3 years) is not given in the text, it is stated that heavy snowfall had been going on for several years.

In our opinion, here and in the texts that follow, it is intended to describe the famine resulting from snowfall and the zud disaster. The steppe animals could not reach the grass under the snow cover, and this situation must have led to the death of tens of thousands of animals and the famine among the steppe communities, whose main source of nutrition was animal food. Jie Fei et al. (2007) pointed out that this may have occurred due to a volcanic eruption (p.473). Indeed, as we mentioned in the previous chapters, anomalies indicating the years 623-626 were found both in the ice cores and in the tree rings (Hammer et al., 1980, p.232; Stothers & Rampino, 1983, p.6363). In our opinion, the fact that snowfall has occurred on the Mongolian plateau for several years in a row supports the dating of the aforementioned volcanic eruption to 623.

At this point, it is informed that Il Kagan's imposition of heavy taxes during the climate disaster led to riots. In 627, many tribes such as Sir Tardush (Xueyantuo 薛延陀), Uyghurs, Bayırkus in the north of Yinshan Mountain united against Il Khagan and expelled his son Yüku Shad. Although Il Kağan commissioned Tuli in the face of this new threat to the Türk state authority and asked him to suppress the rebellion, Tuli's forces were defeated, and Tuli had to flee with light cavalry units. Enraged by this failure, İl Kagan had Tuli imprisoned for ten days and whipped him, making the situation of the Türks even more difficult. Because Tuli, who had long been close to Tang Taizong and thought that his right to the throne was usurped, moved further away from Il Khagan because of this incident and asked Tang Taizong to send an army against Il Khagan (JTS 194a, p.5158).

It is noteworthy that Tuli, who was punished, still had an army at his disposal, and this army remained loyal to Tuli and refused Il Khagan's request for help. This situation, which we may rarely encounter in sedentary agricultural empires, brought

the current Türk Civil War between the tribes into the Ashina family and further weakened the state.

As the Gök-Türk internal conflict grew, the climate crisis also got worse. Tang envoy Huan Zou 還奏, who is stated to have been sent to the Türks as an envoy five times in Jiu Tangshu, told Tang Taizong the following information about the situation the Türks were in, when he returned to Chang'an:

> ‘突厥興亡，唯以羊馬為準。今六畜疲羸，人皆菜色，又其牙內炊飯，化而為血。征祥如此，不出三年，必當覆滅.
>
> The rise and fall of the Turks depend only on sheep and horses. Today the six [kinds of] animals are exhausted, the heads of all humans are disheveled, and the food on their teeth has turned to blood. If this continues, [the Turks] will perish within three years (JTS 62, p.2380).

The same information is noted in Xintangshu with similar expressions: '貞觀三年，復使突厥，還言：「夷狄以馬羊准盛衰，今突厥六畜不蕃，人色若菜，牙內飯粟化為血，不三年必 亡。」 (XTS 100, p.3938).

As it turned out, Tang Taizong wanted to take advantage of the conditions of the Türks at the expense of the 626 Wei River Treaty, but this attempt was prevented by Changsun Wuji (Taşağıl, 2019, p.98). As a matter of fact, Il Khagan was also worried that the Tang dynasty would benefit from this situation. There are also statements about climate disaster in the lines conveying this concern:

> 其國大雪, 平地數尺, 羊馬皆死, 人大饑, 乃懼我師出乘其弊。引兵入朔州, 揚言會獵, 實設備焉。

> When it snowed a lot in the country and even on flat land, it reached a height of several feet, and when the sheep and horses died, and the people starved, Il Khagan feared that our army might go there and take advantage of their plight. Therefore, he supposedly went with his soldiers to Shuozhou province to organize a hunt, but in fact he was preparing for defense there (JTS 194a, p.5158).

As a matter of fact, it is reported that the attack on the Türks in Chang'an Palace was voiced again after this news from the north, but Tang Taizong refused:

> 匹夫一言，尚須存信，何況天下主乎！豈有親與之和，利其災禍而乘危迫險以滅之耶？諸公為可，朕不為也。縱突厥部落叛盡，六畜皆死，朕終示以信，不妄討之；待其無禮，方擒取耳。
>
> Even the common man must keep his word, isn't that even more true for the ruler of a country? How can I, who personally made a peace treaty with him, take advantage of their catastrophic predicament to destroy them? Even though you all support it, I am against it. Even if all the factions of the Türks rose up against Il Khagan and all his animals perished, I would still keep my honesty towards him and not attack him for no reason. But if he acts against tradition, I'll get him caught! (JTS 194a, p.5158)

At this point, it should be reminded that Chinese sources took an attitude of praising the Chinese emperors. As mentioned above, Tang Taizong considered breaking the Wei River Treaty, and this attempt was prevented by Changsun Wuji. Moreover, he would be the one who ultimately broke the agreement soon, but in our opinion, it is possible to deduce from these lines that the appropriate time has not yet come for Tang Taizong's strategy because the Türk Khaganate continued to

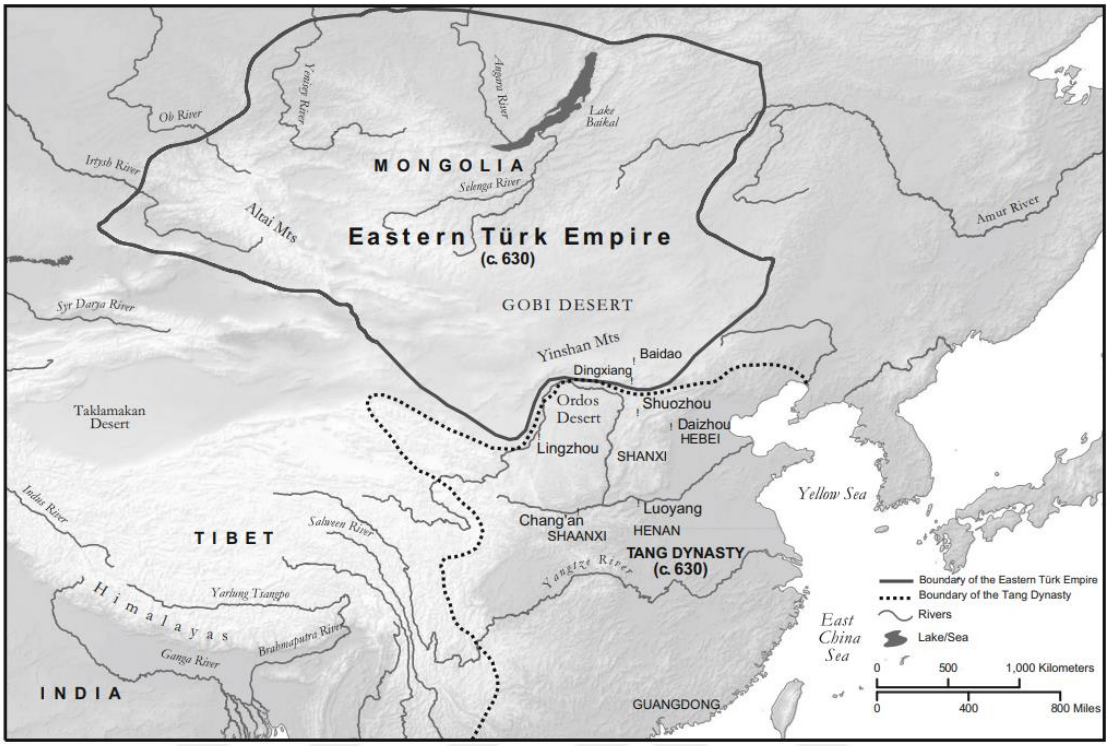
disintegrate spontaneously. In the spring of 628, the pro-Mongol Kumuxi and Xi tribes also recognized Tang Taizong's rule. Afterwards, the Khitans rebelled and became attached to the Tang Empire, and Il Khagan said that he would hand over Liang Shidu, an opponent of the Tang dynasty, in exchange for the return of the Khitans, but this offer was rejected, and then the Türk army suffered a heavy defeat in the battle between Türk and Tang forces. (JTS 56, p.2281).

After these events, it is seen that Sir Tardush became stronger. In other words, the tribes living in the steppe gradually began to recognize the sovereignty of Sir Tardush. Tang Taizong sent drums and banners to Sir Tardush khagan, who ascended the throne in Ötüken under the name Inal Khagan, as a sign of sovereignty, and gave him the title of Zhenzhu 真珠 Wise Khagan (Chavannes, 1903, p.95). According to Grousset (1965), this decision aimed to utterly surround Il Khagan (p.133).

In summary, in only two years, the revolting tribes attached to either the Tang Empire or the Sir Tardush Khaganate, Tuli collaborated with Tang Taizong and turned against Il Khagan, and there was a great climate crisis consisting of zud, drought, and famine in the background of these events. In these circumstances Il Khagan moved to the north of China with the remaining tribes and organized a drag hunt to relieve the situation of his people. At the same time, he stated that he required to marry a princess from the Tang palace in order to reconcile with the Tang dynasty. However, this situation provided an opportunity for Tang Taizong, who had previously stated that he did not want to break the Wei River Treaty. Taizong, who was not ready for war with the Türks in 627, when he had not filled his first year on the throne, was increasing his forces in military bases such as Taiyuan, Daizhou, Shuozhou as of 629 (Graff, 2002, p.49).

**Figure 7**

Map of the Eastern Türk Empire c.630.




*Note*. Taken from Di Cosmo, N., Oppenheimer, C., & Büntgen, U. (2017). Interplay of environmental and socio-political factors in the downfall of the Eastern Türk Empire in 630 CE. Climatic Change, 145(3-4), p.384.

Consequently, Tang Taizong ordered his generals Li Jing 李靖 and Li Ji 李勣 to attack the Türks. Il Khagan, who was defeated by the Tang army, was planning to resist the Chinese army with horses fed with the growth of grass in the following spring (Erkoç, 2015, p.111). Thus he retreated towards the Iron Mountain area in today's Gansu province, but with a sudden raid by Li Jing in this region, Yicheng Princess with her ten thousand soldiers was killed, and the Il Khagan had to flee. Il Khagan, who at this point planned to take refuge with the Tuyuhuns as a last resort, was captured by his nephew Ishbara and handed over to Tang general Zhang Baoxiang, and sent to Chang'an to be brought before Tang Taizong as a prisoner (JTS 194a, p.5159).

It is widely considered that the First Eastern Türk Khanate collapsed due to the defeat and captivity of the Il Khagan, and entered an 'Interregnum Period' that would last until 682. Some of the tribes affiliated to the Türk Khanate moved to the north of East Turkestan, some of them joined the Sir Tardush, and a mass of about 100,000 was attached to the Tang dynasty (Taşağıl, 2019, p.221).

Di Cosmo, Oppenheimer, and Büntgen (2017) are of the opinion that the Türk Khaganate collapsed not directly due to the climate crisis but because of the decisions preferred during the crisis (p.394). One of the decisions mentioned above is that Il Khagan intensified the taxes after the 627 climate disaster that caused the animals of all pastoral nomadic tribes living on the Mongolian plateau to perish (Erkoç, 2017, p.77). In addition, factors such as the fact that he preferred the Sogds, who are referred to as 'Hu 胡' in Chinese sources, in the distribution of duties, and that he was influenced by the Chinese Zhao Deyen, whom he brought to a critical position, and that he had ordered the preparation of several laws that were not suitable for the Türk social life, also caused the weakening of Il Khagan and thus the khaganate (Taşağıl, 2019, p.97).

As a result, we believe that the collapse of the Türk Khaganate in 630 cannot be reduced for a simple reason, the climatic conditions, but it is evident that the climate crisis has been a catalyst that has accelerated developments.

### 3.4. The Impact of Climate on the Re-establishment of the Türk Khaganate

After the definitive defeat in 630, the Türks dispersed in three directions. Some of them joined the Sir Tardush Khaganate and strengthened them. Another part settled in the oasis cities on the skirts of the Tian Shan and in the Tarim Basin and

formed the basis of the Karakhanid State that would emerge later here (Taşağıl, 2022, p.65).

The majority of the Türks, stated in the chronicles to be about one hundred thousand people, were settled in Northern China by Tang Taizong. With this decision, Tang Taizong wanted to emphasize that he was also the legitimate ruler of all steppes. He even received the title of '天可汗 - Tengri Khan' proposed to him (Wang, 2013, p.36). While this attitude surely indicates the expansionism of the Tang Empire, there are also those who regard the steppe (Xianbei)-based Tang dynasty as a project of integrating the Chinese civilization with the steppe. For example, Gumilev (2008) likened Tang Taizong to Alexander the Great and commented that Tang Taizong tried to put forward a synthesis of Chinese and steppe cultures, just as Alexander the Great tried to unite the Hellenic and Iranian peoples (p.256-257). There is some evidence that Tang Taizong also thought this way. In the Zhizhi Tongjian it is written that two years before his death (in 647) Tang Taizong said: '自古皆貴中華，賤夷、狄，朕獨愛之如一，故其種落皆依朕如父母。- From ancient times till now, the Chinese have been honored and the northerners humiliated. However, I love them both equally as if they were my own children, and they see me as their father' (ZZTJ 198, p.6247). In our opinion, it is possible to evaluate the fact that Türk notables were given general positions in the Tang army as a result of this idea of Sino-steppe synthesis.

However, as can be seen in the expressions in the Orkhon Inscriptions, whatever the claim of the Tang dynasty, the situation resulting from the 630 defeat meant captivity for a significant part of the Türks. Tuli's brother Jiesheshuai 结社率, who was given the generalship, attempted a revolution in Jiucheng Palace on May 19, 639, but the revolution plan failed due to the storm. Despite the failure of the

revolution, the Tang administration was frightened. Consequently, most of the Türks, whose number exceeded one hundred thousand, were expelled from the Chang'an vicinity and settled in the north, despite the objections of Sir Tardush (Taşağıl, 2019, p.245). Seeing the collapse of the Eastern Türk Khaganate as an opportunity, Tang Taizong moved west at about this time, conquering the oasis cities in the Tarim basin one by one and establishing the 'Anxi Protectorate 安西大都護府' here in 640.

In the 670s, the Tibetans conducted successful military campaigns against the Tang Empire and dominated the Tarim basin. The Tibeto-Tang wars ended in 679 when the Chinese armies recaptured the city-states in the Tarim basin and re-established the administration called the '安西四鎮 Four Garrisons of Anxi' (Twitchett & Wechsler, 1979, p.286).

The first revolt against Tang domination among the Eastern Türks began precisely in this period, in the winter of 679, when two leaders named Ashide Wenfu 阿史德溫傅 and Ashide Fengzhi 阿史德奉職 persuaded Nishufu 泥熟匐 of the Ashina clan to become the khagan. Although this revolt movement, which spread over a wide area, had some successes at first, the Türk revolt forces were defeated by a massive Tang army of about 300,000 under the command of Pei Xingjian 裴行儉 (JTS 194a, p.5166).

Undeterred by the failure of the first revolt, Ashide Wenfu had Il Khagan's nephew Funian 伏念 declared khagan in 680, but in the meantime, they fell into a severe famine in the north of the Karakum region. Despite these unfavorable conditions, the Türk forces managed to defeat the Chinese armies in four different places under the leadership of Ashina Funian. However, they were eventually surrounded and starved by the Chinese army from the south and the Toquz Oghuz

forces from the north. Pei Xingjian promised the Ashina Funian and Türk commanders, who lost their troops, that their lives would be spared, and they surrendered in return. However, this promise was not kept, and 53 Türk chiefs, including the khagan Ashina Funian, were publicly executed in the eastern market (Dong-shi 東市) of the Tang capital Chang'an (Taşağıl, 2019, p.334).

Upon the failure of the second revolt against Tang domination, the majority of the Türks (approximately 5000 according to JTS) led by Kutluk (Chinese: Guduluo 骨咄祿) moved to Chogay Kuzu Mountain (Zongxai Shan 總材山 ), located far from Chinese military power. ) and took refuge there (JTS 194a, p.5167). Kutluk, who would start the third rebellion, moved from Chogay Kuzu to Karakum (Kara Kumug) Castle/city (Chinese: Heishacheng 黑沙城) and increased his power by plundering the numerous sheep herds and horses of the Toquz Oghuz in this region (JTS 194a, p.5167), then declared his khaganate (Taşağıl, 2019, p.335). Considering the importance of horse and sheep in the steppe, which is emphasized throughout this work, there is no doubt that Kutluk inflicted significant damage on the Toquz Oghuz and strengthened his tribe's stature with these hit-and-run operations. In fact, it was the power he gained as a result of these raids that made Kutluk decide to declare his khaganate (Chen, 2021, p.20). Taşağıl (2022) likens this situation to Bumin Kağan's acquisition of manpower by linking the Töles tribes to himself before raiding the Rourans in 552 (p.75).

Research studies on inscriptions and Chinese sources have led to discussions about the location of the enemies of the Türks, the Çuğay Kuzy Mountain, Karakum, and Kök Öng River. Orkhon Valley, the former homeland of the Türks, was in the hands of the Toquz Oghuz, who replaced the Sir Tardush as a result of the attack they

carried out with the Chinese in 646, and the Toquz Oghuz domination area extended to the south, up to the Khangai Mountains (Hamilton, 1962). Kök Öng River is today's Ongi River (Czegledy, 1962, p.61; Giraud, 2007, p.218; Taşağıl, 2020b, p.80). Hirth (1899) emphasized the possibility that what is meant by Karakum is the entire Gobi Desert (p.31). Hao Chen (2021), who says that Çuğay Kuzy Mountain must have been located in the northwest of today's Shanxi, argues that Karakum should not be sought in the north of Gobi since it is known that Çuğay Kuzy and Karakum are side by side (p.24). As a result, it is possible to say that Kutluk and the Türks who joined him were located in the south of the Toquz Oghuz, in the north of the Tang Empire, and in the west of the Khitans, mainly in the north of today's Ordos and around the Gobi Desert (Czegledy, 1962, p.58).

When the Türks had just declared their independence and were plundering the herds of the Toquz Oghuz around the Ongi River, they were joined by a good soldier and strategist who knew China very well because he had lived in China for a long time. This person was Ashide Yuanzhen 阿史德元珍 or with his more well-known name, also the name we encounter in the inscriptions Tonyukuk 𐱅𐱃𐰾𐰚 (Chinese: Tunyugu 暾欲谷), who joined Kutluk as soon as he succeeded in escaping from the prison he was in. Kutluk, who was very happy that Tonyukuk joined him, appointed him Apa/Baga Tarkan and gave him the command of the armies (JTS 194a, p.5167; Taşağıl, 2020b, p.84; Aydın, 2020, p.96).

The political developments after this point can be followed in the 8-17th lines of the Tonyukuk Inscription. It is explained very clearly in the lines that the independence movement of Kutluk, a descendant of Ashina, worried the Toquz Oghuz, who were utterly discomforted by the strengthening of the Türks, and for this

reason, they sent envoys named Tongra Eshim to the Khitans in the east and General Ku to China and attempted to establish a Sino-Kitan-Toquz Oghuz alliance (Aydın, 2019, p.106). Tonyukuk, who heard about this attempt thanks to a fugitive who took refuge with the Türks, said that "it is easy to defeat the enemy when he is weak" and asked Kutluk Kagan's permission to act on the Toquz Oghuz without wasting time. Thereupon, Tonyukuk, advancing to the north with a force of about two thousand people, defeated the army of the Toquz Oghuz people of six thousand people in the Ingek Kölek (Cattle Lake) locality (p.107-108). Thus, the khaganate was strengthened by surviving the greatest danger before the forces that were hostile to it could form an alliance.

Many horses needed by the Tang cavalry were captured by the Türks in a large number of raids from the center of Karakum to the north of the Yellow River, corresponding to today's China's Shaanxi, Shanxi and Ningxia provinces (ZZTJ 202, p.6388). Then, after a series of battles against the Tang armies, the Türks managed to drive the Toquz Oghuz out of the Ötüken region and settled in the Orkhon Valley for sure. During the later period of Kapgan Khagan, the II. Türk Khaganate succeeded in catching the power of the First Khaganate period. According to Hao Chen (2021), the Türk Khaganate thus took its place in history as the only steppe empire that managed to resurrect after being destroyed, unlike the Xiongnu and Rourans before and the Uyghur and Mongolian examples after it (p.8).

In summary, as a result of a series of revolts that took place between the years 679-691, the Eastern Türk Khaganate succeeded in obtaining its independence. However, this period also coincides with another climate crisis that is likely to have had worldwide effects.

A remarkable document in Chinese sources regarding the climate crisis experienced in this period is in the section titled Bian Yi Dian 邊裔典 of the encyclopedic work Gujin Tushu Jicheng 古今圖書集成. According to the report written by a minister/official named Zeang, the whole steppe had been in drought for three years, and people were in a miserable condition and were taking shelter in China. The color of their lands had turned red from the loss of grass:

> 臣比在同城，接居延海西，逼近漠 南口，其磧北突厥來入者，莫不一一，臣所慰察。比者 歸化，首尾相仍，攜幼扶老，已過數萬。然而瘡痍羸憊，皆無人色，饑餓道死，頗亦相繼。先九姓中遭大旱，經 今三年矣，野皆赤地，少有生草，以此牛馬死耗，十至 七八。今所來者，皆是稍能勝致，始得度磧。磧路既長， 又無好水草，羊馬因此重以死盡，莫不掘野鼠，食草 根，自相殘命，以給餱食。臣具委細，問其磧北事，皆異 口同辭。又耆老云，「自有九姓來，未嘗見此饑饉之甚。」
>
> I was recently in Tongcheng. The city is located on the shore of the Juyan Sea [Gasiun-nor Lake in present-day Inner Mongolia] and very near the southern entrance of the desert to the west. I consoled and observed the Türks who had come from the north of the desert and entered here one by one. Not long ago they came in endless rows to declare their devotion; They carried their young children and brought their elders with them. Their number was well over twenty-thirty thousand, but they had wounds, they were very weary, and they were all no longer human; Many died of hunger on the way. There was a drought among the Toquz Oghuz before, and the drought has been going on for three years to this day: In all the meadows the soil has turned red and there

> is little grass growing on it; because of this, seven or eight of the ten cattle or horses perished. Now, those who have come here are also burned by all this, and thus they were able to cross the desert, but the road in the desert is very long, and there is neither good water nor good grass there. As a result, sheep and horses perished during this time. They had to dig the field mice out of the ground and eat grass roots; They killed each other to get supplies. I asked them all the details of the events in the north of the desert and got the same answer from different mouths. Also, an old man told them that he had not experienced such a terrible famine since the existence of the Toquz Oghuz (GTJ Bianyi Dian, 132; Liu, 2019, p.489).

According to these expressions, a drought occurred again in the steppe, and it affected everyone who practiced the pastoral nomadic lifestyle. The text mentions a loss of up to 70% of livestock, and even if the number is exaggerated, it is evident that there happened a severe disaster and famine.

Scuderi (1990) stated a lack of growth in all trees in the Cirque Peak region of California in 687 and attributed this to an as yet undetermined volcanic eruption between 685-687. (p.75). The study of Salzer & Hughes (2007) also shows that pine trees in Colorado experienced growth failure in 684-685 (p.65). Rigl et al.'s (2015) study includes findings of a possible major eruption in 682 that affected both the northern and southern hemispheres (p.5). As a result, drought and famine events, which are known to have occurred in the Mongolian plateau steppe in history, coincide with the data on the volcanic eruption.

It is possible to find similar famine and migration narratives in the Orkhon Inscriptions, just like the famines due to the climate crisis during the collapse of the

I.Gök-Türk Khaganate and the establishment of the II.Gök-Türk Khaganate. On the south face of the Kultigin Monument, on lines 8 and 9, Bilge Kagan criticizes the Turks who left Ötüken (Orkhun Valley) and went to China, narrating that the Turks were devastated in China:

> You went everywhere (and) without listening to the words (and their consent) of your khagans who fed you (and) you were destroyed (and) exhausted. Those of you who (however) stayed there were walking (in an almost) exhausted and helpless (state) in every direction (Tekin, 2006, p.23).

The same expressions can be found on the seventh line of the north face of the Bilge Khagan Monument (Tekin, 2006, p.47; Aydın, 2019, p.76). It is possible to guess that what is meant here is the tribes that settled in China after the tribe revolts of 711-716 in the last years of Kapgan Khagan's rule. As a matter of fact, it is known that the Toquz Oghuz left their homeland in 716 and took refuge in China (Taşağıl, 2019, p.363). As a result, Bilge Khagan's expressions are remarkable in that they reveal parallels with the report given above. According to the plot, which is known to have been repeated many times before, famine broke out in the steppe, the Türks and other tribes living in the steppe were affected due to the famine, some of the Türks took refuge in the Chinese territory and fell into a difficult situation there (Pei & Zhang, 2014, p.2).

Similarly, famine is mentioned in the Orkhon Inscriptions with the following expressions: 'I always sat on the throne and gathered the poor. I made the poor people rich; I made the few people more" (Tekin, 2006, p.23). Also, on the 31st line of the eastern face of the Bilge Kagan Inscription, the word "yud", which continues to live

today in Kazakh Turkish and Mongolian as "frost disaster," as a response to famine, is used (Aydın, 2019, p.92).

Ganiev and Kukarskih (2018) are of the opinion that the climate crisis in this period may have made the struggle for independence of the Türks more difficult but also may have enabled them to rise. According to the sources, the Türks surely benefited from the loss of livestock of the tribes that were more affected by the famine, and thus, they easily subjugated other tribes, particularly the Toquz Oghuz (p.186). As a matter of fact, in the text we quoted above, it is important to state that the Toquz Oghuz (九姓) were affected by drought as much as, if not more, than the Türks (突厥). Also, in the Tonyukuk Inscription, it is reported that the situation of the Türks just before the start of the operation against the Toquz Oghuz was better than both the Toquz Oghuz and the Chinese, thanks to the plundering:

> When Ilterish became the khagan, he greatly defeated the Chinese in the south, the Khitan people in the east, and the Oghuz in the north. I was the wise man, the commander-in-chief (at that time). We had made Karakum our home with Çuğay Kuzy. We lived by eating wild animals, eating rabbits. The people were fed. Our enemies were around like grain husks and straw (poor, in misery), we were vast (in abundance) (Aydın, 2019, pp.105-106).

Ercilasun (2016) translated the same expressions into today's Turkish as 'We were sitting eating wild animals and rabbits. The nation was fed. Our enemies were around like birds of prey; we were like a share to be divided.' (p.601). In any case, it is understood that the situation of the Türks was too much better than their enemies before the Toquz Oghuz campaign.

In our opinion, it is to be reminded that the climate is not the only determinant here, as it was during the collapse of the First Türk Khanate between the years 627 and 630. According to Gumilev (2008), the fact that the Tang army had to fight the Tibetans until 700 helped the success of the Türks (p.340). Roux (2001) also states that after defeating the Tuyuhuns, the Tibetan Empire became a great power and caused significant damage to the Tang dynasty (p. 159).

However, as a result of a volcanic eruption, the results of which were understood to be felt in both hemispheres, it is clear that there was a drought and famine affecting both the Türks, the Toquz Oghuz and China, but Kutluk and Tonyukuk were able to profit from this situation. First, they settled in the Karakum region between the border of the Toquz Oghuz and Tang Empire, from this region raids were made to the Tang cities in the south and the Toquz Oghuz herds in the north and the enemies were defeated. If the expression '突厥興亡, 唯以羊馬為準 – The rise and fall of the Turks depend only on the presence of sheep and horses' in Jiu Tangshu (JTS 62, p.2360) taken as a steppe rule, it can be estimated how much damage the plundering raids did to the Toquz Oghuz and how utterly the same raids strengthened the Türks.

Then, with Tonyukuk's suggestion, the Orkhun-Tola valleys were recaptured by taking action against the Toquz Oghuz before the three enemy forces could unite. In this respect, Jean-Paul Roux (2001) likened Kutluk Khan to Genghis Khan and Tamerlane (p.145). Suppose the opinion of Di Cosmo, Oppenheimer and Büntgen (2017) is to be repeated at this point. In that case, that it is not the climate crisis that is decisive but the decisions that are preferred in a crisis situation (p.10), it is possible to say that the rational politics of Kutluk and Tonyukuk succeeded in resurrecting the khaganate from the climate crisis.

## CONCLUSION

Climate crises resulting from volcanic and caldera eruptions have affected the formation of species and their evolution since the formation of life. Climate crises have also affected all humanity since the evolution of human life. Studies conducted in recent years have revealed the connection of many events in world history with climate change. The Late Antique Little Ice Age cooling, which started after the volcanic eruption estimated to have taken place in 536 and increased its effect with the eruptions of 540-547, is thought to be the most crucial environmental background that shaped the political history of the sixth and seventh centuries. There are disasters such as drought, famine, and plague epidemic among the events thought to be caused by global cooling. The dates of these disasters are synchronized with the political crises that took place in various parts of the world.

Our thesis emphasizes that the human communities living in the Eurasian steppes, especially the societies that maintain the pastoral nomadic lifestyle, are more sensitive to climate changes than the sedentary agricultural communities. The conditions provided by the Eurasian steppes and especially the Mongolian Plateau, which has an average altitude of 1650 meters, a permanent high-pressure area and scarcity of precipitation, pushed human communities to raise five animals consisting of horses, sheep, goats, cattle, and camels. The dependence of steppe plants, which are the only source of nutrition for the majority of steppe animals, on precipitation causes the destruction of all vegetation in case of drought, which in turn leads to the massive loss of livestock. The snow cover caused by snowfall outside the seasonal norms, called zud, is a severe disaster for the livestock and, therefore, the economic life of pastoral nomads.

It is understood that the political structures established by the pastoral nomads are more federative in nature, compared to the political institutions of the sedentary agricultural communities. The reason for this federative structure may be explained by the tribal organization based on blood ties, the sharing of pastures, and the nomads' constant need to spread to the vast steppes. Our thesis argues that the climate crises, which deeply shook the steppe economy, were influential in the establishment and collapse of these federative structures.

The establishment of the Türk Khaganate developed in synchronization with the 536-540 climate crisis. The severe climate crisis that supposed to have initiated the Late Antique Little Ice Age was described with the expressions such as the "darkening of the sun" in Mediterranean sources and is likely to have occurred as a result of volcanic activity, as revealed by the data obtained from the ice cores and tree rings in recent years. We emphasized the fact that the Altai Mountains region, where the Türks first settled, was a more humid region than the grassland steppe where the leading tribes of the Rouran Khanate were supposed to lived. The abundant water sources at the feet of the Altai Mountains might have enabled the Ashina tribe to survive the 536-540 crisis with less loss. We have shed in light that the climate crisis caused a crack in the federative structure of the Rouran Khaganate and the Toles Revolt might be a result of the crisis. The Türks didn't hesitate to take advantage of the unfavorable circumstances in the steppe empire that they were attached to. Uniting their force with the Töles tribes, Bumin Khagan defeated the Rourans, and thus, the Türk domination replaced the Rouran one.

It is noteworthy that in the 29 years between 552-581, when the Türk Khaganate dominated all steppe tribes and put pressure on Northern China, there was no serious climate crisis, despite the continuation of the Late Antique Little Ice Age

cooling conditions. However, during the following period of 581-585, the Türk Khaganate was divided into two separate khaganates, and an internal conflict took place, and finally, Ishbara Khagan accepted the Chinese vassalage. It is remarkable that the period was synchronized with another global climate crisis after volcanic activity, just like the crisis in the years 536-540. In this process, we revealed that the impact of the Chinese diplomat-general Changsun Sheng's subversive activities was exaggerated in Chinese sources, and that the main reason behind the crisis of the khaganate was the unfavorable climatic conditions and the federative structure of the state that Changsun Sheng and even the Chinese emperor Sui Wendi took advantage.

The climate crisis during the fall of the Türk Khaganate is a better-researched issue. The khaganate, being recovered after Shibi Khagan, meddled in China's internal affairs and even acquired vassal forces in North China during the disintegration of the Sui dynasty. The Türks maintained their authority in the steppes and Northern China even after the Tang dynasty, which had seized Chang'an with the Türk support, strengthened and unified China. As the other researchers who studied the period before us, we also shed light on the adverse impacts of the climate crisis between the years 627 and 630 on the fall of the khaganate. We argued that the climate crisis was not the only reason, although the cold summer seasons, which lasted for several years and experienced snowfall, significantly damaged the steppe livestock. We have demonstrated that this grave climate crisis led to rebellions and disintegration, not only because of the gravity of the crisis but also due to Il Khagan's decision to levy the taxes on tribes who already had lost the majority of their livestock. Also we emphasized that the nomadic khaganate's federative structure facilitated its fall in crisis conditions. We stated that the succession crisis within the Ashina family, the division between the Il and Tuli Khans as the third factor, and Tang Taizong and his

commanding staff's familiarity with the Türk war tactics and Türk mentality could be considered as the fourth factor. As a result, the Türk Khaganate, which was on the verge of ending the Tang State by capturing Chang'an in 626, broke up rapidly between the years 627 and 630. When Il Khagan arrived in Northern China to hunt with his tribe, he had already lost his state. The Sir Tardush Khaganate had been established, and the tribes affiliated to the Türks had already been attached to the Tang State.

There occurred another climate crisis during the period when the Türk Khaganate reached independence under the leadership of Kutluk as a result of the rebellions that started in 679. The pieces of evidence of famine in this period, both in Chinese sources and in the Orkhon Inscriptions, are consistent with data from recorded droughts and famines in many parts of the world in the 680s and with data obtained from ice cores and tree rings.

In summary, five volcanic eruptions were detected both in ice cores and tree rings in the sixth and seventh centuries (approximately 536, 540, 581, 626, 682). The consequences of these eruptions, such as drought, zud, and famine, which can be detected in historical chronicles, are synchronized with the well-known political crises in steppe history. The fragility of the steppe vegetation and livestock, in other words, the fragility of the whole pastoral nomadic economic structure against climate crises and the federative structure of the steppe political organizations make political turmoil inevitable, particularly in the presence of maladministration at home and the presence of neighboring powers that turn the crises into opportunities.

We believe that this analysis, which was carried out by examining the history of Türks within the context of a specific climate crisis period (Late Antiquity Little

Ice Age), using the data of sciences such as volcanology and climatology, as well as primary sources, can be applied to the entire political history of the steppe.

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