

## The climate cooling of 536 – 545 AD and the rise of the Turkic Empire

Rustam Talgatovich Ganiev

Ural Federal University named after the first President of Russia B.N. Yeltsin, Mira St. 19, Yekaterinburg, 620002, Russia

**Abstract.** The work analyses the natural anomalies of 536-546 AD with the help of modern climate data and written sources. The period in question was noted for its sharp and long lasting cooling that led to global ethno-political changes in the Medieval Ages. It exerted a strong influence on Central Asia and the nomads who peopled it – the Turks (Tujue). This work is the first to advance the thesis on the influence of natural and climatic anomalies of 536 – 545 as being the main prerequisite for the birth and rise of the ancient Turkic state – the Turkic Empire. The Turks took advantage of the complicated political situation in the region and set up a powerful and military efficient state. Thus the Turkic Empire became a stronghold together with other powerful states of the time, namely: China, the Sasanian Empire and Byzantium which grew weaker due to extreme climate impact (starvation and plague).

[Ganiev R.T. **The climate cooling of 536 – 545 AD and the rise of the Turkic Empire.** *Life Sci J* 2014;11(12):496-499] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 97

**Keywords:** Turks (Tujue), Turkic Empire, China, climate change, dendrochronology, volcanic eruption

### Introduction

The several past decades have witnessed a growing interest among scholars in the problem of climate changes in the past and their influence on human society [1, 2, 3, 4, 5, 6, 7]. The interest has been enhanced not only by the contemporary picture of global warming [8], but also by the necessity to give a broader and more in-depth explanation of the complicated processes that take place in human society. The beginning of the 21<sup>st</sup> c. has offered science additional possibilities and instruments for the study of this or that historical phenomenon. Natural science methods help us recreate the historical past in a more objective and trustworthy way. To get a clearer picture of the climate changes in 536 – 545 AD, we have to turn to the investigations made by dendrochronologists, palaeoglaciologists, volcanologists and even specialists that study cosmic bodies without the help of whom the historical picture would not be full. The materials of modern climatological investigations will be compared with data from documentary sources and the information about the political and socio-economic events that took place in China and in the Turkic Empire. We will try to show the cause-and-effect relationship between these two events on the basis of these data.

### The climate extremes

The history of the Turks (Tujue) contains numerous debatable questions. One of them is the problem of the origin of the Turkic Empire and its early history. The Turks are first mentioned in Chinese chronicles in 534 AD [9, p. 6]. The Chinese informed us that the Turks (Tujue) were strengthening their positions and had become a

consolidated community ready to establish trade contacts with their southern neighbor. Then there is information about the first appearance of the Turks on the Chinese border as buyers of Chinese goods, not as typical barbarians attempting to use military force to seize these goods, as they are often depicted in Chinese sources. Of importance here is the assortment of goods that the Turks wanted to buy. The first party of silk that the Turks had planned to buy was to contain the waste material of the silk industry. Later sources do not mention this factor. To all appearances, at that moment the Turks did not have the means to buy pure silk, so they had to make do with the waste material. Thus, in 534, the Turks were the first to come forth with an initiative to enter the Chinese market for the first time, without even having a real possibility to enter full-scale trade operations.

We come across the Turks being mentioned next in the year 545. Only nine years had passed between 534 and 545, but, as modern climatologists say, they were the most dramatic in the history of the medieval world because the mean annual temperatures fell to their lowest in the northern hemisphere in the last 2000 years [10].

This is what the well-known Byzantine historian Procopius of Caesarea wrote about the events of 536 – 537: “And it was in that year that the greatest wonder of all took place: during the whole year the sun shone like the moon, without rays, as if it were losing its strength. It stopped shining clearly and brightly. From that moment war and plague and other calamities that brought death raged on and on among people” [11, p. 274]. Similar phenomena were noted in 536 – 537 in many other corners of the planet: in Ireland, China, Chili, Europe and Asia.

The 536 – 545 climate anomalies have brought together a great number of contemporary scholars and scientists who are at present studying this phenomenon.

Participants of The Greenland Ice Sheet Project (GISP) have been studying samples of ice cores from Greenland and the Antarctic [12]. The research undertaken has shown that the samples of the years 536, 538, 539, 541 and 543 from Greenland have a high content of sulfate [13], which speaks of its high content in the atmosphere in that period and of the low temperature of its formation.

Dendrochronologists have been studying tree rings to see the changes in climate. One of the longest tree ring chronologies was made by Russian scientists working on the Yamal Peninsula [14]. The 536 – 545 climate extremes are reflected in this chronology as well. These studies show that the years 536, 537, 543 and 545 were the coldest with the most extremes [14, p. 9].

Climatologists and dendrochronologists study the impacts of the natural phenomena that took place whereas volcanologists and astronomers search for the reason of possible natural cataclysms.

Volcanologists study specimens of lava and traces of eruptions that took place in the past. They analyze the chemical composition of ores and the activity of volcanoes. Some of these scientists hold to the opinion that the reason for the extreme cooling of 536 – 545 AD could have been the eruption of Krakatau on the Philippines or Tavurvur in Papua-New Guinea [10, 15].

Another group of scientists thinks that the reason for the anomaly could have been the fall of a comet or asteroid [16] on the earth, but here we come across the problem of pinpointing the exact place where the cosmic body fell. Dallas Abbott, a climatologist from the USA, says that it could have been the Gulf of Carpentaria in the north of Australia [17].

Dr. Dallas Abbott is also working on the hypothesis that the 536 – 545 climate cooling was caused by both volcanic and cosmic factors [13]. Dr. D. Abbott holds to the opinion that the dramatic events that took place in 536 – 537 led to the fall of temperature by 3°. Researchers have found traces of volcanic activity in the core of Greenland ice, but the eruption of a volcano in 536 would not have been strong enough to cause such a sharp change of climate. Dr. D. Abbott thinks that though there was a volcanic effect, the fall of a cosmic body on the earth could have been the main factor. As proof of this, specimens of Greenland ice have shown to contain particles of alien origin with a content of Ni-rich material and Fe oxide-rich spherules, which are characteristic for cosmic bodies [13].

Scientists say that Halley's Comet, which appeared in 530, could have been the celestial body that caused the natural anomaly. In that year the comet appeared in its brightest form ever. The Byzantine chronicler Ioannes Malalas wrote: "During the reign of Justinian I there appeared in the west a huge, terrifying star from which a white ray led upwards, causing lightning. Some called it a torch. It shone for twenty days, and there was a drought, and in the towns people were killed and many other terrible events took place" [11, p. 474].

The extreme cooling had a very bad impact on many people in the medieval world. This was the period of one of the worst epidemics called the Plague of Justinian. It is the first known pandemic of a plague known in history and it received the name of the Byzantine Emperor Justinian I. More than 100 million people fell victim to it. It is thought that the plague began in Egypt in 540 – 541 (other sources say it was Ethiopia). It spread along the Mediterranean trade routes and reached Constantinople from where it spread to all of Byzantium, then to the countries of North Africa, to Europe, to Central and South Asia and Arabia. However, latest genetic research has shown that Central Asia was the place where the pathogene of Justinian's Plague first appeared, it was not Africa [18]. Such rodents as marmots, gophers, gerbils, rats and mice are the natural reservoirs of the plague. Swarms of fleas thriving on the rodents in the region were the carriers.

### **The rise of the Turkic Empire**

It is not accidental that after 534 Chinese sources say nothing about contacts between the Turks and the Chinese until 545. One of the possible reasons could be a slump in the economy and a decrease in population both in China and in the Turkic Empire. Moreover, a civil war was in progress in 534 – 535 in China, as a result of which the Northern Wei Dynasty split into the Eastern Wei Dynasty and the Western Wei Dynasty. In 536 – 537 Northern China lost 80% of its population due to starvation [19].

The main difference between the Turks and the Chinese was the nomadic way of life of the Turks, traditional for the nomads of Central Asia. It is the nomads who are most susceptible to changes of climate, more so than farming societies, that is why it was the Turkic Empire that must have suffered most in 627 – 630 when the Eastern Turks (Tujue) came to be under the rule of China [20], though in the mid-6<sup>th</sup> century conflict the Turks took the upper hand. Let's analyze the most notable events of the period.

In 534 – 545 there were four main powers in the region: the Eastern Wei Dynasty, the Western

Wei Dynasty, the Rouran Empire and the recently formed Turkic Empire dominated by the Rouran Empire which kept it in the background though in 534 it managed to show itself to the Chinese as a new independent political power [9, p. 6].

Both dynasties (the Eastern Wei and the Western Wei) rivaled in their efforts to establish friendly relations with the Rouran Dynasty by way of marriages. The struggle continued against the background of climate anomalies which brought to an economic slump, that is, the Chinese were most probably also suffering a depression. The Rouran Dynasty took advantage of the situation the Chinese found themselves in, but lost control over the internal situation in their own empire. The Western Wei Dynasty turned to the Turks for help. Thus we see that a new center of political and military power appeared in the region in which the Turks came to play the leading role [9, p. 11].

The Turks rose to a new stage of power as a result of their military victory over the Tiele tribe in 546, which posed a threat to the Rouran Dynasty, that is, the Turks took upon themselves the defense of the Rouran Empire. The final mistake made by the Rouran Dynasty was their refusal to enter into a marriage with the Turks which led to the development of a confrontation. Then it took the Turks seven years to strengthen their positions after the climate cooling of 536 – 545 after which, in 552, they occupied the place of their sovereign in the region.

### Conclusion

Thus we see that in the political events of 534 – 545 the climate cooling served as a catalyzer that aggravated the internal and external struggle between China's dynasties. In its turn, this led to a more critical situation for the nomads in the steppes, the nomads themselves also being in a very complicated situation. The internal political struggle in China in 534 – 535 and the anomalies of 536 – 545 that aggravated the situation were the prerequisites that led to military and political changes in the region. They weakened China and helped the Turkic Empire rise to power in the conditions of a sharp rivalry with the Tiele and the Rouran. Thanks to a timely mobilization of their inner resources and the personal qualities of their leaders the Turks turned out to be more successful in this struggle.

### Acknowledgement

The research for this paper was funded by the Gerda Henkel Stiftung. I would like to thank Dr. Dallas Abbott (New-York, USA) and Dr. Rashid Khantemirov (Yekaterinburg, Russia) for the helpful and constructive comments and suggestions.

### Corresponding Author:

Dr. Ganiev Rustam Talgatovich  
Ural Federal University named after the first President of Russia B.N. Yeltsin  
Mira St. 19, Yekaterinburg, 620002, Russia

### References

1. Hsiang, S.M., M. Burke and E. Miguel, 2013. Quantifying the influence of climate on human conflict. *Science*, 341 (6151) : 1235-1237.
2. Bai, Y. and J. K. Kung, 2011. Climate shocks and sino-Nomadic conflict. *Review of Economics and Statistics*, 93 (3) : 970-981.
3. Zhang, D.D., P. Brecke, H. F. Lee, Y.-. He, and J. Zhang, 2007. Global climate change, war, and population decline in recent human history. *Proceedings of the National Academy of Sciences of the United States of America*, 104 (49): 19214-19219.
4. Büntgen, U., W. Tegel, K. Nicolussi, M. McCormick, D. Frank, V. Trouet, J. O. Kaplan, F. Herzig, K.-. Heussner, H. Wanner, J. Luterbacher, and J. Esper, 2011. 2500 years of European climate variability and human susceptibility. *Science*, 331 (6017) : 578-582.
5. Ganiev, R., 2014. The Impact of Climate Extremes on Historical Processes in Central Asia in the Early Medieval Period from the 6th to the 10th Centuries. *World Applied Sciences Journal*, 30 (12) : 1741-1745.
6. Zhang, D.D., H. F. Lee, C. Wang, B. Li, Q. Pei, J. Zhang and Y. An, 2011. The causality analysis of climate change and large-scale human crisis. *Proceedings of the National Academy of Sciences of the United States of America*, 108 (42) : 17296-17301.
7. Zhang, Z., H. Tian, B. Cazelles, K. L. Kausrud, A. Bräuning, F. Guo and N. C. Stenseth, 2010. Periodic climate cooling enhanced natural disasters and wars in China during AD 10-1900. *Proceedings of the Royal Society B: Biological Sciences*, 277 (1701) : 3745-3753.
8. ACIA, 2004. *Impacts of Warming Arctic: Arctic Climate Impact Assessment*: Cambridge University Press, pp: 140.
9. Liu Mau-Tsai, 1958. *Die chinesischen Nachrichten zur Geschichte der Ost-Turken (Tu-kue)*: Otto Harrassowitz Verlag, pp: 831.
10. Keys, D. P., 2000. *Catastrophe: A Quest for the Origins of the Modern World*: Ballantine Books, pp: 368.
11. Procopius, C., 1998. *The Persian War. The Vandalic War. The Secret History*: Aleteya, pp: 574.

12. Jouzel, J., 2013. A brief history of ice core science over the last 50 yr. *Climate Past*, 9 : 2525-2547.
13. Abbott, D. H., D. Breger, P. E. Biscaye and A. J. Robert, 2014. Calendar-year dating of the GISP2 ice core from the early 6th century using historical, ion and particulate data. *Volcanism, Impacts and Mass extinctions: Causes and Effects*, G. Keller and A. Kerr (eds.), Geological Society of America Special Paper, in press.
14. Khantemirov, R. M., 2009. Dynamics of woody vegetation and climate change in the north of western Siberia in the Holocene, D. Sc. (Biology) thesis, Ural Department RAS, Yekaterinburg.
15. Southon, J., M. Mohtadi and R. De Pol-Holz, 2013. Planktonic foram dates from the Indonesian ARC: Marine 14C reservoir ages and a mythical AD 535 eruption of Krakatau. *Radiocarbon*, 55 (2-3) : 1164-1172.
16. Rigby, E., M. Symonds and D. Ward-Thompson, 2004. A comet impact in AD 536? *Astronomy and Geophysics*, 45 (1): 23-26.
17. Abbott, D. H., E. W. Tester, C. A. Meyers and D. Breger, 2007. Impact ejecta and megatsunami deposits from a historical impact into the Gulf of Carpentaria, Geological Society of America Annual Meeting, Denver, CO. *Abstracts with Programs*, 39 : 312.
18. Wagner, D. M., J. Klunk, M. Harbeck, A. Devault, N. Waglechner, J. W. Sahl, J. Enk, D. N. Birdsell, M. Kuch, C. Lumibao, D. Poinar, T. Pearson, M. Fourment, B. Golding, J. M. Riehm, D. J. D. Earn, S. DeWitte, J.-. Rouillard, G. Grupe, I. Wiechmann, J. B. Bliska, P. S. Keim, H. C. Scholz, E. C. Holmes and H. Poinar, 2014. *Yersinia pestis* and the Plague of Justinian 541-543 AD: A genomic analysis. *The Lancet Infectious Diseases*, 14 (4) : 319-326.
19. Durand, J. D., 1960. The Population Statistics of China, A.D. 2-1953. *Population Studies: A Journal of Demography*, 13 (3) : 209-256.
20. Fei, J., J. Zhou and Y. Hou, 2007. Circa A.D. 626 volcanic eruption, climatic cooling, and the collapse of the Eastern Turkic Empire. *Climatic Change*, 81 (3-4) : 469-475.

6/18/2014