

## PRELIMINARY OBSERVATIONS ON THE LITTLE ICE AGE IN ROMANIA

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**Key words:** chronicles, Romanian Countries, Little Ice Age.

**Abstract.** We have consulted several sources of information (chronicles and diaries) on the climate of the three Romanian Countries (Wallachia, Moldavia and Transylvania) during the 14<sup>th</sup> – 18<sup>th</sup> centuries and have found some characteristics of the Little Ice Age in the eastern part of Europe.

### Introduction

The diversity of the terrestrial climates depends on the energy released by the Sun, on the Earth albedo, and on the inclination of the Globe's rotation axis. Cyclical climatic variations in time, as well as other variations, e.g. the equinox precession phenomenon (variation in the position of the axis of the poles), variation of the axis and of the eclipse of the Earth's or bit are also factors contributing to climatic diversity. All these astronomic variables have entailed changes in insolation, which alongside variations in the chemical composition of the atmosphere, and in the astronomic and terrestrial phenomena of vast propositions, have in the course of geological time, produced climate changes from periods of heat to lasting glaciations.

In historical times, the memory of glaciers, of sediments and fossil pollen has retained the existence of longer or shorter climatic variations that have influenced the life and development of human society. But before devices to measure the temperature, the quantities of precipitation and wind velocities were invented, it was archives, chronicles, parochial registers, and travel journals that used to record unusual climatic phenomena which impressed people, caused damage or casualties.

One such phenomenon was the cold mediaeval period that lasted for four hundred years, between 1350-1400-1450 (or perhaps 1550) and 1800-1850, limits set by different researches as H.H. Lamb says (1977). It was a time of cold, lengthy winters and short, wet summers. Historian Emm. Le Roy Ladurie has studied this period by looking at the temporal expansion and thickness of alpine glaciers and at data on grapevine gathering in France. In his view, the Little Ice Age was not a monolithic period of climatic uniformity, because milder winters and dry summer

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did occur as well; he would wonder whether other regions had experienced a Little Ice Age simultaneously with Western Europe and if they had was it with the same intensity as on our Continent.

Few studies have tackled this period in Romania. An interesting work titled *Cavalerii Apocalipsului. Calamitățile naturale din trecutul României (până la 1800)* (The Knights of the Apocalypse. Natural calamities in Romania's past, up to 1800) by Paul Cernovodeanu and Paul Binder) deals with climatic events and their economic consequences in the three Romanian Countries, especially in the 16<sup>th</sup>, 17<sup>th</sup> and 18<sup>th</sup> century.

I deemed it opportune to overview some notes found in the travel journals of foreigners who passed through the Danubian Countries in the Middle Ages, e.g. foreign diplomats – Italians, Poles, Hungarians, later on Austrians, Catholic missionaries, Russian pilgrims, Turkish chroniclers (who used to accompany the Ottoman armies that often invaded these territories), as well as the observations on certain climatic phenomena made by some Moldavian and Wallachian chroniclers.

### **1. Climatological information from Wallachia, Moldavia and Transylvania (14<sup>th</sup> – 18<sup>th</sup> cc)**

As a rule, Moldavian and Wallachian chroniclers were concerned with the wars waged by their countries with the Turks, Poles, Tartars, Cassacks, Hungarians, later on with the Austrians, or the battles between various foreign armies stationed on Romanian territories (Turks with Russians, Turks with Hungarians), as well as the conflicts between ruling princes and the boyars or the intrigues made by certain families claiming accession to the throne. Therefore, these chroniclers usually offer scanty climatological information, mostly connected with other events in society. What they tell us is, for example, a harsh winter or a spell of heavy rainfall that had a bearing on the development of historical events.

The information supplied by foreign travellers is by far more comprehensive, acquainting the reader with the adversities of the inhospitable climatic conditions of their journey. Therefore, some of the adjectives attached to the phenomena they described might be rather subjective given the discomfort caused by disrupted time-tables, recollections of their native lands with more friendly landscapes, or better roads than those encountered in the Romanian Countries. Some descriptions are quite picturesque and moreover suggestive, some details (e.g. snow-pack thickness) offering insights into the scope and breadth of the respective phenomena.

From the very beginning, long and harsh winters (of which over 80 had been unusually difficult) have had a high incidence during the four-five centuries of Little Ice Age, e.g. 1331-1332, 1396, 1475, 1503, 1552, 1580, 1594-1595, 1597-1598, 1633, 1638, 1653, 1656-1657, 1657-1658, 1659, 1683, 1673, 1684-1685,

1700, 1701, 1704, 1706, 1709, 1735, 1742, 1759, 1768). Witnesses record a heavy winter, occasionally setting in early autumn (October), or lasting until late in spring (March, April), and associated with food shortage, famine, frost, freeze and casualties.

Some would mention snowstorms and a thick snow pack (in 1482, 1652, 1657, 1691, 1699, 1700, 1709, 1740, 1789-1790), such a description being more suggestive, more vivid than simply informing that, say, “winter was harsh”.

Here is what Turkish chronicler Mehmed Neshri wrote: *By the will of Allah, that year (1482 a.n.) the winter was very severe. And this expedition was made just in such a winter, when horses could not leave the track, **the snow reaching the stirrup**. Also plenty of thick snow covered the Danube. The army went and sat down on ice. **Right away the Padishah said: cities be pillaged. That day the battle lasted until evening.***

Andrej Taranovski, the Polish Consul assigned numerous missions to Wallachia, noted: *I arrived in Bucharest, at the place of the Wallachian Ruling Prince during the Easter Holiday (April 3, 1575 a.n.). There I had to endure dire starvation and necessities of all kind. True enough, famine and food shortage is so acute in those places that people would kill one another for a morsel of bread. Cattle are dying everywhere, eight of my draught cattle are dead, the others are limping. I must remain in Bucharest for another eight days because I am exhausted and tired from the journey. On the 26<sup>th</sup> of March it snowed so heavily, **that the snow reached up to people's shoulders**. Because of hunger and severe frost, villagers and peasants catch cranes and birds with their own hand.*

The Turkish chroniclers Silahdar Fyndyklyly Mehmed Aga wrote about the conditions encountered in December 1690: *The Islamic armies, singled out for this expedition against Transylvania, proceeded by Allah's will, after Ruz-y-Kasym (Oct. 26), but they had much to suffer from snow, rain and frost, the snow **being as high as the horses' chest** barred the roads, and the pedestrian army could no longer move on; many animals dying, the officers were left to go on foot ... great shortage of provisions ... the hardships and sufferings they endured had never been seen before.* Frozen rivers (the Dniester, Pruth, Dâmbovița and Olt) and more especially the Danube, are reported in many years (1482, 1594, 1597, 1603, 1636, 1640, 1654, 1656-1657, 1659, 1693, 1695, 1699, 1710, 1738, and 1740). So, the Turkish army, which frequently raided the Danubian Countries, crossed the channel on a bridge of ice.

Evlia Celebi, a famous Turkish traveller, historian, geographer and writer, made several journeys to the three Romanian Countries. In one of his Oriental-style descriptions (November 7, 1659), he appears full of sympathy for the Turkish inhabitants on the right bank of the Danube, and describing a Little Ice Age winter (1659-1660) he says: *Pitching their tents on the frozen Danube, many thousands of*

diligent people from Silistra have a good time eating and drinking. Turkish orchestras are asked to play and all young people are skating ... the snow is amazing ... If the Bairam happens to fall in this season, then big swings are mounted for all lovers to rock and have a good time, the Danube being frozen stiff down to 1.5-1.7 m). We also know that in severe years, ice on the River was 2.5 m thick, it becoming kind of a wall. This marvel is of Allah's wisdom. Many fishermen catch beluga and Black Sea sturgeon weighing about 130 kg each. The inhabitants of Silistra use to preserve pieces of ice for July, when they put them in stewed sour cherries, a crystal-clear compote like a Murano mirror, cooling themselves by drinking it. On the 25<sup>th</sup> of December, when in Giurgiu, Celebi continues: By the will of Allah, a biting frost turned the Danube frozen-stone in one night alone. Then, the army as large as the sea, stood on the other side of the Danube, and taking advantage of this occasion ... **the Mohammedans crossed the Danube on ice at Giurgiu ... laying waste all the villages and leaving no blade of grass or soul alive anywhere.**

Another famous travellers, Paul of Aleppo, Archdeacon of Damascus, who accompanied Patriarch Macarios the Third of Syria to the Danube lands on a six-year journey, writes: *This year, from the beginning of the month of Canon II (January 1654, a.n.) to the end of Adar (March) it snowed abundantly, the snow covered the ground until Easter. I have never before seen such snowstorms and frost, moisture and cold, even **edible oil and wine got frozen in the jars** - this observation confirms the reality depicted by Ovid, the Latin poet exiled to Tomis (A.D. 8-17), who experienced another period of cold prior to the onset of the Little Climatic Optimum. Here is what he wrote: Frost makes wine get frozen in the jars. This solid wine the barbarians crush with their teeth - a thing unknown to the people of our country. **The Danube froze three times: first it was some 75 cm thick, then it froze a second time and again a third time until ice was 2.25 m thick. To get water from the River, the inhabitants would dig kind of a surface canal. They say that something like this has not happened for the last 30 years.** Some notes speak of people having frozen hands and feet (1436-1437, 1441-1442, 1645 and 1690) of people having died (1594-1595, 1616, 1684-1685) or of frozen birds (1640).*

Achacy Taszychi, a Polish messenger on his way to the Sublime Porte, when passing by the town of Buzău (on March 23, 1640) wrote: *It was a biting frost, **the snow up to the horses's knees.** There was such a frost that **I caught two frozen birds on the way simply with my own hand**, a blackbird, and a thrush, I put them in my glove and I brought them alive to my host, gave them to their children, and remembered my dear Pawlowski nieces (also Madam de Sevigné tells about the frost that caused birds to die in flight).*

Although little mention is made of summertime, yet some notes report rainy and stormy weather (1583, 1653, 1678, 1716 and 1769), lightnings destroying steeples and killing herds of cattle, associated with high floods (1503, 1598, 1640, 1653, 1658, 1670, 1693, 1709, 1711, 1738, 1739, 1769 and 1783), invasions of locusts (1691 and 1710), wasps and mice (1670) all of which causing severe damage, destroying crops, vine-yards, bringing famine and the plague (1584, 1670, 1673-1675, 1693, 1717-1719, 1738, 1740 and 1790).

Piotr Perchevik, Archbishop of Marcianopol, Apostolic locum tenens in Moldavia (1668-1673), writes on the 20<sup>th</sup> of July, 1670: *in these provinces and particularly in Moldavia, terrible floods, frequent showers and heavy rainfall day and night raged for three months on end, destroying all of the best wheat, barley, oats, millet and all types of crop; because they lie in water and are attacked by too much moisture, they neither ripen nor bear seeds. Nor can the grasses and herbaceous plants in hay-fields grow for frost and water, or if they do, they cannot be harvested, the sun never warms or dries up the land; at the same time, overflowing rivers have flooded all the fields, carrying away everything, soil, grasses and plants, mixing them up with sand. Moreover, quite unexpected we saw myriads of mice on the territory of Bacău, at one day distance from the town (Bacău), and not only did they eat up all they found in the vegetable gardens ... but climbing up the trees ate all the fruit, finishing them up, and to end the job, they would gnaw even at tree branches, fully destroying them, and even worse they finished the wheat in the field, barley and the like. Frightened by this calamity the inhabitants would forecast famine and plague; last year, there was such a host of wasps in these parts and in Transylvania, that one could barely stay in-doors with the windows shut ...*

As a rule, in spring and autumn it rains, sometimes associated with disastrous flooding, storms and high winds. Often enough, winter begins as early as October, with snow and frosty weather, the snow lasting late into April and May. Unbearable hot weather, terrible heat, drought and famine are quite rare.

The Turkish chronicler Mehmed Neshri, recalling the summer of 1462 depicts a situation like in a fairy-tale of the Arabian Nights: the blazing sun made it so hot that one could prepare kebab (Turkish roasted lamb meat, a.n.) on the officers mail shirts.

In the Journal of Peter the Great one can read the following lines prompted by the battle of Stănilești on the Pruth River: *... the 20<sup>th</sup> of June 1711. Our march from the Dniester onwards was extremely difficult because of lack of water, scorching heat and tormenting thirst which caused many soldiers to vomit blood.*

Philippe Le Masson Du Pont, a military engineer in the service of the Polish king John III Sobieski, wrote in 1686, during the Moldavian campaign: *For three years now, I haven't seen any single drop of rain in all of Wallachia, neither in*

*Moldavia, where the climate is very warm, and at that time the weather was extremely hot, all lakes and ponds were dry ... the Bahlui River, on whose banks the capital-city stands and which is nearly as big as the Marne (river a.n.) was no longer flowing. In the swampy soil cracks were so deep that a standing man could not be seen ... I doubt that there is another exemple of such a terrible and lasting drought.*

However, now and then, we find pages in which travellers are seen to enjoy the beautiful and rich landscape, the climate that enables crops to ripen, and moreover people to cultivate even exotic plants. The same Paul of Aleppo writes: *One must know that in this country the first cucumbers, small and juiceless, get ripe at the feast of the Saint Apostles (June 29), while plum-trees, so-called "piogeon's heart", are so many that they look like an overflowing sea; plums are of different colours and varieties, white, yellow, red, in rusty, shades and very tasty; the sweet cherry-trees, bearing red fruit, are so numerous that one may take them for actual woods; there are also wonderful varieties of pears ... In the Prince's garden I saw some mulberry trees with sweet fruit, many apricot trees and also almond trees; I also saw a small tree with pomegranates planted in a barrel, and sweet lemons also grown in buckets ...* And he goes on saying: *the Greek and Cossack merchants and the soldiers, began running ... they flung in a field of wheat which, in that country, is usually taller than a man's height (an information, confirming Herodotus assertion when speaking about King Darius' armies which, in 531 B.C., that is before the Little Climatic Optimum, encountered in these places wheat fields higher than a man on horseback).*

There are cases when travellers get some insights into people's hardships and troubles caused not only by the capricious climate, but also by the historical conditions of the land *lying in the way of all evils*, as the Moldavian chronicler Grigore Ureche put it. On the 9<sup>th</sup> of October, 1677 Antonio Rossi, a Catholic missionary from Mondano writes from Cotnari Village: there is a rich crop of wheat and all kinds of eatables and wine, many of the vine-yard yield cannot be gathered because barrels to put the grapes into are missing ... in these unhappy places, where life is full of endless misfortunes, people are being robbed on the one hand by the Prince and on the other by bandits.

### **Conclusions**

Looking at the climate of the Romanian Countries (Wallachia, Moldavia and Transylvania) it appears that the Little Ice Age was obviously present also in Europe's eastern half. The coldest century was the 17<sup>th</sup>, in which some 30 winters are reported to have been extremely cold, with people freezing to death, with heavy

and lengthy snowstorms and thick snow packs, with frozen rivers that could be crossed by a whole army; cold, rainy summers, and large flooded areas. The 16<sup>th</sup> and 18<sup>th</sup> centuries featured 20 heavy winters each, but somehow fewer in the 15<sup>th</sup> century. Winters used to last until springtime, or begin in early autumn, so that the summers, which anyhow were cold, were short and little productive. A milder winter or a hot summer were a rarity. About a quarter of a century crops were good, the other quarter was marked by poor crops, famine every 3-5 years, epidemics and numerical decreases of population.

Maunder's minimum (1645-1715), underscored by Emm. Le Roy Ladurie for France and Chr. Pfister for Central Europe, shows a lapse of 60 years without sunspots, basically a period when the Sun was "on strike". It was one of the coldest periods in the Romanian Countries, too; the interval between 1710 and 1739, considered to be far milder in the West, did nevertheless remain cold in the East, with harsh winters (1711, 1735, 1738, 1739-1740), summers affected by floods (1712, 1715, 1736) or unusual droughts (1718, 1720, 1724, 1726, 1728), which brought about long periods of famine and plague that left tens of thousands of people dead.

Summing up, we would say that these preliminary observations indicate the obvious presence of a Little Ice Age in the Romanian Countries. However, since in certain years the climate of Western Europe had distinctively different manifestations from its Eastern counterpart, it is necessary to look in greater detail into the information sources reporting on the mediaeval climate of this part of the Continent.

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