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## PERCEPTION OF CLIMATE FROM THE 15TH CENTURY UP TO NOWADAYS

*Abstract:* An overview of perception of climate and early records about climate from the 15th century up to nowadays is presented. A special attention is paid to the awareness of the influence of climate and weather on the everyday activities and on human beings and other living organisms.

*Key words:* perception of climate, description and prediction of weather, bioclimatology, Slovenia, health resorts.

### 1. Introduction

The belief that the atmospheric environment affects human health can be traced back almost to the dawn of civilisation. The seasonal exodus of the rich from the squalor of cities to the cleaner and more comfortable environment of their country estates occurred also in ancient cities (Kevan 1993). During the height of summer big cities were notorious for their unhealthy conditions. The city was deserted by all but the poor. The upper class during summer months moved to their country villas, where summer living was quite pleasant. Farmers were even more dependent on climate and weather. Severe weather was threatening their efforts and sometimes jeopardise even their survival. As their prospering and existence depended on weather, they tried to develop rules in order to predict weather, not only for the current, but also for the next day or even for a longer period like the whole season, they were aware that a crop was highly weather dependant. They observed the behaviour of certain species of animals in order to find the relationship between their behaviour and weather development. Not by chance most of the sayings are dealing with weather. As good observers farmers were able to find out the relationship between weather changes and local weather signs. Some of them are still in use, the problem is that they are place dependant, applying them elsewhere, they could be misleading.

## 2. First Written Documents

In the 15th century observations and measurements were rare, at that time meteorology was under the strong influence of the church. Weather phenomena were regarded as God's work. During storms and severe weather people pried asking God for mercy. During drought they used to walk in procession praying for rain and abundant crop to avoid starvation. But there were also first attempts to describe weather. Paolo Santorini was the author of the first known description of weather conditions in Slovenia. There are evidences that farmers burned several witches in surrounding of Zagreb, blaming them for causing a bad crop. Believing that witches caused hail they burned one woman in 1751 in Zagreb, next year they burned two of them for the same reason. In Slovenia the last process against witches was reported in 1745.

## 3. Janez Vajkard Valvasor

Janez Vajkard Valvasor (1641–1693) in his comprehensive work “Slava Vojvodine Kranjske” (Valvasor 1689) in third chapter of the third book described weather and climate in Kranjska dukedom (Kranjska mostly correspond to the Slovenian ethnical territory). In fourth chapter he described a development of thunderstorms, hail, lightning and thunder. In spite the fact that the work was based only on the visual observations, it represents a valuable contribution to the development of meteorology in Slovenia. He described weather peculiarities and people's perceptions as well as positive and negative impacts on fruit and wine production.

Correctly he stated that a relatively small Kranjska has extremely diverse climate. He wrote that the air is mild, but weather changes frequently, not only in time but also in space and region. His description was clear as well as picturesque. Here are some examples: In Gorenjska during summer the air is fresh, nearly cold, because of altitude and proximity of snow in the mountains. Towards south it is warmer, or even hot. In Istria and Karst sun is broiling hot.

Rain and frequent hail mitigate heat load, the same effect has snow in the mountains, which provides clean and fresh air. Even during summer there are periods with outbreaks of cold air, especially when it rains or there is hail in the mountains.

In winter in Gorenjska snow still covers the landscape while in Dolenjska plants already started to grow; and in Istria it is already a flowering time. Winds are the strongest in winter on Karst. In mainland the strong winds occur during summer thunderstorms. On Karst and Istria ground is never frozen, but the cooling effect of wind noticeably increases the cold stress.

Fog is rare in Gorenjska, but in Dolenjska is quite frequent. In Ljubljana sometimes it is so dense that people do not see each other. His opinion was that fog is unhealthy and causes coughing and catarrh. Rain is frequent and abundant, even during summer in mountains sometimes it snows. Rain becomes more frequent and more abundant in autumn. During summer cold wind blows when it rains, on the contrary in winter warm wind brings rain. Sometimes drought or persistent rainy periods jeopardise crop.

## 4. Calendars and Chronicle

That was what Valvasor wrote about our climate, but not only intellectuals, also common people were trying hard to learn the signs predicting weather development. Farmers developed rules based on behaviour of animals, plants, on clouds or fog on the top of mountains, and they believed that Moon and stars have impact on weather.

Special attention should be paid to farmers' calendars. They predicted weather for each day, a weather type was denoted with a special weather sign, a purpose was to help farmers planning their field activities. In Slovenia farmers' calendars have a long tradition. The first known calendar was from the year 1726, and it was probably printed by Jurij Mayer; the oldest preserved calendar is from the year 1741.

J. G. Dolničar (1655–1719) in Chronicle of Ljubljana published an overview of weather conditions in the period 1660–1718 (Pučnik 1980). According to Dolničar an extreme amount of snow fell in 1660. In 1680 a crop was good, especially cereals and vine. In 1682 winter was unusually mild, in 1684 winter was very cold, the same happened the next year. Severe drought and hot weather caused damage in summer 1701. Precipitation was abundant in the years 1702 and 1703. In 1705 summer was dry, the 1707 was wet, the 1710 was wet and stormy.

In 1781 A. Muznik published "Klima Goroške" (Muznik 1781), a description of climate in Goriška region. Seidl (1902) published the description of climate in "Podnebjje Kranjske".

## 5. Hail Prevention

The first hail prevention started in 1713, they were shooting on cumulonimbus clouds from the city's castle. Marija Terezija with a special decree prohibited that kind of a hail protection. Because of numerous causalities, but after her death the shooting on cumulonimbus clouds became even more popular. The believe that shooting on clouds from cannons and mortars prevents hail became even stronger in the 19th century, when storms were frequent. The mayor of Slovenska Bistrica, Albert Štigler was one of the most devoted fans of hail protection.

## 6. Bioclimatology

In 1872 Dr. M. Samec published in Letopis Matice Slovenske for the year 1871 a paper dealing with impact of different climates on human well being. As example of two extremes he described the impact of hot tropic climate and cold polar climate. Beside the features of those two climates, he described distinctive diseases of such climates and the background.

According to him in temperate climate we encounter characteristic diseases for both extreme climates. In spring and autumn rheumatic and respiratory diseases are more frequent. In winter inflammations are prevailing. In summer, mostly in cities with pore hygienic conditions, epidemics of cholera and plague develop. He was

convinced that a temperate climate is the most suitable for human beings, his argument was that the most evolved nations live in temperate climate.

Arold Rikli settled in Bled in 1854, he established the first health resort with therapy based on healing effects of local climate. Climatotherapy was a cure lasting one month. The rules concerning cloths, food and prescribed activities were quite strict. Hiking was part of the healing therapy, so it was heliotherapy and bathing. Smoking and alcoholics were strictly prohibited. His patients were aristocrats from the most of European countries. After Bled many other climatic health resorts were founded in Slovenia, for example Jezersko, Martuljek, Rakitna.

Recently the interest in healing effects of climate increased. In the last years, climatology and perception of climatology is turning again more towards the effects of climate on humans and other living beings. Many health resorts are planing to introduce climatotherapy as a part of their standard therapy for their pretending guests.

## 7. Conclusions

In the pre-instrumental era people's perception of climate and weather was under the influence of the impacts on nature, human beings, animals and plants. Even at that time they were extremely good observers, able to detect even indirect relations. Farmers, depending on weather, were able to forecast local weather without instruments, taking into account only the local signs. Not only farmers, who directly depended on weather conditions, also intellectuals paid attention to climate and weather, considering climate and weather a determinant factor for health, safety and prospering of nations. But of course, also some irrational actions, based mostly on fear of extreme weather phenomena, developed among population. The most dreadful among them was blaming women (the so called witches) for causing weather hazards and condemning them to the stake.

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