CLIMATE DETECTIVES 2021 – 2022

Escuela de Pequeñ@s Científic@s Espiciencia, “Little
Escuela de Pequeñ@s Científic@s Espiciencia

RESEARCH QUESTION

IS THERE A RELATIONSHIP BETWEEN THE PATTERN OF ANNUAL TEMPERATURE CHANGE AND THE LOSS OF FOSSIL ICE IN THE TORCAS DEL SOMO AND VALNERA?

SUMMARY OF PROJECT

The Cantabrian Mountain Range in its easternmost zone is characterized by its karstic nature and its high presence of formations such as torcas and sinkholes, some of them almost 200 m deep. The mountains of Somo and Valnera, located in the north of the province of Burgos, are home to several of these cavities, the best known being the torcas de la Grajera, Monteros and Len.

This massif in turn formed part of a glacial valley, whose ice tongue extended to the area where the town of Espinosa de los Monteros is currently located.

Given the special climatic conditions that occur in this area (type climate...), many of the torcas have shown the presence of fossil ice, which has been dated and studied by various entities such as Paleoclimate and the Edelweiss group.

With this project we wanted to delve into the study of these fossil ices, the importance of ice and snow in shaping our landscape, their ethnographic importance and show that their disappearance is linked to global warming.

Figure 1: Extraction of fossil ice and measurement of its height in the Torcas del Castro Valnera

MAIN RESULTS

According to the consulted bibliography, the estimation of the age of the ice of the torca de la Grajera around the 18th or 19th century, would imply conditions clearly colder than the current ones, necessary for the accumulation and preservation of the ice at the bottom of the chasm. . The 19th century corresponds to the end of the so-called Little Ice Age, and it was especially cold in the Northern Hemisphere. Northern Spain was no exception, with temperatures exceptionally cold.

Previous CIEMAT paleoclimatic studies based on the analysis of stalagmites found average temperatures more than one degree Celsius lower than those existing in the 20th century, and possibly several degrees lower than today.

Other evidence such as the location of the bone remains of Ursus arctos in the adjoining caves, typical of much lower temperatures than the current ones, would support this hypothesis.

DECREASE IN ICE HEIGHT VS CLIMATE DATA:

As can be seen in the tables and graphs provided in the study, there is a clear relationship between the increase in global temperature and the decrease in the height of the ice of the investigated torcas, which shows the environmental changes produced by global warming. .

ETHNOGRAPHIC RESEARCH:

As we have gathered in our investigations, snow and ice have been linked to our area since ancient times (neveros, fresqueras, virgin, ski...). The change in precipitation patterns and the increase in average temperatures is causing a loss of this link between the nature of cold and our people.

FINAL CONCLUSION:

The changes in the climate that we are witnessing in recent decades are already evident today and impossible to deny. The study of those that occurred hundreds and thousands of years ago can help us decipher and manage the effects of the current ones, to which we cannot be oblivious and that are manifested, already in our day to day, in different forms and ways.

It is clear that this acceleration of the melting of many of the torques, which until a few years ago maintained perpetual cones, is a verifiable and accelerated fact. Therefore, it is not difficult to predict that we are witnessing the end of the last accumulations of ice in the Montes de Valnera, which preliminary studies date back to the Little Ice Age, a cold period that spanned from the beginning of the 14th century to the middle of the 19th century.

Cave's name	Date of sampling (summer of)	ANNUAL AVERAGE TEMPERATURE (ºC)	AVERAGE ANNUAL PRECITATION (mm)	Ice height (m)
La Grajera	1981	13.75	560	22.25
La Grajera	2015	14.60	520	20
La Grajera	2016	14.25	680	14
La Grajera	2017	14.75	460	6.5
Blanca o de la Nieve	1984	12.75	700	15
Blanca o de la Nieve	2017	14.75	460	1.80
Len	1985	13.60	580	28
Len	2017	14.75	460	14.5

Figure 2: Fossil ice heights in the different taps vs. mean annual temperature for the different sampling years

ACTIONS TO HELP LESSEN TO THE PROBLEM

Figure 3: Espinosa de los Monteros SDG 2030

Global warming is here and it is drastically changing our weather patterns and our closest landscapes. As people who live in the villages, a priori models of a sustainable way of life, we want to present our contributions from RURAL LIFE BASED ON THE SDGs: SDG 11Y 12 Sustainable transport: we use public transport (bus, train) and we share our vehicles. We walk or bike to school. SDG 7 Renewable energies: our region has a large number of wind turbines for clean energy to heat us and light our streetlights. SDG 1 Circular economy: our pastures are our crops. The cattle born on our small farms are fed with them and it returns to the organic matter to the soil so that healthy and nutritious grass grows. Products are sold in local shops, thus closing a family, circular, self-sufficient economy. SDG 15 Reforestation, care and sustainable use of forests: our trees are, together with our mountains, the emblem of our region. The forest is our lung and the place where our great biological diversity resides. They provide us with direct and many indirect resources (attract ecotourism). SDG 4 Quality education: by participating in STEAM initiatives like this one, we improve our skills such as creativity, communication, critical thinking and cooperation. SDG 15 Reuse of facilities: To avoid the deterioration and disuse of the ski resort, propose sustainable mountain tourism activities. SDG 4 Continuation of research: Urge the research institutes involved to continue their studies on the paleoclimate, etc.