Latitudinal network of multiparametric stations in Antarctica and Climate Change Observatory

English version provided by the author

Latitudinal network of multiparametric stations in Antarctica and Climate Change Observatory

Information Paper submitted by Chile

Background

Global warming is a phenomenon that does not affect the entire planet homogeneously. While in equatorial regions, its effects are much more attenuated, in polar regions, they are intensified thanks to a fundamental principle called “polar amplification”.

Chile is one of the longest countries in the world, but with a north-south axis, and the latitudinal influence is evident, making it a country highly vulnerable to climate change, since it has low-lying coastal areas; arid and semi-arid zones; forest areas; territory susceptible to natural disasters; areas prone to drought and desertification; urban areas with air pollution problems; and mountainous ecosystems. In addition to this, Antarctica is important as a global climate regulator.

While in the Chilean north, there is little precipitation and the average annual temperature is high, in the south, precipitation is much higher, and temperatures are low. Between the two extremes, there is a gradient of temperature, precipitation and other parameters of interest for the study of climate change. If we project this latitudinal variation towards the Antarctic Peninsula, we will have the longest latitudinal gradient to study climate change in the world, spanning more than 8,000 kilometers.

A number of facilities and capabilities already exist in continental South American Chile, to which will be added, thanks to a project led by the Chilean Antarctic Institute, a network of multi-parametric sensors that will have as its axis the Chilean stations along the Antarctic Peninsula, up to the Union Glacier (only 1,000 km from the South Pole), in a first stage.

In a second stage, wide areas of land and sea between the Antarctic bases will be sensed by means of automatic stations, generating a continuous gradient of climate change measurements.

The network's backbone includes 2,118 linear km, from the INACH station "Professor Julio Escudero" to the Union Glacier Joint Polar Station. This represents the largest permanent sensor network ever installed in Antarctica, but it is also a powerful tool for understanding and modelling the global change scenarios that are already affecting the world and will undoubtedly provide fundamental data for future development models based on quality scientific information.

This project will be part of other initiatives such as the Climate Change Observatory, promoted by the Chilean Ministry of Science, Technology, Knowledge and Innovation (CTCI).

First stage: installation of sensors in Antarctica

The project involves installing 21 automatic stations, of which 10 will be at Chilean stations and 11 in areas where there is no direct information. The sensors include measurements of basic climatological parameters such as temperature, humidity, atmospheric pressure, wind speed, solar radiation, water and snow precipitation, among others, as well as advanced equipment for measuring albedo, multispectral and photosynthetically active radiation, infrared temperature, soil moisture, pH, seismic and deformation of the Earth's crust.

In addition, the Climate Change Observatory programme of the Ministry of CTCI will integrate existing sensors within the national territory, creating a decentralised sensor network (i.e., including sensors from both public and private institutions) with an adequate density and variety of Earth observation instruments across the national territory. The Observatory will have governance, that will establish interoperable standards and steer, coordinate and facilitate collaborations between the scientific community, the public, the public sector and the private sector. At the technical level, a data laboratory will set up a platform to collect and open observational data relevant to climate change, including priority data for monitoring, ensuring continuity of data availability, aligning data and metadata with international interoperable standards, and providing computational resources for evidence-based analysis and solutions.

An Information brochure on the Climate Change Observatory is attached as an annex.

### Conclusion

Chile will make a major scientific and logistical effort to install multiparametric sensors on the Antarctic Peninsula to complete the world's most extended latitudinal gradient to study climate change, covering more than 8,000 kilometers. The implementation of the first sensors and their connection to the Climate Change Observatory will occur in December 2021.

The Climate Change Observatory and its network of Antarctic sensors will contribute to international knowledge about climate change and allow the international scientific community to share data freely.

Chile would like to invite the Parties to the Antarctic Treaty to be part of this joint effort and establish cooperation mechanisms to integrate the various existing capacities as a clear demonstration of the fundamental principles of the Antarctic Treaty.