Earthquake Emergency Management System

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Working Paper submitted by Chile

Background

The north of the Antarctic Peninsula has been experiencing unusual seismic activity in the Bransfield Strait, starting at the end of August 2020, with an earthquake of magnitude 4.9 (according to the United States Geological Survey, USGS) felt on 29 August at 12:47 (UTC) and the following day 30 August at 10:31 (UTC), with the occurrence of a 5.4 Mw earthquake (USGS). The tectonics around the Antarctic peninsula are complex, since there are various processes of convergence, divergence and lateral sliding of plate segments in a relatively small area, such as the subduction zone of the remnant of the Phoenix paleoplate in the northwest of the South Shetland Islands and the separation of the South Shetland microplate from the Antarctic plate.

Since the end of August 2020, more than 30 thousand earthquakes have been detected on the white continent through seismic sensors and satellite technologies. There has also been a significant increase in the rate of deformation of the crust by more than one order of magnitude, from only a few millimetres per year to about 15 centimetres per year. Instruments located on King George Island managed to measure in just four months, from September to December 2020, a shift of about 5.5 cm in a northwest direction.

The situation regained public visibility after the earthquake on Saturday, 23 January, at 20:36:51 (local time) with a magnitude of 7.1 and its epicentre located near Bridgeman Island, about 250 km northeast of the Chilean O'Higgins, Escudero and Eduardo Frei bases. This event, together with that of 8 February 1971, which also occurred within a radius of approximately 300 km from the Chilean bases, are the only two major earthquakes, of magnitude >6.5 in the last 70 years at least.

Chile has a Seismic Activity Monitoring System and a National Tsunami Alarm System (SNAM), the responsibility of the Hydrographic and Oceanographic Service of the Chilean Navy (SHOA), which is part of the Pacific Tsunami Warning and Mitigation System. This system is fed by information from DART buoys (Deep ocean Assessment and Reporting of Tsunamis) and from a network of 45 Sea Level Stations, two of which are located in the northern sector of the Antarctic Peninsula. In the event of a tsunami, the SNAM sends information on the earthquake parameters and the estimated time of arrival to the civil organisations in charge of notifying the population and the Armed Forces based in the ports and inlets along the coast. Therefore, the Chilean bases in Antarctica have immediate information in the event of a tsunami risk.

Based on this monitoring and warning system, Chile has developed tsunami evacuation plans in all inhabited coastal areas, which involve the evacuation of people to areas higher than 30 metres above sea level following the international recommendation given by the International Tsunami Information Centre (ITIC). In this regard, the Chilean Antarctic Institute (INACH) has generated and implemented emergency and evacuation plans that respond, among others, to earthquake and tsunami threats.

The emergency and evacuation plans have been designed for each facility and seek to familiarise its occupants, both scientists and support personnel, with the base, its evacuation routes, the emergency systems implemented, such as the warning system (emergency lights, warnings); fire extinguishing systems (smoke detectors, wet network, fire warnings); security areas and emergency procedures for each threat.

An important aspect of base Emergency and Evacuation Plans is the definition of a shelter or evacuation location. These places must provide: shelter, water, food and aid; therefore, they must have a basic supply in case of emergency. The distribution of articles, their quantities, and specifications vary by virtue of the characteristics of each installation and the environment in which they are located. An example of the above is the list of implements from the LARC (Antarctic Laboratory for Cosmic Rays) shelter at the “Professor Julio Escudero” base, located on King George Island.

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Descripción generada automáticamente

**Summary**

Considering the unusual increase in the frequency of seismic movements observed in the north of the Antarctic Peninsula, including a 7.1 magnitude earthquake that activated the Chilean tsunami warning system, and the probability that a high-magnitude earthquake or tsunami could seriously affect people and infrastructure in Antarctica, it is considered urgent to share the scientific information available to study and analyse this phenomenon.

We also propose the urgent establishment of an information platform related to Disaster Risks in Antarctica, providing the contact details of those in charge by country/base, established evacuation places, locations of shelters and their level of implementation. Cooperation and exchange of good practices among the Parties in this matter are very relevant to face disaster risks in Antarctica and in particular in the Antarctic Peninsula.

We propose:

1. To invite the Parties to share information on their research on seismological or potential disaster risks in Antarctica.
2. To ask the SCAR to report to the next ATCM on seismological research or potential disaster risks in Antarctica.
3. To ask the COMNAP to prepare a report to evaluate the general situation of emergency plans in Antarctic bases and the degree of implementation of disaster risk programmes.
4. To encourage interested Parties to review existing emergency management plans in order to evaluate their implementation and share their good practices with other Parties.

In this regard, Chile submits the following draft resolution to consideration by the ATCM, so that it can be discussed among the Parties, amended if necessary, and approved in order to give due attention to the emergency management of seismic disasters in Antarctica.

**Proposed resolution**

The Representatives:

Recognising the risks of seismic activity for people and infrastructure in Antarctica, and the importance of safeguarding operations in Antarctica;

Desiring that disaster risks in Antarctic operations be minimised;

Noting the need to perform monitoring and research on the increase in seismic activity in the Antarctic Peninsula and to obtain data to assess the risks associated with a high-magnitude seismic event;

Recognising the tradition of cooperation among the Parties to the Antarctic Treaty;

And thanking the COMNAP for the work done on this matter;

Recommend that the Parties:

1. Identify and share information with other Parties about their seismological research and potential disaster risks in Antarctica.
2. Invite the Council of Managers of National Antarctic Programmes (COMNAP) to present a report to assess the general situation of emergency plans at Antarctic bases and the degree of implementation of disaster risk programmes.
3. Invite the Scientific Committee on Antarctic Research (SCAR) to present a report on seismic activity in Antarctica and the risks to people and infrastructures in Antarctica.
4. Review, as far as possible, their emergency management plans in order to evaluate their implementation and share their good practices with the other Parties.