Report on emergency plans and implementation of natural disaster risk assessment at Antarctic stations

**Report on emergency plans and implementation of natural disaster risk assessment at Antarctic stations**

As per invitation to COMNAP in ATCM Resolution 7 (2021)

***Summary***

ATCM Resolution 7 (2021) invited COMNAP “to present a report to assess the general situation of emergency plans at Antarctic bases and its support operations, and the degree of implementation of natural disaster risk assessment programmes”. A COMNAP survey was undertaken to assess the general situation of emergency and evacuation plans, procedures and the availability of shelters or evacuation locations in case of natural disaster affecting Antarctic stations and their support operations.

All Member programmes with stations responded to the survey. Overall the survey results indicate that twenty (20) of the twenty-nine (29) COMNAP Member national Antarctic programmes with one or more stations in the Antarctic Treaty area have emergency plans in the event of natural disaster. Additionally, the survey results also indicated that twenty-three (23) of the twenty-nine (29) COMNAP Member national Antarctic programmes with one or more stations in the Antarctic Treaty area have shelters external to, and as an alternative to, the station that can be used when needed including in case of natural disaster.

***Background***

In response to national Antarctic programme concern about unusual seismic activity around the Antarctic Peninsula, and the request by the ATCM to COMNAP in Resolution 7 (2021) *Earthquake Emergency Management System*, COMNAP began the project “Earthquake, Tsunami, Volcanic Events Awareness”.

The project started with a desktop exercise to identify the locations of all sixty-seven (67) Antarctic stations. In regards to natural hazard, details such as station height above sea level and station distance to nearest active volcano or active tectonic boundary are important to overview.

While height above sea level is not the only risk factor for inundation from tsunami, the desktop exercise indicates that forty-one (41) stations are at a height above sea level less than or equal to 30 metres, with twenty-one (21) of those stations sitting at a height above sea level less than or equal to 10 metres. There are twenty-seven (27) stations that sit at an altitude above 30 metres, including many well-above this height. Work is continuing to understand stations’ distances to active volcanoes and risk of seismic activity in the region.

As the next step in the project, COMNAP will convene a Technical Collaboration Group to identify knowledge gaps and collaboratively strengthen the ability to actively prepare for, and in real-time respond to, risk related to seismic-related hazard.

Through a survey, part of the project was aimed to provide a response to the ATCM Resolution 7 (2021) which invites COMNAP “to present a report to assess the general situation of emergency plans at Antarctic bases and its support operations, and the degree of implementation of natural disaster risk assessment programmes”. A survey of all the COMNAP Member national Antarctic programmes who administer an Antarctic station(s) in regards to emergency plans was undertaken to assess the general situation of emergency and evacuation plans, procedures and the availability of shelters or evacuation locations in case of natural disaster affecting Antarctic stations and their support operations. This Working Paper presents the survey results for ATCM consideration in response to the ATCM invitation to COMNAP.

***Survey***

The COMNAP database lists (as at 1 December 2021) twenty-nine (29) national Antarctic programmes as operating an Antarctic station. The COMNAP Secretariat conducted a survey through the twenty-nine (29) COMNAP Member national Antarctic programme Managers which were listed in the COMNAP database as administering one or more open stations within the Antarctic Treaty area. A total of sixty-seven (67) stations were included in the survey which opened in December 2021 and closed on 28 February 2022; answers for sixty-six (66) stations have been recorded (Table 1).

*Question 1: Does this station have emergency plans for natural disaster?*

Forty-four (44) stations recorded an affirmative answer “Yes” and twenty-one (21) stations recorded a “No” answer for Question 1. One (1) station recorded a “not applicable” answer. Meaning 66% of stations have emergency plans for natural disaster.

*Question 2: Does this station have external shelters? If yes, how many?*

Forty (40) stations recorded an affirmative answer “Yes” and twenty-six (26) stations recorded a “No” answer for Question 2.

Meaning 60% of stations have external shelters.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Station Name | Station Latitude (DD) | Station Longitude (DD) | Station Altitude (metres) | Does this station have emergency plans for natural disaster? | Does this station have external shelters? |
| Belgrano II | -77.87 | -34.62 | 256.5 | Yes | Yes |
| Carlini | -62.24 | -58.66 | 10 | Yes | Yes |
| Esperanza | -63.39 | -56.99 | 25 | No | Yes |
| Marambio | -64.24 | -56.62 | 210 | No | No |
| Orcadas | -60.73 | -44.73 | 8 | Yes | Yes |
| San Martín | -68.13 | -67.10 | 5 | No | Yes |
| Casey Station | -66.28 | 110.52 | 32 | Yes | Yes |
| Davis Station | -68.57 | 77.96 | 27 | Yes | Yes |
| Mawson Station | -67.60 | 62.87 | 15 | Yes | Yes |
| Princess Elisabeth Antarctica | -71.94 | 23.34 | 1382 | Yes | Yes |
| Estacao Antartica Comandante Ferraz | -62.08 | -58.39 | 3 | Yes | Yes |
| St. Kliment Ohridski Base | -62.64 | -60.36 | 15 | Yes | No |
| Base Naval Antártica Arturo Prat | -62.47 | -59.66 | 3 | Yes | Yes |
| Estación Marítima Bahía Fildes | -62.20 | -58.96 | 3 | Yes | Yes |
| Dr. Guillermo Mann | -62.46 | -60.77 | 10 | No | No |
| Base Antártica Presidente Gabriel González Videla | -64.82 | -62.85 | 6 | Yes | Yes |
| O'Higgins Base | -63.32 | -57.89 | 12 |  |  |
| Base Aérea Antártica Presidente Eduardo Frei Montalva | -62.20 | -58.96 | 48 | Yes | Yes |
| Professor Julio Escudero | -62.20 | -58.96 | 11 | Yes | Yes |
| Risopatron | -62.38 | -59.66 | 20 | Yes | No |
| Yelcho | -64.87 | -63.58 | 5 | Yes | No |
| Great Wall Station | -62.21 | -58.96 | 10 | Yes | Yes |
| Kunlun Station | -80.41 | 77.11 | 4087 | Yes | Yes |
| Zhongshan Station | -69.37 | 76.37 | 11 | Yes | Yes |
| Johann Gregor Mendel Czech Antarctic Station | -63.80 | -57.88 | 10 | Yes | Yes |
| Pedro Vicente Maldonado Station | -62.44 | -59.74 | 10 | Yes | No |
| Aboa Station | -73.04 | -13.40 | 400 | No | No |
| Dumont d'Urville Station | -66.66 | 140.00 | 42 | No | No |
| Robert Guillard | -66.68 | 139.90 | 10 | No | No |
| Gondwana Station | -74.63 | 164.22 | 20 | No | Yes |
| Kohnen Station | -75.00 | 0.06 | 2892 | No | Yes |
| Neumayer-Station III | -70.66 | -8.27 | 43 | No | Yes |
| Bharati Station | -69.40 | 76.19 | 35 | Yes | Yes |
| Maitri Station | -70.76 | 11.73 | 117 | Yes | Yes |
| Concordia Station | -75.09 | 123.33 | 3233 | No | Yes |
| Stazione Mario Zucchelli | -74.69 | 164.11 | 15 | Yes | Yes |
| Syowa Station | -69.00 | 39.58 | 29 | No | Yes |
| Scott Base Station | -77.84 | 166.76 | 10 | Yes | Yes |
| Troll Station | -72.01 | 2.53 | 1275 | No | Yes |
| Machu Picchu Station | -62.09 | -58.47 | 3.5m | Yes | Yes |
| Henryk Arctowski Polish Antarctic Station | -62.15 | -58.47 | 2 | Yes | No (but, emergency tents) |
| Mountain Vechernyaya | -67.65 | 46.15 | 95 | Yes | Yes |
| Jang Bogo | -74.62 | 164.20 | 36.6 | Yes | Yes |
| King Sejong | -62.21 | -58.78 | 10 | Yes | Yes |
| Bellingshausen | -62.19 | -58.96 | 16 | Yes | Yes |
| Bunger Oasis | -66.26 | 100.73 | 29 | Yes | No |
| Druzhnaya IV | -69.74 | 73.70 | 20 | Yes | No |
| Leningradskaya | -69.50 | 159.39 | 300 | Yes | No |
| Mirny | -66.55 | 93.00 | 35 | Yes | No |
| Molodezhnaya | -67.66 | 45.84 | 40 | Yes | No |
| Novolazarevskaya | -70.77 | 11.83 | 102 | Yes | No |
| Progress | -69.37 | 76.38 | 15 | Yes | No |
| Russkaya | -74.76 | -136.80 | 126 | Yes | No |
| Vostok | -78.46 | 106.83 | 3488 | Yes | No |
| SANAE IV | -71.67 | -2.84 | 850 | No | Yes |
| Gabriel de Castilla Station | -62.97 | -60.67 | 15 | Yes | No |
| Juan Carlos I Station | -62.66 | -60.38 | 12 | No | Yes |
| Wasa | -73.04 | -13.41 | 440 | No | Yes |
| Vernadsky | -65.24 | -64.25 | 7 | No | Yes |
| Halley VI | -75.57 | -25.47 | 37 | No | No |
| Rothera Research Station | -67.56 | -68.12 | 16 | No | No |
| Signy Station | -60.70 | -45.59 | 5 | No | No |
| Amundsen-Scott South Pole Station | -89.99 | 139.27 | 2830 | n/a | No |
| McMurdo Station | -77.84 | 166.66 | 10 | Yes | No |
| Palmer Station | -64.77 | -64.05 | 10 | Yes | Yes |
| Artigas Station | -62.18 | -58.90 | 17 | Yes | Yes |
| Ruperto Elichiribehety Station | -63.40 | -56.99 | 28 | No | No |

Table 1: Stations included in the COMNAP Database as of 1 December 2021 with longitude, latitude and altitude from desktop study, and responses to survey questions 1 and 2.

**Recommendation**  
COMNAP invites the Parties to consider these results during any review of their emergency management plans and future work within the ATCM on this topic.