Efficiently and Safely Conducting Expeditions in the Arctic and Antarctic During the SARS-CoV-2 Pandemic

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**Information Paper submitted by Germany**

**Summary**

Since the beginning of the SARS-CoV-2 pandemic in 2020, the German Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) has focused on how to conduct safe and infection-free Arctic and Antarctic expeditions to enable researchers from around the globe to pursue their research in the polar regions despite the ongoing pandemic. In particular, the MOSAiC (Multidisciplinary drifting Observatory for the Study of Arctic Climate) expedition, which was of unprecedented scale and already underway at the time of the SARS-CoV-2 outbreak, made doing so necessary early on. The constantly changing nature of the pandemic, including the emergence of variants, posed new challenges time and time again. The AWI was forced to adapt its measures and implement jointly the COVID‐19 Outbreak Prevention & Management Guidelines[[1]](#footnote-1) of COMNAP (Council of Managers of National Antarctic Programs) and DROMLAN[[2]](#footnote-2) (Dronning Maud Land Air Network) Sanitary Protocol in order to continue the research activities. Over the past two years, the AWI has organised and implemented nine quarantines. Throughout this time, there has not been a single SARS-CoV-2 infection, either at the German Neumayer Station III or on the German Research Ice Breaker (RIB) Polarstern expeditions to the Arctic and Antarctic. This shows that due to the comprehensive application of the measures, which entailed substantial time, financial and organisational investments, it was possible to conduct efficiently and safely field research in polar regions despite the conditions imposed by the pandemic.

**Expeditions in the Arctic and Antarctic during the SARS-CoV-2 pandemic**

When the World Health Organisation categorised SARS-CoV2 as a pandemic in March 2020, international research institutes were confronted with the question of how and to what extent expeditions to the polar regions of the Arctic and Antarctic were still possible under the given conditions. The challenge was, on the one hand, to protect the health of the expedition participants; on the other, the lockdowns in place around the globe made travel and transport virtually impossible, posing serious logistical challenges. Making matters worse, in the first year of the pandemic, no causal therapies or vaccines were available.

In December 2019, when the SARS CoV-2 virus was first identified, the first phase of the Alfred Wegener Institute’s MOSAiC expedition, which had begun in September 2019, was in full swing. Researchers from 18 countries were taking part in the expedition, the goal of which was to monitor changes in the Arctic over the course of an entire year. Moored to a large ice floe, the German RIB Polarstern drifted with the sea ice. Numerous research facilities and monitoring stations were installed on the ice for the duration of the expedition, and the original plan was to exchange the researchers and crew every three to four months with the aid of resupply ships and icebreakers, which would also provide fuel and provisions.

**Preventive measures**

In this stage of the pandemic, a confirmed SARS-CoV-2 infection on board the RIB Polarstern would have meant the immediate termination of the expedition, the outcome of years of preparation. At the time, there were no vaccines, and the number of infections with serious, even fatal outcomes continued to climb. Since the ship would be cut off from the outside world in the winter and, from a medical standpoint, left to its own devices, options for preventing or containing an outbreak on board and for providing patients with the best possible treatments for suppurative symptoms were evaluated. Provisions were readied and e.g. the following measures were implemented:

• Procurement of laboratory equipment for conducting PCR tests;

• Increasing the oxygen reserves;

• Increasing reserves of selected medications;

• Increasing reserves of personal protective equipment;

• Increasing reserves of disinfectants.

However, the utmost priority was ensuring passengers arrived on board infection-free.

**Measures taken prior to the personnel changeover and deployment of MOSAiC expedition participants**

In February 2020, the Alfred Wegener Institute prepared a catalogue of measures for completing a personnel changeover without the risk of a SARS-CoV-2 infection:

• For all participants: domestic self-isolation for 5 days prior to departure;

• PCR test immediately before departure;

• Subsequent 14-day quarantine in a dedicated hotel;

• Regular PCR testing;

• Planned response formulated in the event of an infection during the quarantine;

• Participants had to sign a consent form confirming that they understood the risks in the event of an infection, and that they could be excluded from the expedition for violating the measures.

**Quarantines during the MOSAiC expedition**

It was planned to implement the first quarantine during the MOSAiC expedition in late March / early April 2020 in Barentsburg, Svalbard. All participants were to stay in individual rooms at an exclusive, dedicated hotel for their 14-day quarantine. During this time, they were to take 3 PCR tests and be examined with the mobile test equipment provided. However, as the infections in Europe continued to worsen, many borders were closed, which also affected travel to Norway and Svalbard.

As a result, all plans for the safe changeover of participants and crew had to be revised. The transfer to RIB Polarstern was reorganised and, with the aid of other research vessels, carried out from Germany. This was possible due to the fact that Germany’s research fleet had suspended operations and the vessels were therefore unexpectedly available. The quarantine for all travellers, including the crews of the resupply ships, took place in hotels in Bremerhaven. Due to the need for new planning and organisation, this didn’t begin until May 2020 (quarantine no. 1); the procedure largely included the measures planned for the exchange at Svalbard:

• For all participants: domestic self-isolation for 5 days prior to departure;

• Subsequent 14-day quarantine in a dedicated hotel in Bremerhaven;

• Regular PCR tests: on quarantine days 3, 8 and 13;

• Planned response formulated in the event of an infection during the quarantine;

• Participants had to sign a consent form confirming that they understood the risks in the event of an infection, and that they could be excluded from the expedition for violating the measures;

• Participants were transported to the ships by bus, buses had separate cabins for the driver;

• Bus drivers were tested.

In July 2020, the same procedure was used in the quarantine for the last leg of the MOSAiC expedition (quarantine no. 2). In October 2020, the expedition was successfully completed without a single COVID infection on board.

**Antarctic season 2020/21**

The lessons learned from the two quarantines already implemented provided a basis for planning and realising preventive measures in connection with the Antarctic seasons 2020/21 and 2021/22. These measures were subsequently adapted in response to the changing nature of the pandemic, the latest findings, and available options. In addition, the guidelines on Antarctic expeditions (ship/station) that were issued by COMNAP and DROMLAN were consistently and stringently complied with. These are the following:

• COVID‐19 Outbreak Prevention & Management Guidelines (COMNAP)

• DROMLAN Sanitary Protocol

The goals for both Antarctic seasons were:

• to prevent the intercontinental spread of SARS-CoV-2;

• to prevent its spread on the continent between stations;

• to contain any infections at stations, should the need arise;

• to ensure the safe evacuation of SARS-CoV-2 patients.

To keep the risk of exposure to SARS CoV-2 as low as possible, no air travel in the Antarctic via DROMLAN was used in the 2020/21 season. The overwintering staff, together with all scientists and technicians for the summer season, were directly transported from Bremerhaven to the Neumayer Station III by ship. Their departure was preceded by a 10-day individual quarantine in keeping with the tried and proven procedures and including 3 PCR tests (quarantine no. 3), being transported to the ship by bus (with the driver in a separate cabin), and a final test and contactless customs processing before boarding the ship.

Once on board, participants spent the next four days in group quarantine with contact restrictions, mandatory masking and social distancing; another PCR test was administered at the end of quarantine. All operations at the Neumayer Station III were successfully carried out and completed without any COVID infections.

A simultaneous RIB Polarstern expedition in the Antarctic from January to late March 2021, which involved nearly 60 researchers, was made possible with the aid of a non-stop chartered flight from Germany to the Falkland Islands(Islas Malvinas).

Prior to the expedition, all participants, the ship’s crew and flight crew were quarantined in Bremerhaven (quarantine no. 4). The measures taken to avoid potential infections included:

• 14-day quarantine for the researchers, ship’s crew and flight crew

• Contactless handover of the plane to the flight crew

• An airport terminal was reserved for the departure to avoid potential contact

• Contactless security check

• Contactless customs check prior to departure

In late March 2021, the summer staff were picked up from the Neumayer Station III by RIB Polarstern and transported to the Falkland Islands (Islas Malvinas).

The changeover of crew and personnel was accomplished with a second chartered flight in early April. The flight was preceded by another, analogous quarantine in Bremerhaven (quarantine no. 5). The outgoing crew, researchers and summer team from the Neumayer Station III took the chartered flight from the Falkland Islands (Islas Malvinas) back to Germany.

**Antarctic season 2021/22**

From late 2020, effective vaccinations for SARS CoV-2 were rolled out, and were readily available by early 2021. From this point on, providing evidence of being fully vaccinated with a vaccine approved for use in Europe became a prerequisite for participating in expeditions organised by the AWI. This offered a significantly higher level of protection for all participants. In light of breakthrough infections, the limited medical possibilities inherent to expeditions, how long rescue / evacuation would take, and the risk not only to participants’ individual health and safety but also of having to completely abandon an expedition, the tried and proven quarantine measures were also used in this season. This was done in full compliance with the guidelines jointly agreed upon by COMNAP and DROMLAN. The preparatory quarantines were relocated to Cape Town (as the gateway to Antarctica). Having them take place in Germany would have necessitated further chartered flights, which, following a painstaking risk analysis, were decided against. Moreover, Cape Town offered the requisite infrastructure in terms of laboratory capacities for PCR tests and contactless transport options.

In the 2021/22 season, the AWI implemented four quarantines for ship-based and land expeditions in the Antarctic (quarantines no. 6, 7, 8 and 9) in Cape Town.

Due to the emergence of the omicron variant during the second quarantine in Cape Town, the season was particularly challenging. Several infections were confirmed among those persons in quarantine. These infections were attributed to an infection among the hotel staff and the omicron variant’s significantly higher contagiousness.

Thanks to the regular PCR tests, the infections were detected prior to departure for the Antarctic and the virus was not spread there, which we consider to be a further validation of the effectiveness and reliability of the procedures implemented. In response to these infections, the hotel staff were included in subsequent quarantines and the testing regime was expanded to PCR tests every two days, so as to detect infections as soon as possible. After quarantines no. 6 and 7 the arrivals were made by exclusive chartered flights.

Following a COVID-19 outbreak at another station in Dronning Maud Land, the last planned flight to the Neumayer Station III was cancelled; the overwintering team came with RIB Polarstern instead. At the station, vaccinations and boosters were made available to the outgoing overwintering team and the summer team alike. For this purpose, vaccines were repeatedly shipped (temperature-controlled) from Germany to the station.

**Conclusion**

The past two years have demonstrated that consistently and stringently upholding quarantine measures can enable efficient and safe research fieldwork even during a pandemic, and without spreading the SARS-CoV-2 virus to untouched regions of the Arctic and Antarctic.

**Recommendation**

ATCM is invited:

1. to note the measures applied and implemented by the German Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI), which made it possible to conduct efficiently and safely field research in polar regions despite the conditions imposed by the SARS-CoV-2 pandemic;

2. to consider the experiences gained by Germany when discussing the impact of the SARS-CoV-2 pandemic on safety and operations in Antarctica.

1. These guidelines are available from the COMNAP member website (username and password required). [↑](#footnote-ref-1)
2. This protocol has been agreed by DROMLAN members but is not available online. [↑](#footnote-ref-2)