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Our ref.: 14835/2020/SI/WWR 30 September 2020

Ref.: 14835/2020-L.10 SI/WWR

Subject: Year of Polar Prediction (YOPP) in the Southern Hemisphere (YOPP-SH) Targeted Observing Periods during the austral winter of 2022

Action required: Indicate willingness to contribute to the Southern Hemisphere YOPP Targeted Observing Periods (TOPs) during the austral winter of 2022, on or before **30 October 2020**

Dear Sir/Madam,

I wish to thank you for your support of the Year of Polar Prediction (YOPP) in the Southern Hemisphere during the 2018-2019 austral summer. I also wish to update you on new planned activities for YOPP-SH for winter 2022. The support of your Service resulted in more than 2 200 additional radiosondes being launched around Antarctica; these are currently being assessed for their impact on atmospheric predictability and observing system design.

The main objective of the austral summer YOPP-SH SOP during 2018/19 was to assess the impact of increased frequency of observations in Antarctica and the Southern Ocean. Preliminary results from observing system experiments (OSEs) suggest that on average this led to only minor improvements in predictive skill. However, there is a strong evidence for much larger impacts on forecasts of major cyclones around Antarctica.

To address the flow-dependent impact of extra observations, YOPP-SH community has decided to hold a second Special Observing Period (SOP) during the late fall and early winter (mid-April to mid-July) in 2022. The scientific focus of this SOP is to characterize intense Southern Ocean cyclones and associated atmospheric rivers during winter, determine how well these can be forecasted up to several days in advance, and to assess atmospheric and oceanographic impacts on coastal Antarctica and the Southern Ocean.

To benefit on this opportunity, I would like to recommend the following:

On demand radiosonde to be launched in the Antarctic during late fall and winter in 2022 and the release of additional drifting buoys, in both, the open ocean and sea ice zone. As this activity is part of the wider YOPP effort, it will benefit from the protocols and software that have been developed for numerical model output comparison with observation data known as YOPPSiteMIP that is currently being used as part of a YOPP contribution to the MOSAiC expedition (see also at https://psl.noaa.gov/people/amy.solomon/MOSAiC_NRV.html). Further details will be provided in the future.

To: Permanent Representatives of Members with WMO (limited distribution)

cc: Hydrological Advisers
Presidents of regional associations
Presidents of technical commissions

In view of the limited Antarctic staff available to conduct the research at this time of the year, the Targeted Observing Period (TOP) approach of intensive observational effort within the umbrella structure of the SOP is being adopted; 3–4 TOPs of ~3 days duration each are anticipated during mid-April to mid-July 2022. TOP strategy has been successfully implemented in the Arctic in conjunction with the MOSAiC campaign to study air mass exchange mechanisms. Therefore, there is a wealth of experience to draw upon to ensure successful TOPs in the Antarctic.

The focus of the YOPP TOPs planned in and around Antarctica is on major Southern Ocean cyclones that will impact the coastal regions in a profound way.

The proposed strategies are:

- To carry out a coordinated and targeted series of atmospheric and oceanographic observational investigations in and around Antarctica during the austral winter season when the sea-ice cover is rapidly expanding with a focus on major cyclone events.

- The primary focus areas are the Ross Sea, the Antarctic Peninsula and Dome C/Concordia Station. As the weather systems that will be targeted are transient, moving in and around the Antarctic, observations from outside these regions are also required.

- Execution of a decision system to request the launch of additional radiosondes will be taken by a committee appointed by the YOPP-SH Task Team. It is anticipated that participating countries/institutions/stations would be notified of a TOP of five days, with details of requested launches of 24 to 48 hours ahead of time.

It is noted that there is an interest in conducting Antarctic fieldwork outside the austral summer and the improved weather forecast skill that is expected to result from this SOP, which will facilitate the required logistical support for wintertime flights, etc.

I would appreciate it if you could send your reply on or before **30 October 2020**, to Ms Nanette Lomarda (nlomarda@wmo.int), Senior Scientific Officer, World Weather Research Programme, with a copy to Prof. Thomas Jung (thomas.jung@awi.de), Chair of the PPP, Prof. David Bromwich (bromwich.1@osu.edu) YOPP-SH Task Team leader, and the International Coordination Office for Polar Prediction (office@polarprediction.net), whether your Service would be willing to contribute towards the Targeted Observing Periods during the austral winter of 2022.

Yours faithfully,

Dr Elena Manaenkova
for the Secretary-General