

## **YOPP-SH Online Session 1, October 21, 2021, 9-10 am EDT, 1300-1400 UTC.**

**Present:** David Bromwich, Vito Vitale, Jordan Powers, Eric Bazile, Steve Colwell, Matthew Lazzara, Anastasiia Chyhareva, Svitlana Krakovska, Nadine Hillenbrand, Raul Cordero, Xun Zou, Blake Murray.

## **YOPP-SH Online Session 2, October 21, 2021, 5-6 Pm EDT, 2100-2155 UTC.**

**Present:** David Bromwich, Jeff Wilson, Adriana Gulisano, Penny Rowe, Blake Murray, Vicki Heinrich, Xun Zou, Svitlana Krakovska, Taejin Choi, Yanina Garcia Skabar, Paolo Rodriguez Imazio.

**Apologies:** Irina Gorodetskaya, Clare Eayrs, Daniela Liggett.

## **Session 1:**

**Goal:** Discuss how to execute the radiosonde launches for the 2022 winter TOPs.

### **First some news from David:**

- WMO and its World Weather Research Programme is considering an Extension Phase for the YOPP project including YOPP-SH as a prominent component. Seems likely to be accepted. This will continue through 2024. This Extension is viewed as a bridge to the next polar project (being advocated by the WMO Executive Council) to start in 2025 and last for 5 years. Start thinking about options for a follow-on to YOPP. The current Extension is likely to have expectations for education and outreach as well for active engagement with operational centers that were previously supported out of the International Coordination Office.
- Email from Irina Gorodetskaya today.

The final Polar Predict Newsletter (number 19) has been published. It contains an article about YOPP-SH led by Irina. <https://www.polarprediction.net/news/polarpredictnews/>

Also ECMWF have established an account for YOPP-SH winter SOP that includes access to forecast data.

### **Main Discussion**

*David: Background on executing the TOPs.*

- The TOPs are a 2-part program that needs to mesh prediction and process studies together. NWP is more concerned with the background state of the atmospheric circulation and typically are a few days in duration. Process studies are typically more regional and extend for 1-2 days. Better understanding of the prediction problem has emerged from the analysis of the summer SOP that has just recently been completed.
- Spread of measurements concentrated in East Antarctica including the Ross Sea, that is more in the Eastern Hemisphere
- Another component is that from analysis of the summer SOP, additional information from the Peninsula was effective for forecasts downstream.

- So the primary question for today is whether should the TOPs be continent wide for at least some of them with the remainder being regionally focused and targeted at processes?

*Vito Vitale:*

- One observing period as a whole group. Good for the program as a whole to demonstrate we are working together.

*Jordan Powers:*

- Favors continent wide launches
- Synoptic scale depiction of troughs and ridges
- Not certain if regional launches will improve NWP

*David:*

- Limited Number of events, should there be 4-5 continent wide events during the winter SOP?

*Eric Bazile:*

- Determine bigger reaching events
- Difficult to show if increase in soundings improves NWP, 4 or 5 TOPs
- Try to satisfy all countries research needs
- Probably continent-wide launches would be a good idea

*David:*

- Pro of Regional: Enhanced probability of capturing events of interest

*Steve Colwell:*

- Look at specific things, events of interest
- Waste of Peninsula radiosondes for action in East Antarctica
- Regional may be better than continental

*David:*

- Already good amount of skill in forecasting from assimilating satellite radiances. Makes it a challenge to link improvements in forecast skill to additional observations from specific radiosonde sites.

*Vito:*

- If plan can be improved, then perhaps add 1-2 continental TOPs.
- Try to work continental into plan; additional, not a focus.

*David:*

- Need to do a better job in the mid-latitudes to get both sides of the baroclinic zone.
- Plot of planned contributions for winter shows a much better effort in lower latitudes than for the summer SOP.

- Key issue is do we get enough increase in forecast skill for the regions versus going continental for at least some events.

*Jordan:*

- Forecast impact spreads northward slowly from regions with greater number of soundings (Antarctica).
- Predictions vs observations is an important aspect.
- More opportunities to capture events of interest if done regionally.

*Eric:*

- Thinks the regional focus is good.
- But continent-wide effort some of the time is necessary

*Vito:*

- Important to fix system in order to make a choice.

*Matthew Lazzara:*

- Time an issue?
- Choices -> Regional = smaller scale, shorter duration; Continental = larger scale, longer duration.

*Vito:*

- Continental TOPs not planned for in the beginning, not ready for it

*Eric:*

- Base the decision on events
- Decision on observations to be taken several days in advance.

*Vito:*

- People
- Core information
- 3 pillars
- "Of course local conditions and safety are variables we can control and that will produce the final result. But we need to agree on the fact that forecast team has the power to say go no-go for extra measurements."

*Raul:*

- Consider resources
- Who makes the decision?
- Safety issues?
- Agree with Vito that the forecast team decides go or no go, but should we try to say go or no go for selected areas in order save soundings for another situation?

*David:*

- Extended observation best approach for numerical weather prediction
- Start from a global model, cycle for ~ 3days, then forecast for several days into future
- Two forecast teams
- Limited number of continental wide launches. Does cement the project together.
- Need to get a buy in from everyone

*Jordan:*

- Models needed to rely on global analysis for initial conditions that had the additional soundings
- Cycling to rid of this issue
- Need regional model without extra soundings
- Model forecasts with & without extra soundings
- Only one joint release period needed to see the impact.
- How to maximize NWP accuracy likely requires more continental events.

*David:*

- Atmosphere advects information around, take times, however.
- Global models need time to spin up in order to manifest the impact of the continent-wide soundings.

*Steve:*

- Routine information to GTS. Additional soundings for 4-5 days not on GTS but subsequently available from an archive?

*Jordan:*

- This would definitely help models see the impact of additional soundings.

*David:*

- A political problem with this approach because centers want all the available data.

*Steve*

- Could the models used by centers be run in parallel to each other to see impact of additional soundings?

*David:*

- Doesn't seem very practical.
- Limitation on personnel. Safety as well as times when they can work.

*Anastasia:*

- Will data be sent immediately? If so, how fast?

*Steve:*

- Centers need the data 2-3 hours after finishing the radiosonde ascent.

*Vito:*

- Standard procedures for reporting data
- Very unlikely that these would be changed.

*David:*

- Need more discussion of this topic. Let's see what happens in the second session first.

## **Session 2:**

### **Proposed extension to the YOPP Consolidation phase**

*Jeff Wilson* spoke about the proposed extension of the YOPP Consolidation phase that was raised at the recent World Weather Research Programme's Scientific Steering Committee (WWRP-SSC). The WWRP-SSC oversees projects such as PPP but is itself overseen by the WMO Research Board who ultimately reports to the WMO Congress. The WWRP-SSC supported the need to continue the work in the YOPP-SH and Model Intercomparison Project areas but needed to refer the discussion about the extension to the Research Board because of the wider implications of extending projects. The positive aspect was that the Chair of the WWRP-SSC (Chris Davis) is anticipating a further polar orientated project to be part of the core WWRP projects in the 2024 to 2027 period. The WWRP-SSC considered that the proposed extension could be a segway to the new project but it would need to have a "Science to Services" theme or outcomes. *David* noted that he felt that the YOPP-SH activities may need to include more explicit educational links as well as links with operational centers. Further discussion on the proposal will be held with members of the WWRP-SSC, the WMO Secretariat and the WMO Research Board on 1 November.

### **Approach to the TOPs**

*David* spoke about the analysis of the forecast impact of the Antarctic summer SOP radiosonde releases within the AMPS model framework. It seemed that overall performance was improved with more sondes but it was not possible to identify particular releases that made a big difference. Three blocks of two-week periods were analyzed in Nov, Jan, and Feb. The improvement over the Antarctic was very marked but improvements equatorward of 60° S were decreasingly less. This SOP did not have many lower latitude additional sonde launches but the winter one will have more additional sondes from the mid-latitudes.

It looks like from an NWP perspective, continent-wide radiosonde releases will be the best approach rather than sectorised launches. The sectorised approach is much better for the process studies of atmospheric rivers, internal gravity waves etc. These approaches also have different time scales. NWP scale is of 5 days duration while the process studies are of more limited duration perhaps 3 days.

Irina and Jonathan have some data on frequencies of atmospheric river events with perhaps a few per year and the Peninsula and around Dumont D'Urville being favored locations while the Ross Sea is a minimum area.

In the 3-week forecast test period for the Ross Sea in August 2021 the storm systems ran from West to East across the top of the Ross Sea and did not impact upon the Ross Sea area although some had impacted the area just prior to the test period. *The lesson is we will get what we will get.*

For the continent-wide approach, we may get several process events at the same time but it is not guaranteed.

The earlier session had suggested two or three continent wide periods and then some specific events around the Peninsula.

*Vicki* noted that the Australian Bureau of Meteorology (BoM) will have a limited number of Antarctic focused forecasters to assist in the forecasting but will not know until just before the TOP period how much support can be provided. The BoM does not have the capacity for a big Antarctic research campaign but is keen to participate in at least the data collection side of the TOPs. Some of the larger systems could feed into High Impact Weather studies in southern Australia. The southern Australian capital city sonde stations currently do 2 flights / day. Hobart may be able to do an extra flight /day whilst Perth, Adelaide and Melbourne may be able to do 06UTC and 18UTC for specific periods. Forecasters work typically, M-F, 8a-5 p.

*David* noted that Jordan Powers would like to see the continent-wide approach taken from the NWP perspective.

The East Antarctic stations may be more about the NWP aspects whilst the grouping of stations around the Peninsula and the Weddell Sea and Ice shelves are better situated for process orientated studies. We would need both groupings for the NWP continent-wide cases.

#### **Updates:**

*Penny Rowe* – Raul and Irina's team will be going south for the Summer and things look okay at the moment for Escudero on King George Island.

*Taejin Choi* – been discussing with Vito about instruments for the winter TOP at King Sejong Station and they will have the supercooled liquid water sondes (Anasphere). Will be done at both Dome C and Jan Bogo in Terra Nova Bay as well.

*Yanina* – Working with Vito and Irina on the sounding program for Marambio.

*Svitlana* – still keen to launch sondes (Anasphere) from Vernadsky and expect to see an atmospheric river in the first part of the winter SOP rather than the later part of the SOP from historical studies. So perhaps process studies early part of the SOP at Vernadsky and continent-wide participation later in the SOP.

#### **Summary of Discussion**

With the TOPs approaching it is important to determine the course of action on how radiosondes will be released. The two possible outcomes are continental wide launches or regionally specific launches. The major issue is the time scale contrast between the two. Regional provides a targeted focus on atmospheric events with 1-2 day time scale. From an NWP perspective, the continental approach would be more beneficial and has a time scale of ~ 5 days. More discussion is needed.

-----