

YOPP-SH November call #01 November 23, 2020

Start at 1404 UTC.

Attendees: Kirstin Werner, Steve Colwell (SC), Sergi Gonzalez (SG), David Bromwich (DB), Clare Eyars, Eric Bazile, Tracy Moffat-Griffin (TMG), Irina Gorodetskaya (IG), Yanina Garcia Skabar (YGS), Jordan Powers, Raul Cordero (RC), Adriana Gulisano (AG), Marie-Laure Roussel, Jorge Carrasco (JC), Tammy Morris (TM).

- 1) **Brief Round of Introductions**
- 2) **What science targets in the Antarctic Peninsula area in particular?**

David (DB) sent link (for last session on 20/21 October, useful for today, but not for the greater Ross Sea as planned) with reminder. What scientific activities are you particularly interested in? Within framework of YOPP-SH winter SOP and embedded Targeted Observing Periods. Some topics: atmospheric rivers (AR), cyclones of various sizes.

IG: contribution during summer YOPP using measurements from Punta Arenas, Escudero station and King Sejong. Studying one specific atmospheric river event. **During Antarctic winter SOP:** continued study and link to other stations taking more of a **regional approach**. Bring in new aspects for AR: surface melt, precipitation changes (snow to rain transition), cloud properties, etc. Interested to talk to others how to use stations on Western Peninsula and South Shetland Islands.

SG: involved in SPICE project that wants to measure solid precipitation. Wants to install automatic reference for solid precipitation on the ground at Spanish station Juan Carlos I Antarctic Base on Livingston Island. Not sure whether this will meet timing for YOPP-SH SOP, want to install in summer, maybe to be delayed for a year. Tried to install in McMurdo previously but too much snow.

AG: we have stations in Marambio, ... peninsula, Belgrano stations, etc., where there are radiosoundings, we can contribute with soundings in collaboration with met service. There may also be radiosoundings from Ushuaia.

YGS: In Marambio: 1 RS/week during winter. Ushuaia only during spring and summer. But people and equipment available to do more RS but not saying for sure if more can be done.

RC: Question about solid precipitation.

YGS: not possible to distinguish solid versus liquid precipitation.

RC: not measuring both separately. Sergi plans to install a tool to measure snowfall.

SG: explains method – with wind only 50 % or so of snow that falls is measured. WMO double-fence snow gauge. Rain gauge (optical disdrometer): able to measure almost all the snow with a lot of wind. If wind is more intense, can still be measured (?)

RC: SG please send description of your system. I'm looking for something similar so can make comparison between the two stations.

SG: WMO snow gauge is very expensive.

IG: importance of MRR (micro rain radar), good idea to spend money on in addition to WMO double fence. Real problem is wind-induced undercatch. MRR is cheaper. If any national program can afford to buy an MRR, would be great to have at least 2 to 3 running in the Antarctic Peninsula region during YOPP-SH winter SOP. One at Ukrainian station, plan to bring one to Escudero. Are you guys planning to acquire one?

SG: Spanish met service doesn't plan to buy MRR at the moment. But for scientific project needed within Antarctic program. If we can, but not sure at the moment, would like to buy MRR, working with one also in Catalonia. Like to also install one next to double fence reference. Great to have all instruments in the same place. Not sure at the moment if we can meet YOPP schedule.

DB: How expensive is an MRR?

IG: New MRR ca 30k EUR. Several MRRs: different vertical resolution and different max height possible, also good to capture melting layer. 20 % of precipitation on the Peninsula during year is rain. Majority of winter rain is during atmospheric rivers, associated with moisture transport. If we can capture moisture transport in detail, that would be something as reanalyses don't provide it.

DB: Raul, you mentioned the possibility of additional radiosondes from Punta Arenas.

RC: maybe Chile met station could look into buying more.

JC: no money coming in from the Air Force. Difficult for the Chilean weather service to do more RS.

RC: If we fund the radiosondes (science money), the Met. Service could launch them.

JC: University of Magallanes could also do RS. Better for Punta Arenas.

DB: How many times a day from Punta Arenas during winter?

JC: once at 12 UTC.

IG: Which system? Vaisala.

DB: How much is a Vaisala radiosonde?

RC: Less than \$200.

DB: we've talked about AR, precipitation, etc., another thing: we need to make sure that we're not just describing what's happening but forecasting. What about predictability aspects?

SG: question: how important is it to catch AR with radiosonde ascents? Events are very narrow. If it's 50 km north or south, we could miss AR by RS. But maybe RS in the vicinity. How important? For 5 day, 48 hour forecasts?

IG: Number of different situations: transition over one or two days. Frequent RS to measure pre, peak and after conditions, all are of high added value. ERA 5 better than ERA interim but doesn't catch the maximum water vapor transport. Question how forecast is done. Caught at several stations. Seeing AR conditions from different stations (Punta Arenas, Peninsula etc.), good snapshot for specific moments. We still have to provide: statistics of occurrence frequency at various stations and types of the events. They are quite frequent. Pre and after measurements are very important.

SG: forecast point of view: would be possible what Irina said. Up to five days before to provide an atmospheric river forecast with a cyclone, for 48 hours ahead a forecast of impact at particular stations.

IG: Cooperation with Penny Rowe at Escudero in summer. Agreement to measure 24 h to 6 h ahead for summer atmospheric river event in BAMS paper, matter of communication, good agreement is needed beforehand. Only 30% could be done as a limited number of RS, question of met services being able to provide RS. How flexible can the operations can be with a limited number of RS?

DB: Tammy Morris, any comments from you?

TM: Southern Antarctic islands: we are trying to set up a winter cruise in this region. But not able to confirm contribution now. But keep in dialogue. Nothing specific but hope we can in the long-run.

DB: willingness to try is the key at the stage. Vaccines coming along, giving us hope for the 2022 activities. Big concern for the 21-22 austral field season: most activities put off from 2020/2021 for 2021/22, so lots of competition for resources.

TM: going ahead with work this year but reduced intensity. What resources we save this year, we put towards to a more intense survey next year or so.

DB: Any comments from BAS? Steve to start?

SC: Not involved in science, focus on RS, will pass over to Tracy.

Tracy Moffat-Griffin

TMG: interested in atmospheric gravity wave events. If there is intense RS obs that will be useful to compare and contrast. See what happens when big storms are come.

DB: Mid-April to mid-July: what kind of events do you get?

TMG: intensive RS obs contributing to explain this hot spot of gravity wave activity.

RC: Past airborne campaign on gravity waves organized by German space agency. Argentinians were involved. Germans were flying. Ozone sondes launched.

3) Document (whitepaper) needed to start formalizing the science ideas:

DB: Topics: Cyclonic activity, atmospheric rivers, precipitation and atmospheric gravity waves covers range of topics that we discussed so far. Would be nice to have a short white-paper like document to point out goals. Maybe divide effort to ease burden for everybody. Maybe half a page or so per topic. Could be a living document.

All agree: sounds good.

DB: does mean that some people have some effort to work on it.

Google Document link (started by Adriana).

https://docs.google.com/document/d/1voNQ7Cfb-RWYn_iwilKTZeijEBXcT5QmzQ4dX5BAI7o/edit?usp=sharing

Atmospheric Rivers: Irina to put some words down

Precipitation: Sergi Gonzalez in conjunction with Irina

Gravity waves: Tracy Moffat-Griffin

Cyclonic activity in peninsula area: ?

Invitation will be shared at later call today as well. Hopefully also contributions from Korean colleagues.

Thank you everyone. Productive call.

Closed at 1457 UTC.

Call 2 – 2203 UTC on 23 November

Attendees: David Bromwich (DB), Michelle Hollister(MH), Jeff Wilson(JW), Inga Smith(IS), Lynee Talley(LT), Daniela Liggett(DL), Vito Vitale(VV), Adriana Gulisano(AG), Scott Carpentier(SC), Jordan Powers(JP), Phillip Reid (PR), Matthew Mazloff(MM).

Short introductions by those present

DB – Introduces the session. **What science do we want to focus upon for East Antarctica which will include the Ross Sea for this call?** Eric Bazile emailed saying the French interested in precipitation studies and katabatic jumps.

VV – please remind us of the period for the winter campaign.

DB - mid April to mid July 2022, i.e., does not include spring. This picks up when the sea ice is expanding rapidly and of interest for operations outside the current austral summer time.

IS – the Antarctic Science platform will be underway during this period. It has a 7-year time frame and one of the focuses is polynas so any data on polyna behavior would be useful. IS interested in Fast Ice and hopes to have instruments on the ice at the end of the period. No NZ ships expected in the deep ice around that time but may have some ships a bit further north. IS hopes to circulate some material on the Antarctic Science platform to the group in the near future for information.

VV – Italy expects to do something at their stations and they have the chance via the Commission since November 2020 to get some extra funding for RS flights and for precipitation measurements and possibly cloudiness although this will be challenging. Italy has some moorings in the Ross Sea and will see if this data is useful when it is recovered the summer after the TOP. Not much capacity for modelling, perhaps some climate, VV trying to identify options but the timing is not good for funding cycles. Some experiments may continue past the end of the TOP to capture the re-emergence of the sun. The Italians will be coordinating with the Koreans as the Italian Mario Zucchelli station in Terra Nova Bay will be closed during the period. Extend past the end date of TOPs to examine ozone? Discussions to take place in early 2021 when people return from Antarctica. Expecting 50 extra soundings to be possible. Some activity on the Peninsula and some around the Ross Sea.

DB – Not sure if Meteo France will be installing a precipitation lidar at Dumont D'Urville (DDU), but they do have MRR. VV - was interested in knowing what precipitation measurements the French were undertaking. Italy has MRR in Terra Nova Bay and Concordia.

SC – In response to a question from DB regarding the operational interests of the Australian Bureau of Meteorology (BoM). Main aim is to support the BoM modelling efforts as well as assisting in some of the case studies and looking at the operational impacts for certain cases, particularly aviation based operations. Aviation ops could extend year-round in the future. The Atmospheric Rivers and similar phenomena (warm moist intrusions, how long they last as significant weather events, how long does the cloud last, and sea ice behavior to see if the fully coupled model is working properly). The BoM now doing sea ice analyses across a wide area of East Antarctica and it may be possible to extend this farther east to the Ross Sea. Happy to support the wider community and benefit from the improved science and operational outcomes. We will be doing extra radiosonde flights and happy to contribute to identification of the events for the TOP which will be led by Michelle.

PR – modelling goals are: BoM moving to a fully coupled model based on UK Unified model with NEMO oceanography and sea-ice. This will be on global scale as well as Antarctic based. There will be uncoupled High Resolution models over Mawson, Davis and Casey. Phil chasing a simplified schematic that shows why Antarctica is so unique and needs to have a specific model dedicated to it that can be used by decision makers. This could be featured in the

whitepaper. He has some ideas and would like to contribute to the development of it. There are schematics that address part of the issue but nothing that brings it all together. Boundary layer, fresh water melt, fast ice....

IS – can't think of one that includes all the processes. At the Antarctic science platform last week it would have been good to have such a diagram.

JW – will chase Taneil up to see if she has made any progress on her diagram.

LT – we have been deploying Argo floats, 130 of them are currently active. Some under the sea ice. She can circulate some papers.

MM – a few new papers out that look at the impact of atmospheric rivers on polynyas. Here as an observer to see where we can help out. The ocean is a great integrator of systematic atmospheric errors and so is a good validation of the atmospheric simulation.

AG – do you have ice buoys or bathymetric floats

LT – Argo floats are under the ice.

DB – hoping to have some additional buoys launched.

SC – we hope to deploy buoys but it will be dependent upon shipping schedules and locations. Examining dropping drifting buoys and putting some buoys on suitable ice if it can be identified.

VV – we have good relations with the European space agency and so can get satellite observation SAR around our stations. They helped us out with similar for MOSAiC for free. This is for the Terra Nova Bay area. Happy to talk to the NZ people to see what areas/polynyas they are interested in. The Chinese station on Inexpressible Island in Terra Nova Bay has not been built. They have deposited material there but construction has not yet commenced. It is expected to be 5000 sqm which will be tricky in that environment. AWS on southern tip of the island measures 80 m/s wind speeds at times. Winds can get over 200 kph (56 m/s) for extended periods. Whilst not an ideal situation it is the only free spot to build a station on the western edge of the Ross Sea that has sea access.

JP – In the earlier call they touched on cyclones as a focus for the Science. How cyclones can affect operations around McMurdo Station, in particular Barrier Winds around McMurdo/Ross Island?

SC – I like the approach of saying cyclones with impact on operations. How well do the models capture such situations?

VV – in the winter the modelling will be with respect to the observations. Can the winterers make special observations over this time, either manual obs like cloudiness, wind behaviour? Can the modellers indicate whether there are any particular obs that they would like to help verify the models.

JP – we may be able to ask the manned stations (NIWAC?) to do additional obs

IS - like the idea and something similar has been done in the Arctic and around Ross Island Station (Scott Base?).

JW – it seems that VV is asking the modellers to identify what additional obs they would like to help verify some of the NWP processes that the normal obs do not address.

DB – there is a 30m Alexander tall tower in the northwestern Ross Ice Shelf in a relatively flat area that could be a good site to add extra low power observations to. This has a roughly 10-year record of observations in non-complex terrain so good for validating NWP models.

VV – the boundary layer perhaps not the main focus so we should ensure we get the extra radiosonde flights.

DB – we need to focus the ideas through the development of the whitepaper to capture the science ideas. David will think about how to do this for East Antarctica. David likes the umbrella idea of cyclones and their impacts.

VV – one whitepaper covering the continent with specific sections for the different regions.

DB – probably won't have a teleconference in December but as the Antarctic Summer season is limited we will try for next teleconference in January.

Meeting closed 2313 UTC 23 November 2020

Action Item for Everyone:

Work on the whitepaper:

(https://docs.google.com/document/d/1voNQ7Cfb-RWYn_iwIKTZeiJEBXct5QmzQ4dX5BAI7o/edit?usp=sharing)