

## Science Drivers for Greater Ross Sea Meeting, 12 November 2020, 1500-1600 UTC.

### Attendees:

David Bromwich, Matthew Lazzara, Steve Colwell, Eric Bazile, Kirstin Werner, Lynne Talley, Mike Dinniman, Irina Gorodetskaya, Adriana Gulisano, Jordan Powers

*Apologies:* Inga Smith, Daniela Liggett.

David explains **the concept of the TOPs**- 3 to 4 TOPs during 3-month period

Regional approach: 3 to 4 events per region. How to define?

- Greater Ross Sea, Antarctic Peninsula, East Antarctica
- Should regions be fixed?
- Coordinating committee for each region?
- Additional radiosondes from Southern Ocean islands and southern Continents?

What exactly are the science targets?

- Major cyclones?
- Atmospheric rivers?

TOP duration 3 to 4 days? Enough?

JP question: What's the difference between regional approach with an event vs. non-regional approach with an event?

DB – Regional approach: big areas with major events, observational coverage – not do additional obs for all Antarctica. Some backtracking of events would be good to see if obs would be impactful for downstream forecasts.

JP: in non-regional approach, all over Antarctica? Or whole space while event is in certain region?

DB: routine soundings are the base network. Some of them might do additional obs during entire 3-month period but limited in number. Most of them will do additional obs during Targeted Observing Periods.

JP: Non-regional: obs are taken everywhere?

DB: yes, downside: we only get 3 to 4 events for the entire continent.

JP: In non-regional event: do we observe fixed period or look for events?

DB: yes, we would look at events.

AG: group of scientists will say: do the measurements? How do we decide when obs will start for given event?

DB. Committee will look at the forecasts, have a plan what are the important science targets. Make a decision when a targeted observing period is to be initiated. Maybe a potentially interesting looking event might not be exciting in actuality. Regional focus will maximize the chances of success by increasing the number of events investigated.

### Science Drivers?

Large cyclones impacting Ross Sea. Where do these come from? There are different trajectories, like moving along the Adelie Land coast and spiraling into the Ross Sea as well as recurving across West Antarctica and moving northward along the Transantarctic Mountains to Ross Island/McMurdo.

Atmospheric rivers.

ML: Could we have overlapping science criteria that fit both? Common criteria, we could catch both.

DB: people like days in advance to know about radiosonde launches (e.g. 5 business days...)

AG: five days is too much.

DB: BAMS paper interesting as it has the plots for the different global forecast models. Forecast skill as function of time: reasonable skill at 5 days. In broad sense we might be able to do 5 days.

ML: day 6 or day 5: indicate it's looking good or not. As days approach more observations and people can be alerted.

DB: a few days we can do, might be stretched to 5 days of additional observations.

ML: if goals is to get 3 to 5 days of observations? How much before the event starts can observations be started?

DB: yes, that's why we need backtracking events to see what would be useful where and when. Very practical things to discuss.

IG: agree with Matthew's opinion how to plan. Difficult to see how many days. Aiming obs from Islands. Cold, dry sector of previous cyclone with low moisture supply. Next cycle with high moisture approaching, maybe we can have measurements in between (?) to measure 5 days before the event to define preconditioning. Regional approach really important. Why developed into atmospheric river and why the model did not capture it? **Another science driver:** Working in IPCC assessment now, importance of warm intrusions highlighted in many papers, especially into West Antarctica and across Byrd Station that is important for the climate change (warming) perspective. Models can struggle to capture warming events.

ML: no RS launches out of WAIS Divide in central West Antarctica. Automatic weather stations will be running. Matthew's team not going anywhere this year. Byrd not sure, not always included but is close to a grid point in many models. Some models do not include Byrd AWS observations. ML will try to initiate obs. from Byrd AWS before the TOPs 2022.

DB: there will be launches from McMurdo but not Byrd or WAIS. Nobody out there in the winter time.

DB: Scott Carpentier email from Nov. 12: combine atmospheric rivers with hazardous weather conditions? To satisfy goals to improve forecast combined with science advance. Question to Irina: do atmospheric rivers impact Dumont D'Urville?

IG: always maximum on Adelie Land. Winter might even be the maximum. Atmospheric rivers from February 2017 is aim of new paper, weather hazardous. Slight shift in precipitation and max wind forecast changed completely the operations, closing station and helicopter flights, ship moved away. Almost no time because forecast predicted event over oceans but two days before forecast changed to event being on land.

DB: local minimum in Ross Sea and McMurdo?

IG: shows AR map: Jonathan Wille algorithm, Annual atmospheric river frequency. Higher frequency over Adelie Land, maximum 1.5% of the time. Minimum for Ross Sea. Consider overlap between regions.

DB: Combine Ross Sea with East Antarctica, from Scotts email?

JP: Maybe. Can consider events hitting both regions with similar considerations.

ML: Refine it, decision could be made by the committee. Sometimes it is. Sometimes it is not.

EB: Difficult for me, not too much experience with type of weather affecting Dumont D'Urville. People complain about wind, BPL, and precipitation forecasts for Dumont D'Urville. Météo France has decided to increase RS frequency in DDU from 1/day to 3/day during TOPs. So, in some document justification for DDU obs. for higher frequency should appear.

DB: part of regional approach motivation: everybody benefits. Everybody should have gotten something out of it.

JP: administratively consider E Antarctica and Ross Sea separately because of the various interests.

DB: try to maximize number of events around the continent. How we cut pie that is the question.

DB: will discuss with Australia and NZ people and listen directly to what they say.

DB: **Physical oceanography people should talk about their interests.** SIPN South/François Massonnet exercise will be carried out. Inga Smith's sea ice studies close to Scott Base.

LT: PhD student (Momme Hell) just finished with Sarah Gille. Storm system impacts on sea ice, waves, ice shelf response, etc. He might be interested and would be good part of the team. Continue to put in Argo floats in the whole region. Looking for ship opportunities for 2021-2022 austral summer. At least one ship operating in the Ross Sea this austral summer with float deployments. Matt Mazloff working in Ross Sea, new PhD student (Yourin Li), oceanographic response to these events. Might also be interested. Subsequently by email, Lynne mentioned Alex Haumann (Princeton Postdoc going to Europe, Southern Ocean studies) and Ethan Campbell (U. Washington, late Ph.D., Weddell Polynya response to storms). **Lynne will sent map where the floats are.**

MD: Have you reached out to SOOS Working Group on the Ross Sea? Walker Smith is co-chair and would have an idea what other assets might be available from the ocean side. Moorings over the winter? Chance to find seals with tags diving around. Matt Mazloff needs to be involved. Coastal ocean radar station at Palmer may still be in operation during the TOP (Josh Kohut, Rutgers, PI). Looking at surface currents. SOOS WG on Antarctic Peninsula is another source of information.

IG: Purely oceanography SOOS group?

MD: only oceanography but some people do ocean-atmosphere interactions.

DB: **Wrapping up on Science Drivers.** YOPPSiteMIP effort could be a mechanism to look at the model physics. DDU and Dome C would be good candidates. Way to broaden the science drivers.

DB: Radiosonde schedules during TOPs: McMurdo 2/d (up from 1/day), DDU 3/d (1/day usually), Macquarie Island 3/d (2/day normally), Invercargill 4/d (2/day routinely), JangBogo at least 1/d (might be for entire 3 months, with 2/day during TOPs), Dome C 2/d (1/day routinely). Gough and Marion Islands to 4/day from 2/day, probably.

Extra drifting buoys from Australia.

### **Wrap-Up thoughts?**

IG: showing map of atmospheric river frequency during winter. Similar to annual.

**Next YOPP-SH session:** Monday November 23, two sessions, may discuss East Antarctica during second session.

IG: Question about E Antarctica: is Queen Maud Land (QML) part of it? DB: How big is the peninsula, i.e., does it include QML? Needs to be discussed.

**Meeting ended 1600 UTC.**