YOPPsiteMIP meeting summary, outcomes and actions

17 to 19 September
Department of Meteorology, Stockholm University
Stockholm, Sweden

Front row (bottom to top): Taneil Uttal, Amy Solomon, Gunilla Svensson, Jonathan Day, Barbara Casati, Niramson Azouz

Back row (bottom to top): Teresa Valkonen, Roberta Pirazzini, Michael Tjernström, Michael Gallagher, Siri Jodha Khalsa, Jeff Wilson, Mikhail Tolstykh .
Photograph by Thorsten Mauritsen (MISU)

Executive Summary

The YOPPsiteMIP meeting was hosted by the Department of Meteorology, Stockholm University (MISU) at the Arrhenius Laboratory in Stockholm from 17 to 19 September 2019 and supported by the International Meteorologica Institute (IMI).

YOPPsiteMIP stands for the Year of Polar Prediction supersite Model Intercomparison Project. The goals of YOPPsiteMIP are to support detailed evaluation of the model representation of a range of physical processes, as described in the YOPP modelling plan (YOPP, 2017). The processes to be evaluated include the terms in the energy budget at the surface, momentum transfer, clouds and vertical profiles of a number of parameters, as well as other processes which are supported by the observations at the supersites or of interest to compare between models.

The aim of this workshop was to present the first results of the YOPPsiteMIP projects, to discuss future analysis and to plan activities in connection to MOSAiC. It drew together practitioners from the modelling and observational world to showcase the current status of intercomparison data for the YOPP SOP campaigns, particularly those based in the Arctic, and refine the plans, processes and procedures to gather intercomparison data available for research purposes in the near future. As the focus of the meeting was analysis of Arctic sites, no participants from the YOPP-SH or YOPP Third Pole observatories were present for the meeting.

The first day of the meeting showcased some early results from detailed modelling studies as well as the status of the observatory data files. The second day provided an opportunity to refine the schema for the NetCDF files that has been developed to allow the intercomparison of the model and observational data and examine options for a potential open community toolbox of Python based tools that could speed up the creating of the merged data files. The third morning of the session focussed upon the interaction between YOPP and MOSAiC, particularly the revised plans for the proposed third SOP. A multi model “near real time” comparison and series of teleconferences following each MOSAiC leg was also agreed. The final afternoon was spent reviewing and clarifying actions before a teleconference with members of the YOPP Process Task Team.

The YOPPsiteMIP activities overlap the work of at least three YOPP Task Teams, namely the Process Task Team, the Verification Task Team and the YOPP Data Task Team. This meeting on YOPPsiteMIP included key participants from each of the Task Teams which was very beneficial in making progress.

This meeting resulted in a number of strategic as well as tactical decisions. Strategically big steps were made in refining the contents, processes, semantics and procedures for creating and supporting the schemas to be used for holding the model and observational intercomparison data in NetCDF format. Tactically, recalling the PPP-SG-#10 decision to focus any additional YOPP observation and modelling campaign associated with the MOSAiC project on the processes occurring during airmass transformations it is proposed to use on-demand Targeted Observing Periods (TOPs), preferably based around other intensive observation campaigns such as the aircraft deployments during March/April 2020 and August/September 2020 if suitable airmass transformations occur in those time periods. The short on-demand TOPs would replace the SOP-NH3 campaign previously proposed for February/March 2020 but would still benefit from countries in the path of the air mass transformations undertaking additional radiosonde releases during the events.

As a result of this meeting notional dates for having some observational and model data in the new Merged Data File Specification (MDFS) schema were set (first quarter of 2020). The semantics for the various schemas were agreed (MDFS is the generic parent schema with Merged Observatory Data Files (MODF) and Merged Model Data Files (MMDF) being its children). A common open toolbox of Python code to assist in the creation of the model and observational MDFS NetCDF files was agreed with a workshop proposed for late April 2020 in Boulder that would bring together the key data managers to create the MODF files. The contents for the YOPPsiteMIP component of the YOPP website were also agreed. Individuals to consider inviting to the Science meeting prior to PPP-SG#11 were also identified.

The action items from this meeting are identified at the end of each section then summarised in Annex 2. Actions related to the specification of the YOPP Merged Model and Observatory File schemas have been assigned to the YOPP Data Task Team.

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Contents

Overview

The goal of the YOPPsiteMIP project is to support the detailed evaluation of the model representation of a range of physical processes, as described in the YOPP modelling plan (YOPP, 2017). The processes to be evaluated include the terms in the energy budget at the surface, momentum transfer, clouds and vertical profiles of a number of parameters, as well as other processes which are supported by the observations at the supersites or of interest to compare between models. The aim of this workshop was to present the first results of the YOPPsiteMIP projects, to discuss future analysis and to plan activities in connection to MOSAiC. The meeting recalled that YOPPsiteMIP applied to the three poles but the focus of this meeting was the Artic.

Action:
A1. Siri Jodha Khalsa offered to contact some colleagues in China to see what was happening with Supersites on the Tibetan Plateau
A2. Jeff Wilson to contact David Bromwich to see what was happening with SH Supersites.

YOPPsiteMIP website

The YOPP website at the time of the meeting references YOPPsiteMIP through a link to the foundation YOPPsiteMIP document entitled *YOPP Supersite Common Model Output* (https://www.polarprediction.net/fileadmin/user_upload/www.polarprediction.net/Home/Organization/Task_Teams/Modelling_Task_Team/YOPP_Supersite_common_model_output.pdf).

This paper is a supplement to the earlier WWRP Polar Prediction Project YOPP Modelling plan (YOPP, 2017 http://www.polarprediction.net/fileadmin/user_upload/www.polarprediction.net/Home/Documents/FINAL_WWRP_PPP_No_6_2017_2_Nov.pdf) which outlines the plans for modelling over the period of YOPP.

This meeting identified the need for a dedicated starting page on the polarpredict website with content along the following lines. Some of these could be links to material held on other sites but is foundational for YOPPsiteMIP activities and thus the website should act as a portal to this additional information.

- The graphic(s) showing the locations of the supersites
- The Supersite characterisation information
- The model characterisation information, generic plus anything particular to a given model
- View the MDFS specification sheet and those for MODF and MMDF (these will be static versions of the google master sheets but captured on a periodic basis for public viewing)
- YOPPsiteMIP publications
- How to contribute to the MDFS specification schemas (covers Models and Observations)
- Access to any code to utilise/ create MODF files
- Link to YOPP data portal so users can see when new data has been uploaded
- Links to sample obs and model MODF files and headers
- View the latest YOPPsiteMIP presentation
- Information on how to reference data using DOI's

- Details on the MOSAiC “near real time monitoring” activity and its associated teleconferences

This meeting identified that the YOPPsiteMIP graphics needed to be updated as the current graphic does not show all of the Arctic sites or include MOSAiC. Also there are no graphics covering the Southern Hemisphere or Third Pole Supersites. It was suggested that the ICO take on the task of updating the graphics to ensure consistency across the three poles. The meeting noted the style of the IOSOA graphic Taneil developed as it graphically depicts the different kinds of Supersites. Taneil offered to make the adobe illustrator files for the IOSOA graphic available for the ICO if required.

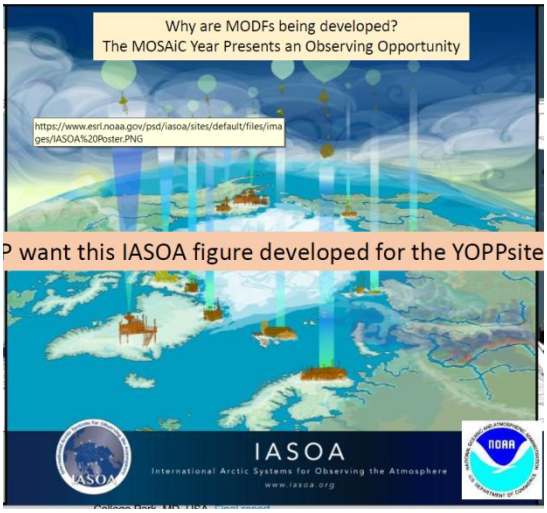

Figure 1. The IOSOA Supersite graphic, the beam widths and shapes provide an indication of type of Supersite

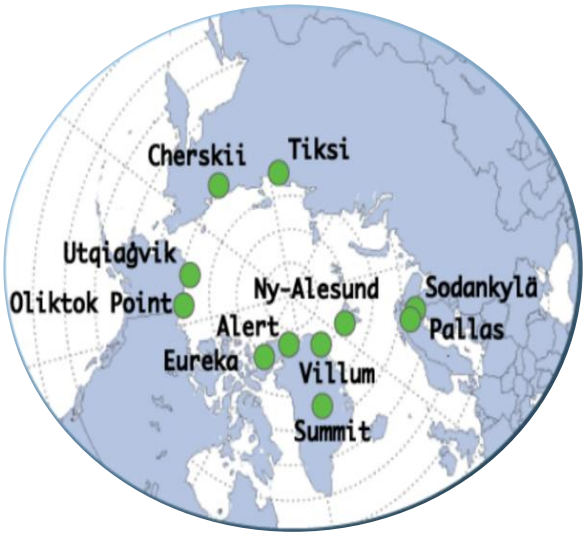

Figure 2. Current YOPPsiteMIP graphic that needs updating as it does not have all of the stations and does not differentiate between the different types of stations

<u>Actions for this item</u>

A3. Prof Svensson /Jeff Wilson to advise the ICO of the need for YOPPsiteMIP to have a dedicated section on the YOPP website.

A4. Barbara Casati to review the current YOPP website for YOPPsiteMIP structure and contents with view to add the table of models by the February 2020 PPP-SG but preferably before November 2019.

Note: The ICO are updating the PolarPredict website during the week of 30 September 2019.

Digital Object Identifiers (DOI’s)

The meeting recalled that DOI’s had been previously discussed during the PPP-SG#9 in 2018 with the PPP-SG recommending that YOPP publications and datasets obtain DOI’s for traceability and reference purposes. Typically DOI’s are issued by the organisation hosting the publications or data sets if they are licensed to do so.

Siri Jodha Khalsa reminded the meeting that a DOI is a persistent identifier used to identify objects uniquely, standardized by the International Organization for Standardization (ISO). DOIs are in wide use mainly to identify academic, professional, and government information, such as journal articles, research reports and data sets, and official publications though they also have been used to identify other types of information resources, such as commercial videos.

A DOI aims to be "resolvable", usually to some form of access to the information object to which the DOI refers. This is achieved by binding the DOI to metadata about the object, such as a URL, indicating where the object can be found. Thus, by being actionable and interoperable, a DOI differs from identifiers such as ISBNs and ISRCs which aim only to identify their referents uniquely. The DOI for a document remains fixed over the lifetime of the document, whereas its location and other metadata may change. Referring to an online document by its DOI is supposed to provide a more stable link than simply using its URL. But every time a URL changes, the publisher has to update the metadata for the DOI to link to the new URL. It is the publisher's responsibility to update the DOI database. If they fail to do so, the DOI resolves to a dead link leaving the DOI useless. (Material for the last two paragraphs was extracted from https://en.wikipedia.org/wiki/Digital_object_identifier) The cost of registering new DOI names depends on the services you purchase. See, for example, DataCite's price list: https://datacite.org/pricelist.html.

Whilst this meeting of YOPPsiteMIP were not able to resolve the DOI questions the meeting noted that DOI's for publications were typically provided by the publication so we were really focussing on DOI's for data sets. Teresa advised the meeting that Met No. were investigating the option for them to be able to provide DOI's for the data they are holding in the YOPP Data Portal but no decisions had yet been made. It was not clear if the DOI's would be only for datasets that were being hosted by Met No. on the YOPP Data Portal or DOI's could be issued for data that could be accessed through the YOPP Data Portal (ie the meta data was on the portal but the data resides elsewhere and does not have a DOI from the organisation hosting the dataset). The meeting was advised that PANGEA may be able to issue DOI's for European sites if they cannot do it from their own institute.

Dr Taneil Uttal estimated that approximately 100 DOI's may be required for the YOPP Arctic Supersites for the two SOPs plus the proposed TOP's. Further DOI's may be required if sets of these data were to be aggregated.

Actions for this item

A5. The YOPP Data Task Team were requested to investigate who and how DOI's could be issued for YOPP data sets. If possible to advise Prof Svensson by the end of October 2019.

A6. Dr Uttal to talk to her colleague (Cathy) regarding DOI issuing based around NOAA practises and potentially hosting the YOPP data on a NOAA data server. Dr Uttal to update Prof Svensson by the end of October on the outcome of these discussions.

YOPPsiteMIP publication

The meeting was advised that a number of publications were being planned around YOPPsiteMIP activities. Dr Uttal and her team were planning several publications for the Data Science Journal edited by Dr David Carlson around the development and use of MODF schemas as well as preparation of the Barrow Supersite observations in MODF schema NetCDF files. Dr Leslie Harten is

authoring the Barrow Supersite publication and is hoping to submit it in 2019. No decision was made about whether there would be a data publication for each SOP but the discussion further underlined the importance of obtaining DOI's for the datasets that the papers would be referencing.

Dr Svensson outlined the publication envisioned for the Bulletin of the American Meteorological Society Journal (BAMS) to be led by Dr Uttal and herself. The article proposal needs to be submitted by mid January with the paper ready for submission in March. The figures for the article need to be ready by mid February for use in the Open Science Workshop prior to PPP-SG#11

The content and contribution for sections is outlined below.

- PDFs of long-wave down for SOP-NH1 and NH2 for Barrow and Sodankyla? – conditionally sample clear and cloudy (ceilometers? LWP?) – Jonny
- Vertical profiles, T, U, Udir and q at Sodankyla for NH1 and NH2 – Gunilla and Michael
- Roughness diagnostics (momentum and wind speed) – Jonny
- Sensible heat flux diagnostic (flux profile relationship) – Amy
- Internal model data deadline November

Actions for this item

A7. Prof Svensson to coordinate the work required to develop the BAMS article.

Merged Data File Specification (MDFS) schemas

The meeting reviewed progress with defining the MDFS schema for model and observatory data to date. The master data for the MDFS schemas is currently held in a google sheet with only Leslie Harten and Barbara Casati having write access. As new sites and models are added to the google sheet they are put into their own tab and then entered into the master tab on the google sheet. During the discussion on this item the group split into two working parties and provided updates to the model and observation tab data.

Following lengthy discussion a number of recommendations were made for consideration by the YOPP Data Task Team:

- That the generic schema for the model and observatory files be known as the MDFS (Merged Data File Specification schema. The Observatory specific schema to be known as MODF (Merged Observatory Data File) whilst the Model specific schema to be known as the MMDF (Merged Model Data File) schema. The schemas provide the meta data for the NetCDF file header.
- That for at least the next three years the MODF and Merged Model Data Files (MMDF) should be backward compatible, ie new variables could be added but the names of existing variables would not be changed. This means that routines to access and use the MODF and MMDF data should be relatively stable for the period of YOPP data collection and analysis.
- That the schemas would hold the native name of the variable for the particular model or observatory site as well as the CMIP name.
- That the files should carry the actual location (latitude, longitude and elevation) for each instrument (MODF) and profile (MMDF) as the instruments in many Supersites were spread out over the site. Thus each site may have different values for the same variable due to multi instruments spread across the site observing the same variable (temperature, wind etc).

- Uncertainty in data from instrument calibration error, missing values, quality flag and reason, different height measures for the masts etc, site exposure should be included in the Supersite characterization data and this should be available via the YOPPsiteMIP webpages.
- Model characterization data files also needed to be developed and referenced from the YOPPsiteMIP webpages.
- Clarify that all measurements from all instruments (incl. aerosol and chemistry) at each supersite should be added to the MODF but not necessarily in the first instance. First priority is to add the parameters in the specification table.
- That the specification of MODF 1.0 be finalised by 1 Nov 2019 to support the open source Python code development.
- To promote the creation of an open source community toolbox of Python code to write and manipulate MODF and MMDF schema files. The code to be based around the work Dr Uttal's group have already undertaken to create MODF NetCDF files for the Supersites they support.
- Whether the CFMIP variable name should be used in the MDFS to overcome problems encountered with CMIP variable names for multiple time (forecast) data.

Actions for this item

A8. Dr Uttal / Barbara Casati to request the modeling centres to provide the grid point location of each of the profiles around the Supersites so they can be overlayed on top of the station locations / topography. The model profile location data will be in google earth as layers.

A9: Dr Uttal's group to create a one page doc on how to characterise uncertainty in the obs and how this will be incorporated in the MDFS by 1 Nov 2019.

A10. Dr Uttal's team are examining the possibility of providing a master template for each RAWIND station to download that will automatically add in set station data.

A11. Siri Jodha Khalsa to provide Prof Svensson with a one summary slide on the difficulty and benefits of semantics for presentation at the WGNE meeting on 24 September 2019.

A12. Siri Jodha Khalsa and Barbara Casati to review the MDFS 1.0 schema to identify if any of the MDFS variable names are likely to change. This needs to be done quickly due to the decision on backward compatibility.

A13. Dr Uttal and Siri Jodha Khalsa bring the YOPPsiteMIP recommendations to the YOPP Data Task Teams attention for their agreement and action.

MODF Creation and workshop

Noting the decision to create an open source community toolbox of Python code to write and manipulate MODF and MMDF schema NetCDF files the YOPPsiteMIP meeting requested Prof Svensson to seek funding from the ICO to hold a YOPPsiteMIP MODF workshop in late April 2020. The workshop would be for the data managers / programmers from the YOPP Supersites and would demonstrate how to extend the toolbox for each site to read their locally formatted data to create the MODF's for their sites. Dr Uttal indicated that it may be possible to host the workshop in Boulder. Dr Casati noted that Zen Mariani (ECCC) who is responsible for the installation and analysis of the wind and lidar from ECCC should be invited to such a workshop. Roberta Pirrazini noted that

FMI would be willing to work with Dr Uttal's group to produce a first attempt at a Sodankylä MODF file before the end of March 2020.

Actions for this item

A14. Dr Uttal to investigate how many people would be interested in attending a YOPPsiteMIP MODF creation workshop in late April 2020.

A15. Dr Uttal to request the YOPP Data Task Team to advise on the best way to share sample data MODF files amongst the group. Options discussed at the YOPPsiteMIP meeting included Dropbox, Box, a google doc that has the links to the various files in different locations.

A16. Prof Svensson to request the ICO to check the YOPP Endorsed projects to see who else may be interested in preparing MODF for interesting cases in MOSAiC YOPP-TOP plus SOP-NH1 and SOP-NH2.

A17. Prof Svensson to request the ICO to check if the Italian National Agency in Thule Greenland has already compiled Sondes for SOP1 and SOP2 and contributed them to the YOPP Data Portal.

Supersite station descriptions and metadata

Dr Uttal demonstrated the work she had undertaken to develop information about the characterization of each of the YOPP Supersites. The characterization shows the layout of each site, where instruments are located, how the land surface changes with season, surface characteristics etc. Dr Uttal plans to make the characterization information for each Supersite available via the YOPPsiteMIP website. It is expected that the MODF would reference via a DOI the URL for the characterization metadata for each site.

Actions for this item

A18. Dr Uttal to request each of the Supersites to review the characterization metadata she has created for each Arctic Supersite.

YOPP Data Task Team and Portal

Prof Svensson noted that participants for this meeting came from the YOPP Processes Task Team, the YOPP Verification Task Team and the YOPP Data Task Team with actions from the meeting to be taken up by the separate groups. Prof Svensson further recalled that the YOPP Data Portal was a key infrastructure component of YOPP and it needed to be functional and hold or point to as much YOPP data sets as possible. Following a short discussion the following action items were agreed.

Actions for this item

A19. Jonathan Day to check datafiles, naming consistency, levels of hierarchy and content on the current YOPP data portal website.

A20. Dr Uttal to provide a step by step process on how to contribute an observatory MODF metafile data to the YOPP data portal.

A21. Prof Svensson to advise Met No. if the CTD data from the Polarstern is to be circulated via the GTS so it can be captured in the YOPP Data Portal.

A22. Barbara Casati to provide the step by step process on how to contribute model MODF files to the YOPP Data Portal.

A23. Dr Uttal with Siri Jodha assistance to create table that shows who and by when YOPP Data TT tasks will be undertaken.

A24. Dr Uttal to discuss with Jørn Kristiansen how much Met No is prepared to store in terms of data rather than meta data

A25. Dr Uttal to investigate whether the US Arctic Data Centre could also hold the non US data?

A26. YOPP Data Task Team to advise how institutions can recommend additions to the MDFS specification.

Details on SH radiosonde data for SOP-SH1 and SOP-SH2 as well as Observation data for Tiksi and Baranova

Radiosonde data

The high resolution radiosonde data can be found at ftp://ftp.bas.ac.uk/src/YOPP-SH/radiosondes/

Colwell, Steve <src@bas.ac.uk>

Tiksi and Baranova 2018 observation data

http://www.aari.ru/main.php?lg=1&id=273 (Tiksi)
http://www.aari.ru/main.php?lg=1&id=407 (Baranova)
(SYNOPs and radiosondes)
Data for other years are there as well

Open Science Workshop before PPP-SG#11

Prof Svensson recalled that an Open Science Workshop would be held prior to the PPP-SG#11 meeting in Bremerhaven in February 2020. To enable some of the actions from this meeting to be concluded such as the BAMS article and the development of the MODF workshop it was suggested that Prof Svensson recommend to the ICO to invite the following participants: Matt Shupe and/or Marcus Rex to provide updates on progress with the MOSAiC experiment, Annette Rinke to encourage the use of MODF and MMDF in the MOSAiC work, Manfred Wendisch or delegate (Timo Vihma), and someone from COMBLE.

Actions for this item

A27. Prof Svensson to advise the ICO of the YOPPsiteMIP recommendations for people to invite to the Open Science Workshop prior to the PPP-SG#11.

MOSAiC

In her introduction to this agenda item Prof Svensson advised the YOPPsiteMIP meeting that the CTD and radiosonde obs from the Polarstern will be circulated to the GTS during MOSAiC. Prof Svensson will advise the WGNE group and the ICO of the details regarding station number, frequency etc. The ICO could also include this information in the YOPP social media and newsletter.

Prof Svensson recalled the overall MOSAiC mission and advised the meeting that the Polarstern is due to depart Tromsø on 20 September but observations are not expected to start until mid October after camp is set up on an ice floe.

The meeting recalled the discussions at PPP-SG#9 and PPP-SG#10 regarding the potential for a third Special Observing Period (SOP) in the Arctic during 2020 to take advantage of the additional observations from the MOSAiC experiment. PPP-SG#10 further identified that the focus of a third SOP in the Arctic should be on polar – mid latitude interactions, in particular studying the processes involved in the airmass transformations. The YOPPsiteMIP team, noting aircraft campaigns using the AWI Polar 5 and 6 aircraft for MOSAiC were proposed from 16 March to 7 April 2020 and again in late August/early September 2020 when there was increased likelihood of polar - mid latitude transformations occurring agreed that these would be good periods to focus upon. The YOPPsiteMIP team further stated that if suitable events were predicted outside of the aircraft campaigns these events should also be targeted. YOPPsiteMIP noted that the proposed campaigns would be different to the earlier Special Observing Periods because additional observations would only be taken when suitable events were occurring. Given the different nature of the observing periods it was suggested that a different terminology be used either Intensive Observing Periods or Targeted Observation Period (TOP).

For YOPPsiteMIP researchers to have access to MOSAiC data it is necessary for YOPPsiteMIP to become an endorsed MOSAiC activity and then the individual YOPPsiteMIP researchers will need to sign the MOSAiC data policy agreement. Prof Svensson with assistance from Dt Uttal and the ICO agreed to initiate the endorsement process.

Dr Solomon advised the YOPPsiteMIP team that she was planning on running near real time Model Intercomparisons during MOSAiC and she would like the modelling centres to participate in the activity. Each centre would be requested to provide a subset of data from their model for the nearest grid point of the Polarstern position found through the GTS or to be provided by Dr Solomon. The YOPPsiteMIP team enthusiastically supported this proposal and suggested a teleconference of interested parties to occur soon after each of the six MOSAiC legs were completed. Prof Svensson offered to coordinate the first of the teleconferences (most likely in November 2019). Barbara Casati offered to work with Dr Solomon to organise the logistics of where and how the various modelling centres could submit data for the MIP. During the teleconferences it would be possible to identify suitable case studies from the previous MOSAiC leg for further study. Dr Uttal suggested that the modelling centres could use this as an opportunity to advise the Supersites and MOSAiC which observation types would be their priority for the previous MOSAiC leg.

Actions for this agenda item

A28. Prof Svensson with input from Dr Uttal to draft a letter for ICO to send to Met Services and research institutes in and around the Arctic requesting additional radiosondes targeting airmass

transformations during the YOPP Targeted Observation Periods (TOPs) and to also request support for developing the YOPP MODF Supersite files.

A29. Dr Uttal to advise Prof Svensson whether it is desirable for YOPPsiteMIP to formally write to NOAA thanking NOAA for the work being undertaken by Dr Uttal's group.

A30. Barbara Casati to advise Dr Amy Solomon of the statistics that were routinely produced for SOP-NH1 and SOP-NH2.

A31. Prof Svensson, with support from Dr Uttal and the ICO, to commence the process of seeking approval for YOPPsiteMIP to access and use MOSAiC data. Following MOSAiC endorsement of YOPPsiteMIP as an endorsed project the individuals within YOPPsiteMIP will need to sign the data policy agreement to get access to the data.

A32. Prof Svensson to update the YOPP / MOSAiC activity diagram.

A33. Prof Svensson to set up the first teleconference for MIP studies following the completion of the first leg of the MOSAiC project.

A34. Dr Solomon to circulate a table to the modeling centres to get an indication of what they can provide, where and how for the whole MOSAiC year, lists of variables and profiles. Just 00UTC forecast run. She will develop a cover letter with the help of Barbara Casati and potentially sent the letters to ECCC, Meteo France, Roshydromet, ECMWF, NCEP (PSD), MetNo.

A35. Prof Svensson will present the concept at the WGNE and invite other NWP centres to contribute.

A36. Teresa Valkonen to check with Met No if they are happy to be an aggregator for this data and then Dr Solomon could extract the data from the YOPP Data Portal once a week or so.

Summary

In closing the meeting Prof Gunilla Svensson thanked all participants for their time and enthusiasm in taking the YOPPsiteMIP activities forward. Prof Svensson stated that she thought great progress had been made during the three days of discussion but as a group we now need to ensure that the actions were carried out as agreed during the meeting. The participants thanked Prof Svensson, the Department of Meteorology and the International Meteorological Institute for hosting and supporting the meeting which assisted in generating the very positive outcomes.

Prof Svensson closed the meeting at 1525.

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Participant list

Niramson Azouz, MeteoFrance, France
Barbara Casati, ECCC, Canada
Jonathan Day, ECMWF, UK
Michael Gallagher, NOAA, USA
Martin Hagman, MISU (Tuesday)
Jareth Holt, MISU (Tuesday)
Siri Jodha Khalsa, NSIDC, University of Colorado, USA
Roberta Pirazzini, FMI, Finland
Amy Solomon, University of Colorado/NOAA-ESRL, USA
Gunilla Svensson, MISU
Michael Tjernström, MISU (Wednesday & Thursday)
Mikhail Tolstykh, Hydrometcentre of Russia
Taneil Uttal, NOAA, USA
Teresa Valkonen, Norwegian Meteorological Institute, Norway
Jeff Wilson, WMO Consultant

YOPPsiteMIP workshop Program

Tuesday, September 17, 2019

09:30 Welcome and local information - Gunilla Svensson, MISU
09:35 Presentation of workshop participants, role in the project and workshop goals - Gunilla Svensson, MISU
10:00 Coffee Break
Open part of the workshop — presentations of YOPPsiteMIP results and plans
10:30 YOPPsiteMIP overview - Gunilla Svensson, MISU
10:50 Status of Developing inter-operable Merged Observatory Data Files (MODFs) and YOPP Time-step Model Files (YTMFs) - Taneil Uttal, NOAA, USA
11:10 The Role of Semantics in Harmonizing YOPP Observation and Model Data – Siri Jodha Khalsa, NSIDC, University of Colorado, USA
11:30 CAPS evaluation using YOPPsiteMIP sites - Barbara Casati, ECCC, Canada
11:50 Understanding the impact of changes in surface physics from an energy balance perspective: Snow in Arctic winter - Jonathan Day, ECMWF, UK
12:10 Discussion
12:30 Lunch at the Faculty club
13:40 Evaluation of IFS using data from AO2018 and Sodankyla - Gunilla Svensson, MISU
14:00 Numerical experiment with the global model Arpege and the NH-model AROME for YOPPSuperSite - Niramson Azouz, MeteoFrance, France
14:20 AROME-Arctic forecasts for Supersites Sodankyla and Ny-Alesund during YOPP SOP-NH1 - Teresa Valkonen, Norwegian Meteorological Institute, Norway
14:40 SL-AV YOPPsiteMIP forecasts for SOP1 and SOP2 - Mikhail Tolstykh Hydrometcentre of Russia
15:00 Sodankyla-Pallas in situ data: input to the MODF - Roberta Pirazzini, FMI, Finland
15:20 Coffee Break
16:00 MOSAiC atmospheric data as a MODF - Michael Gallagher, NOAA, USA
16:20 Coordination of MOSAiC Forecast and Process Model Studies and Short-term Arctic forecasts at NOAA/ESRL - Amy Solomon, University of Colorado/NOAA- ESRL, USA
16:50 Discussion
17:00 End of day
End of open part

Wednesday, September 18, 2019
09:00 Discussion - inventory of models and observations, publication of data, common publications, marketing, website, YOPP workshop ...
10:00 Coffee Break
10:30 Discussions continued
12:15 Lunch
13:30 Discussion continued
15:00 Coffee Break
15:30 MOSAiC Discussions, Intro - Gunilla Svensson
17:00 End of Day

18:30 Dinner at Beirut Cafe, Engelbrektsgatan 37, http://www.beirutcafe.se/

Thursday, September 19, 2019

09:00 MOSAiC Discussions continued
10:00 Coffee Break
10:30 Discussions
12:15 Lunch
13:30 Summary of actions
14:30 Coffee Break
15:00 Process task team meeting with remote participation
16:30 End of Workshop

Annex 1 – Steps to get Model MODF files into the YOPP Data Portal

1. convert timeseries following the guidances available on the web (https://www.polarprediction.net/fileadmin/user_upload/www.polarprediction.net/Home/Organization/Task_Teams/Modelling_Task_Team/YOPP_Supersite_common_model_output_rev2.pdf). Check CF naming convention (http://cfconventions.org/Data/cf-standard-names/62/build/cf-standard-name-table.html) compliance on the CF online chekker (http://pumatest.nerc.ac.uk/cgi-bin/cf-checker.pl).
2. Contact Øystein Godoy / Egil Støren at MetNorway and send them a sample file (and a document with the description of data and metadata). They will return advises for improving the file formatting.
3. When they give the ok on the formatting, agree a transfer method for sending to MetNorway the whole time series files. They will take charge of storing the files and uploading the link on the YOPP portal.
4. Note: in the general attributes of the NetCDF files the version of the model dataset is stated. If modelling centre want to submit a second version of the model data they need to repeat steps 1 to 3, while changing the version number in the netCDF files.

Annex 3 – Action table

#	Who	When	What
A1	Siri Jodha Khalsa	27/9/2019	Siri Jodha Khalsa offered to contact some colleagues in China to see what was happening with Supersites on the Tibetan Plateau
A2	Jeff Wilson	24 September 2019	Jeff Wilson to contact David Bromwich to see what was happening with SH Supersites.
A3	Prof Svensson / Jeff Wilson	24 September 2019	Prof Svensson /Jeff Wilson to advise the ICO of the need for YOPPsiteMIP to have a dedicated section on the YOPP website.
A4	Barbara Casati	30 November 2019	Barbara Casati to review the current YOPP website for YOPPsiteMIP structure and contents with view to add the table of models by the February 2020 PPP-SG but preferably before November 2019.
A5	YOPP Data Task Team	31 October 2019	The YOPP Data Task Team were requested to investigate who and how DOI's could be issued for YOPP data sets. If possible to advise Prof Svensson by the end of October 2019.
A6	Dr Uttal	31 October 2019	Dr Uttal to talk to her colleague (Cathy) regarding DOI issuing based around NOAA practises and potentially hosting the YOPP data on a NOAA data server. Dr Uttal to update Prof Svensson by the end of October on the outcome of these discussions.
A7	Prof Svensson	March 2020	Prof Svensson to coordinate the work required to develop the BAMS article.
A8	Dr Uttal / Barbara Casati	31 October 2019	Dr Uttal / Barbara Casati to request the modeling centres to provide the grid point location of each of the profiles around the Supersites so they can be overplotted on top of the station locations / topography. The model profile location data will be in google earth as layers.
A9	Dr Uttal	1 November 2019	Dr Uttal's group to create a one page doc on how to characterise uncertainty in the obs and how this will be incorporated in the MDFS by 1 Nov 2019.
A10	Dr Uttal	31 October 2019	Dr Uttal's team are examining the possibility of providing a master template for each RAWIND station to download that will automatically add in set station data.
A11	Siri Jodha Khalsa	24 September 2019	Siri Jodha Khalsa to provide Prof Svensson with a one summary slide on the difficulty and benefits of semantics for presentation at the WGNE meeting on 24 September 2019.
A12	Siri Jodha Khalsa and Barbara Casati	31 October 2019	Siri Jodha Khalsa and Barbara Casati to review the MDFS 1.0 schema to identify if any of the MDFS variable names are likely to change. This needs to be done quickly due to the decision on backward compatibility.
A13	Dr Uttal / Siri Jodha Khalsa	31 October 2019	Dr Uttal and Siri Jodha Khalsa bring the YOPPsiteMIP recommendations to the YOPP Data Task Teams attention for their agreement and action.
A14	Dr Uttal	30 November 2019	Dr Uttal to investigate how many people would be interested in attending a YOPPsiteMIP MODF creation workshop in late April 2020.
A15	Dr Uttal	31 October 2019	Dr Uttal to request the YOPP Data Task Team to advise on the best way to share sample data MODF files amongst the

			group. Options discussed at the YOPPsiteMIP meeting included Dropbox, Box, a google doc that has the links to the various files in different locations.
A16	Prof Svensson	31 December 2019	Prof Svensson to request the ICO to check the YOPP Endorsed projects to see who else may be interested in preparing MODF for interesting cases in MOSAiC YOPP-TOP plus SOP-NH1 and SOP-NH2.
A17	Prof Svensson / Jeff Wilson	31 October 2019	Prof Svensson to request the ICO to check if the Italian National Agency in Thule Greenland has already compiled Sondes for SOP1 and SOP2 and contributed them to the YOPP Data Portal.
A18	Dr Uttal	31 December 2019	Dr Uttal to request each of the Supersites to review the characterization metadata she has created for each Arctic Supersite.
A19	Jonathan Day	30 November 2019	Jonathan Day to check datafiles, naming consistency, levels of hierarchy and content on the current YOPP data portal website.
A20	Dr Uttal	31 October 2019	Dr Uttal to provide a step by step process on how to contribute an observatory MODF metafile data to the YOPP data portal.
A21	Prof Svensson	16 October 2019	Prof Svensson to advise Met No. if the CTD data from the Polarstern is to be circulated via the GTS so it can be captured in the YOPP Data Portal.
A22	Barbara Casati	31 October 2019	Barbara Casati to provide the step by step process on how to contribute model MODF files to the YOPP Data Portal.
A23	Dr Uttal and Siri Jodha Khalsa	31 October 2019	Dr Uttal with Siri Jodha assistance to create table that shows who and by when YOPP Data TT tasks will be undertaken.
A24	Dr Uttal	31 October 2019	Dr Uttal to discuss with Jorn Christiansen how much Met No is prepared to store in terms of data rather than meta data
A25	Dr Uttal	31 October 2019	Dr Uttal to investigate whether the US Arctic Data Centre could also hold the non US data?
A26	YOPP Data TT	31 October 2019	YOPP Data Task Team to advise how institutions can recommend additions to the MDFS specification.
A27	Prof Svensson / Jeff Wilson	24 September 2019	Prof Svensson to advise the ICO of the YOPPsiteMIP recommendations for people to invite to the Open Science Workshop prior to the PPP-SG#11.
A28	Prof Svensson / Dr Uttal	16 October 2019	Prof Svensson with input from Dr Uttal to draft a letter for ICO to send to Met Services and research institutes in and around the Arctic requesting additional radiosondes targeting airmass transformations during the YOPP Targeted Observation Periods (TOPs) and to also request support for developing the YOPP MODF Supersite files.
A29	Prof Svensson	16 October 2019	Dr Uttal to advise Prof Svensson whether it is desirable for YOPPsiteMIP to formally write to NOAA thanking NOAA for the work being undertaken by Dr Uttal's group.
A30	Barbara Casati	16 October 2019	Barbara Casati to advise Dr Amy Solomon of the statistics that were routinely produced for SOP-NH1 and SOP-NH2
A31	Prof Svensson / Dr Uttal	16 October 2019	Prof Svensson, with support from Dr Uttal and the ICO, to commence the process of seeking approval for YOPPsiteMIP to access and use MOSAiC data. Following MOSAiC endorsement of YOPPsiteMIP as an endorsed project the individuals within YOPPsiteMIP will need to sign the data policy agreement to get access to the data.

A32	Prof Svensson	31 October 2019	Prof Svensson to update the YOPP / MOSAiC activity diagram
A33	Prof Svensson	Early November 2019	Prof Svensson to set up the first teleconference for MIP studies following the completion of the first leg of the MOSAiC project.
A34	Dr Solomon	16 October 2019	Dr Solomon to circulate a table to the modeling centres to get an indication of what they can provide, where and how for the whole MOSAiC year, lists of variables and profiles. Just 00UTC forecast run. She will develop a cover letter with the help of Barbara Casati and potentially sent the letters to ECCC, Meteo France, Mikhail Tolstoy's institution in the Russian Federation, ECMWF, NCEP (PSD), Met No.
A35.	Prof Svensson	24 September 2019	Prof Svensson will present the concept at the WGNE and invite other NWP centres to contribute.
A36	Teresa Valkonen	16 October 2019	Teresa Valkonen to check with Met No if they are happy to be an aggregator for this data and then Dr Solomon could extract the data from the YOPP Data Portal once a week or so.

GLOSSARY

AMAP: Arctic Council's Arctic Monitoring and Assessment Programme. https://www.amap.no/

APECS: Association of Polar Early Career Scientists. https://www.apecs.is/

APPLICATE: Advanced Prediction in Polar regions and beyond: Modelling, observing system design, and LInkages associated with a Changing Arctic climaTE (EU Horizon2020 project). https://applicate.eu/

AROME: AROME is a small scale numerical prediction model, operational at Meteo-France since December 2008. https://www.umr-cnrm.fr/spip.php?article120&lang=en

AWI: Alfred Wegner Institute Helmholtz Centre for Polar and Marine Research. https://www.awi.de/en.html

BAMS: The Bulletin of the American Meteorological Society. https://www.ametsoc.org/index.cfm/ams/publications/bulletin-of-the-american-meteorological-society-bams/

CBS: The WMO Commission for Basic Systems. http://www.wmo.int/pages/prog/www/BAS/CBS-info.html

CMIP: Coupled Model Intercomparison Project. https://www.wcrp-climate.org/wgcm-cmip

DOI: Digital Object Identifier. https://www.doi.org/

DWD: Deutscher Wetterdienst (The German Weather Service). https://www.dwd.de/EN/Home/home_node.html

ECCC: Environment and Climate Change Canada. https://www.ec.gc.ca/?lang=en

ECMWF: European Centre for Medium-Range Weather Forecasts. https://www.ecmwf.int/

FMI: Finnish Meteorological Institute. https://en.ilmatieteenlaitos.fi/

github: GitHub Inc. is a web-based hosting service for version control of data and computer code. https://github.com/

GODAE: The Global Ocean Data Assimilation Experiment. https://www.godae-oceanview.org/

GTS: The WMO Global Telecommunication System. http://www.wmo.int/pages/prog/www/TEM/GTS/index_en.html

IASOA: International Arctic Systems for Observing the Atmosphere. https://arctic.noaa.gov/Arctic-News/ArtMID/5556/ArticleID/384/International-Arctic-Systems-for-Observing-the-Atmosphere

ICO: International Coordination Office for Polar Prediction. https://www.polarprediction.net/background/ico/

Met Norway: The Norwegian Meteorological Institute. https://www.met.no/en

Météo-France: The French Weather Service. http://www.meteofrance.fr/

MDFS: Merged Data File Specification schema. Describes how YOPPsiteMIP model and observational data is to be stored in NetCDF files.

MMDF: Merged Model Data File, this is the schema for the model data for a YOPP Supersite stored in NetCDF format

MODF: Merged Data Observatory File, this is the schema for observation data from a YOPP Supersite stored in a NetCDF file.

MOSAiC: Multidisciplinary drifting Observatory for the Study of Arctic Climate. https://www.mosaic-expedition.org/

NCAR: National Center for Atmospheric Research in the United States of America. https://ncar.ucar.edu/

NCEP: National Centers for Environmental Prediction in the United States of America. https://www.ncep.noaa.gov/

NMHS: National Meteorological and Hydrological Services. Generic WMO term for weather and hydrology services.

NOAA: National Oceanographic and Atmosphere Administration, United States of America. https://www.noaa.gov/

NWP: Numerical Weather Prediction.

OSEs: Observing System Experiments. https://www.wmo.int/pages/prog/www/WIGOS-WIS/reports/6NWP...3/3.10.pdf

OSSEs: Observing Simulation System Experiments. http://www.met.reading.ac.uk/~stefano/research/osse/index.html

PPM: Polar Prediction Matters, a YOPP initiated dialogue platform to engage with users of polar weather and sea-ice forecasts. https://www.polarprediction.net/yopp-activities/polar-prediction-matters/

PPP: Polar Prediction Project. https://www.polarprediction.net/

PPP-SG: Polar Prediction Project Steering Group. https://www.polarprediction.net/steering-group/

Roshydromet: The national weather service of Russia. http://government.ru/en/department/49/

RV Polarstern: German Icebreaking Research Vessel Polarstern. https://www.awi.de/en/expedition/ships/polarstern.html

SIDFex: Sea Ice Drift Forecast Experiment. https://www.polarprediction.net/yopp-activities/sidfex/

SIPN: The Sea Ice Prediction Network. https://nsidc.org/data/sipn

SOP: Special Observing Period.

SOP1-NH: First Special Observing Period in the Arctic, 1 February to 31 March 2018.

SOP1-SH: First SOP for the Southern Hemisphere, 16 November 2018 to 15 February 2019.

SOP2-NH: Second Special Observing Period in the Arctic. 1 July to 30 September 2018.

SOP3-NH: Third Special Observing Period for the Arctic. 1 February to 31 March 2020.

Supersites: Locations were additional observations or model data has been produced for YOPP, particularly during the Special Observing Periods.

Third Pole: The region that encompasses the Himalaya-Hindu Kush mountain range and the Tibetan Plateau. http://www.icimod.org/?q=3487

UK MetOffice: The Weather Service of the United Kingdom of Great Britain and Northern Ireland. https://www.metoffice.gov.uk/

UK: United Kingdom of Great Britain and Northern Ireland.

US: The United States of America.

WGNE: The Working Group on Numerical Experimentation (WGNE), jointly established by the WCRP Joint Scientific Committee (WCRP-JSC) and the WMO Commission for Atmospheric Sciences (CAS), which is responsible for WWRP. http://wgne.meteoinfo.ru/

WMO: World Meteorological Organisation. https://public.wmo.int/en

WWRP: World Weather Research Project. https://www.wmo.int/pages/prog/arep/wwrp/new/wwrp_new_en.html

WWRP-SSC: WWRP Scientific Steering Committee. https://www.wmo.int/pages/prog/arep/wwrp/new/main_page_wwrp_ssc.html

YOPP Core Phase: From mid 2017 to mid 2019.

YOPP Data Portal: Website providing information and access to data collected during YOPP (https://yopp.met.no/).

YOPP: Year Of Polar Prediction. https://www.polarprediction.net/

YOPPsiteMIP: Year of Polar Prediction Supersite Intercomparison Project. https://www.polarprediction.net/.../YOPP_Supersite_common_model_output.pdf