

# Semantics and the Year of Polar Predictions



## **POLAR PREDICTION PROJECT**

- The WMO's Polar Prediction Project (PPP) aims to improve weather and environmental prediction services for the polar regions, on time scales from hours to seasonal, through cooperative international research.

## **YEAR OF POLAR PREDICTION**

- The Year of Polar Prediction (YoPP) is the flagship activity of the PPP involving intensive observing periods, modelling experiments, model verification, user-engagement and education activities.

# YoPP Verification Plans

- The YoPP verification task team created the YoPP verification strategy and supports the YoPP verification effort.
- The main goal is to demonstrate the advancements associated with the YoPP modelling and observation efforts.
- Currently defining a consistent set of core fields, with common units and conventions that all model simulations should produce.
- Will facilitate the use of YoPP data for model intercomparisons and verification of model data against observations

# Supersites: Multi-Variate, High-Frequency Observations for Model Process Evaluation



IASOA coordinates the activities of individual Observatories to provide a networked, observations-based view of the Arctic.



A Common set of **Model** Outputs  
Implies the need for a  
A Common set of **Observation** Outputs



**Holy Cow!**

However are we going to do that?

# A truly holey plan!

A single variable (even something simple like temperature) may be collected redundantly, QC-ed and processed differently and/or derived with different retrieval methods, so expert selection must be made of which value to use

Data collected at research stations may or may not be co-located with operational weather stations (if not, no consistent meteorology available)

ATTRIBUTION

Essential variables are established for a wide variety of different (mostly) research objectives

Global archives (GAW, BSRN, AeroNET, ebas) are for a narrow range of variables and typically are not up to date

Instruments are operated by different countries, organizations and institutions even at the same observatory

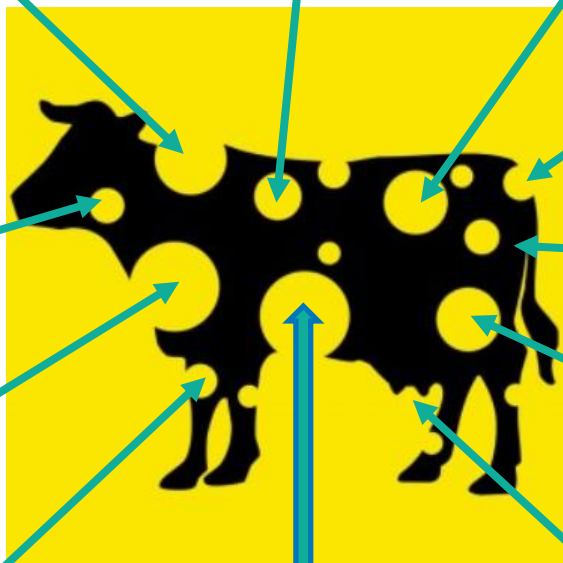
There is a serious under-estimate and resulting lack of resources for data processing, archiving

Grant-funded research groups still tend to embargo (especially processed) data

Portals require that target repositories have (consistent) metadata

A wide community of potential users (gridded data people) want a consistent network product

**THE DATA AT RESEARCH STATIONS IS INTENDED TO SUPPORT INDIVIDUAL LINES OF RESEARCH LEADING TO AN ENDPOINT OF A PEER REVIEWED RESEARCH PUBLICATION**



# Proposed Attributes for the IASOA Merged Observatory Data Files (MODFs) for YOPP

- Essential variables include not only those specified in [A common set of model output for YOPP](#) but also by science objectives established by the IASOA Working Groups
- There will be one MODF per observatory per Special Observing Period.
- The MODFs will NOT be created real-time
- MODFs will be consistent with YOPP model output files and will internally match variables, time interval and averaging conventions, levels and units and externally match output formats (TBD)
- Surface meteorological variables will be acquired consistently for all stations from NOAA/NCEI
- Each variable will be processed consistently for all observatories, typically with a single individual/team responsible for processing assigned variables for all observatory MODFs rather than establishing processing format/procedure/requirement protocols and relying on processed contributions from individual researchers
- IASOA working group specialists will determine most usable and representative MODF values for the many variables (e.g. turbulent fluxes) that have multiple measurement and derivation techniques

# Proposed Attributes for the IASOA MODFs

## Continued

- The atmosphere-surface variables inventory will be expanded to include green-house gases and atmospheric constituents not identified as YOPP priority variables.
- “Missing” data flagging protocols will be developed to accommodate the fact that different observatories have different permutations of instruments and measurement capabilities, data may be embargoed, data exists but has failed QC, resources may not be available for processing etc.
- Uncertainty estimates will be included with units information
- The initial MODFs will be for the YOPP 2018 Special Observing Periods (Feb-Mar and June-Aug).
- Each observatory and SOP specific MODF will have an individual DOI.
- Each MODF will internally and externally attribute all contributing parties
- The MODFs generated specifically for YOPP may be hosted by ACTRIS (<https://www.actris.eu/>) as well as by IASOA ([www.iasoa.org](http://www.iasoa.org))
- The provenance of each variable will be established and policies will be develop to accommodate and document the situation when individual MODF variables constitute either duplicate or alternative products that are generated from the same original raw data and products that may be served through other archives



# Common Model Output

Proposed by YoPP Verification Group

Lots of blank cells

## Example

CMIP variable name	Name	Unit	Notes
	Land-sea mask	Proportion	Only from Control Member in ensemble forecasts.
	Orography	gpm	Only from Control Member in ensemble forecasts.
psl	Mean sea level pressure	Pa	
ps	Surface pressure	Pa	
uas	10 metre u-velocity	m s <sup>-1</sup>	Instantaneous
vas	10 metre v-velocity	m s <sup>-1</sup>	Instantaneous
	Average 10m u-velocity	m s <sup>-1</sup>	Averaged since previous output time
	Average 10m v-velocity	m s <sup>-1</sup>	Averaged since previous output time
	Maximum 10m wind speed	m s <sup>-1</sup>	Maximum grid-box value, since previous output time
	Wind gust speed at 10m	m s <sup>-1</sup>	Diagnosed wind gust speed
	10 metre air temperature	K	Instantaneous
tas	Surface air temperature	K	At nominal height of 2m (instantaneous)
tasmax	Maximum surface air temperature	K	Since previous output time
tasmin	Minimum surface air temperature	K	Since previous output time
	Surface air dew point temperature	K	At nominal height of 2m



# CF Standard Names

- [Guidelines](#) for Construction of CF Standard Names
- List of [contributors](#) to CF Standard Names
- [Current status of proposals for new standard names](#)
- [Archive of resolved proposals for new standard names](#)

# Geoscience Standard Names

- Geoscience Standard Names (GSN) are variable names labeling concepts in the geosciences
- Extension of the [CSDMS Standard Names](#)
- Utilizes rules and controlled vocabularies described in [Peckham \(2014a\)](#)
- Goal is to formalize the concepts needed to provide a comprehensive and unambiguous description of a resource
- Facilitates discovery, comparison and incorporation of resources into workflows (model components, exploitation platforms, etc.)

# In Summary

- Matching model outputs to in situ observations should be guided by community accepted protocols for assigning variable names
- The output of this effort can benefit the broader geoscience community by establishing referenceable, reusable names for variables that currently lack them