AMPS Update

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Charleston, SC

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NCAR

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NSF

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The Antarctic Mesoscale Prediction System

AMPS provides high-resolution NWP guidance tuned specifically to the needs of Antarctic weather forecasters

AMPS is based on the Weather Research and Forecasting model (WRF)

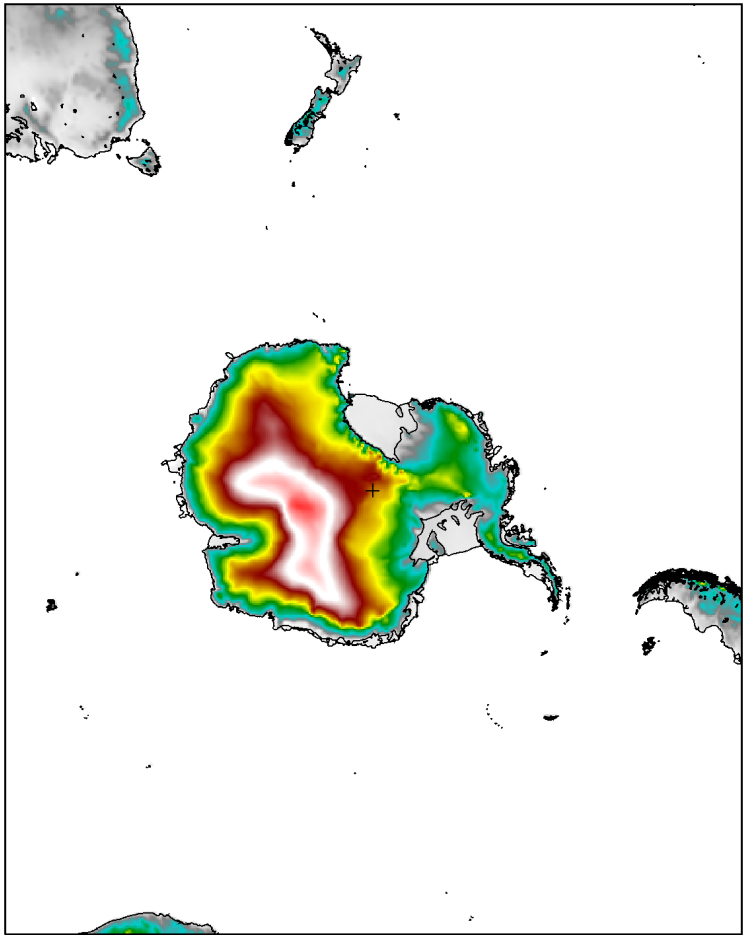
AMPS experimentally uses the Model for Prediction Across Scales (MPAS)

AMPS maintains an archive of model forecast output

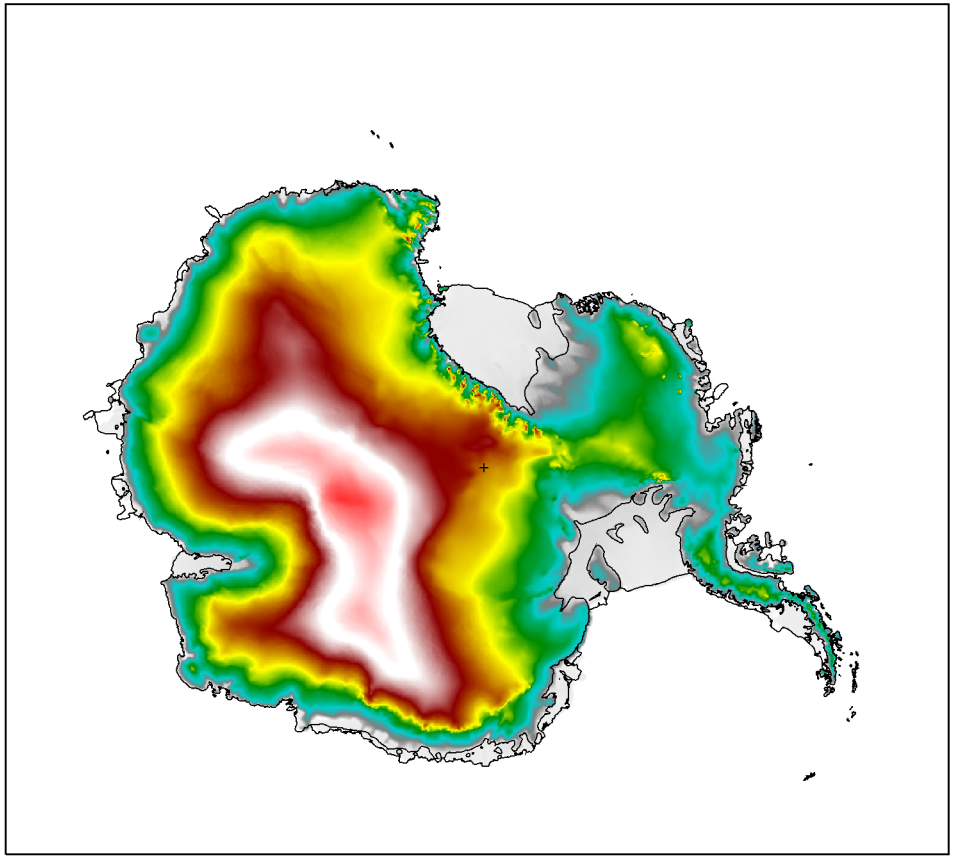
AMPS is funded by the National Science Foundation
Office of Polar Programs

AMPS Grids – 24-km and 8-km

24-km



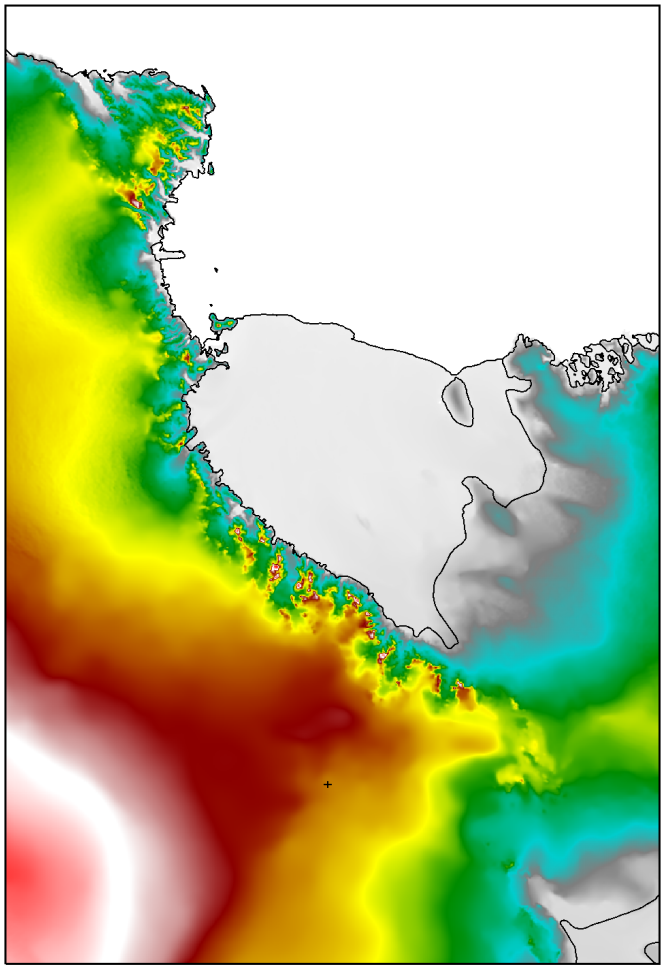
8-km



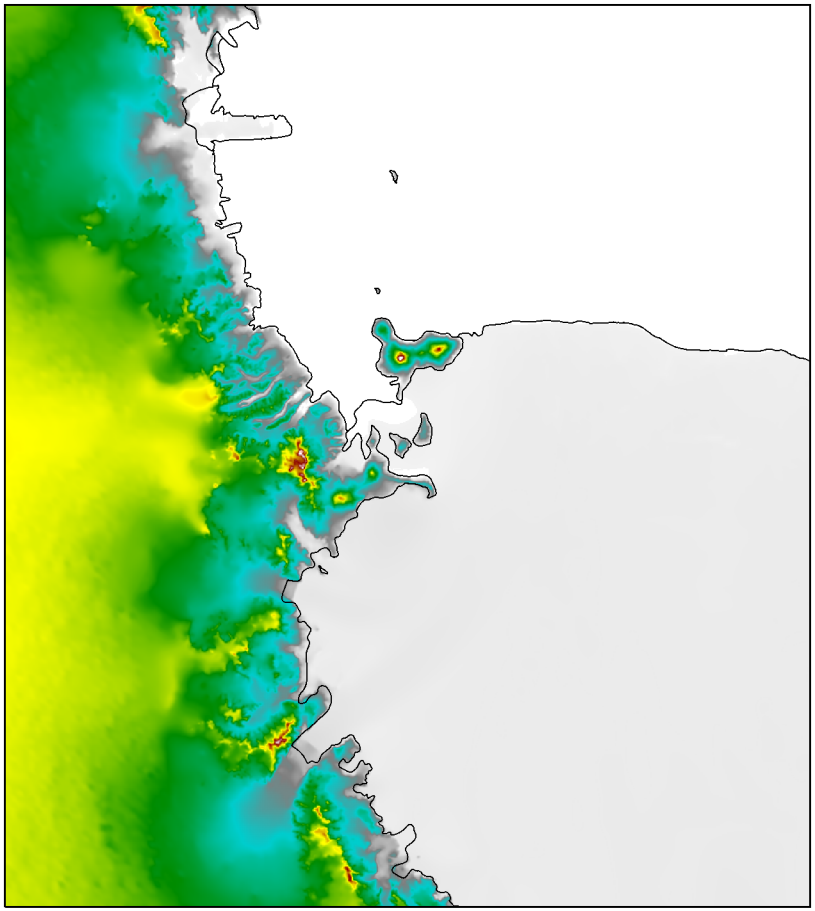
These large-scale grids run out to 120 hours (5 days) forecast time

AMPS Grids – 2.67-km and 0.89-km

2.67-km



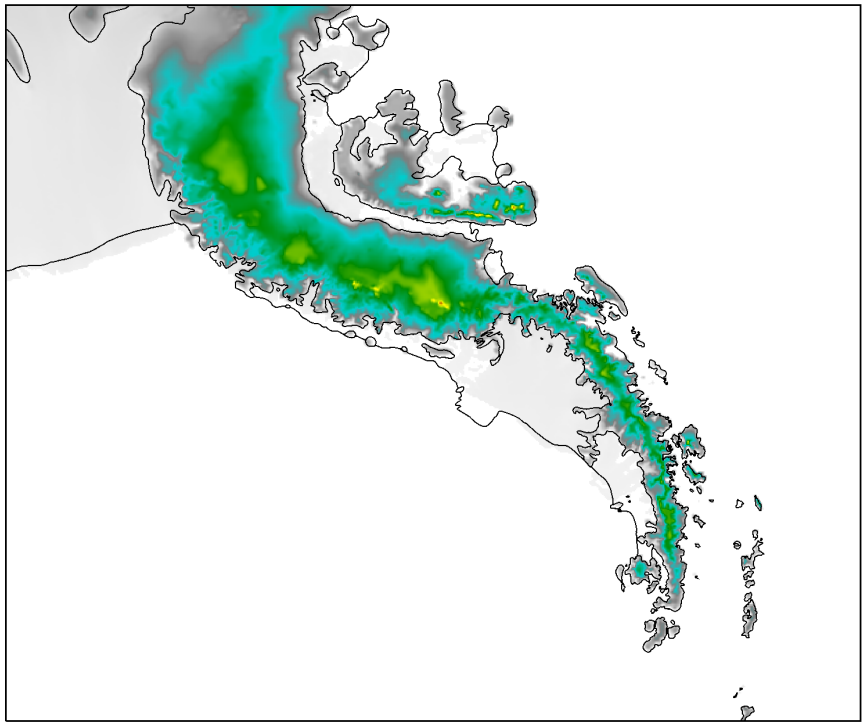
0.89-km



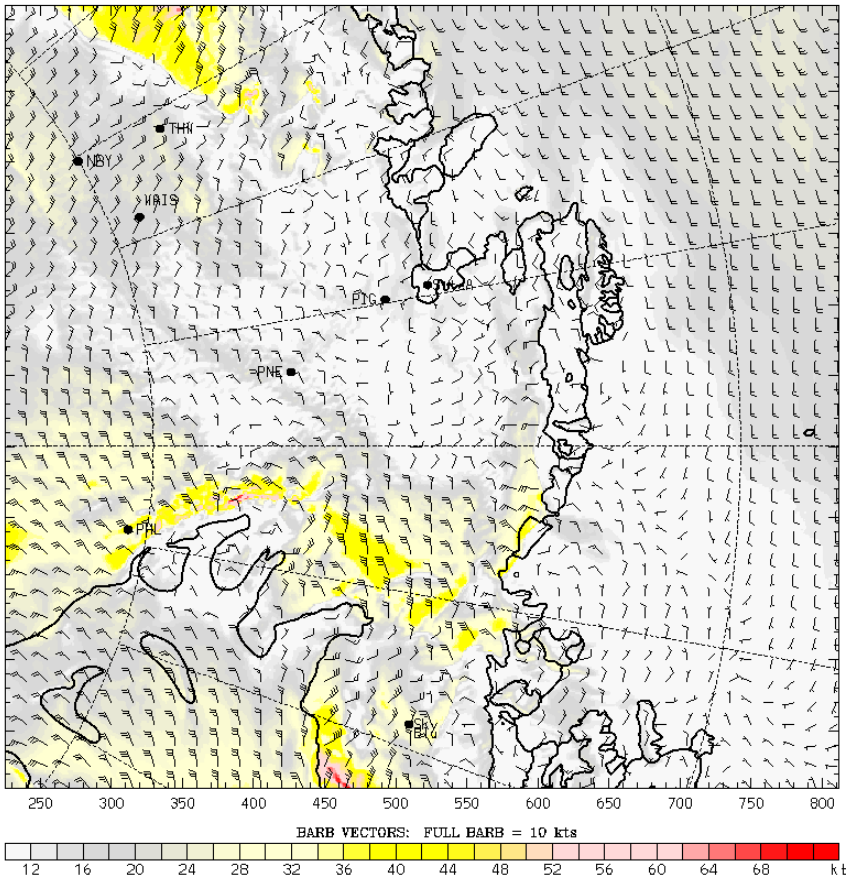
High resolution is *expensive*. These grids run out to 39 hours forecast time

AMPS Grids – 2.67-km

2.67-km

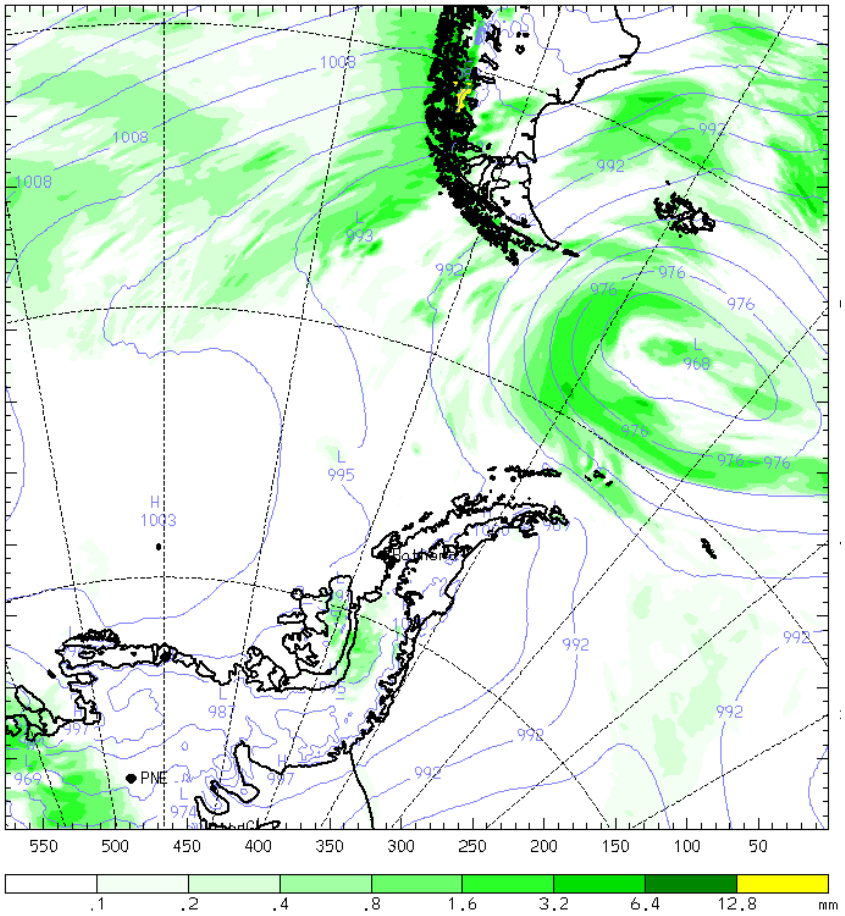


Thwaites One-way 2.67-km

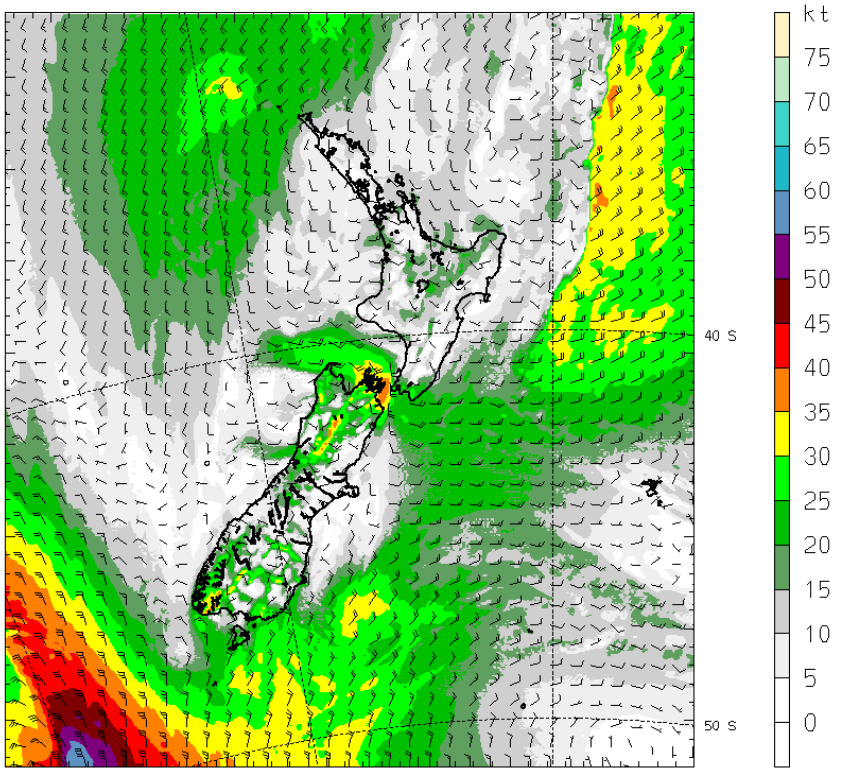


AMPS Grids – 6-km

“Palmer” 6-km



New Zealand 6-km



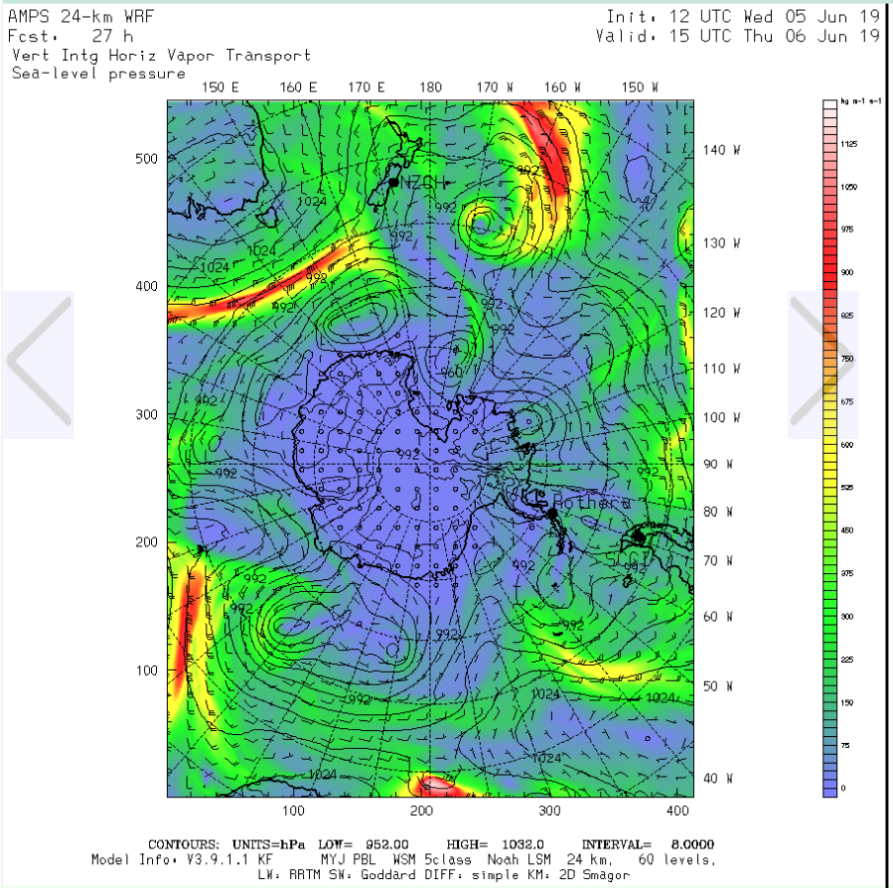
These grids (run out to 72 hours) are nests of an independent large-scale (24-km) grid

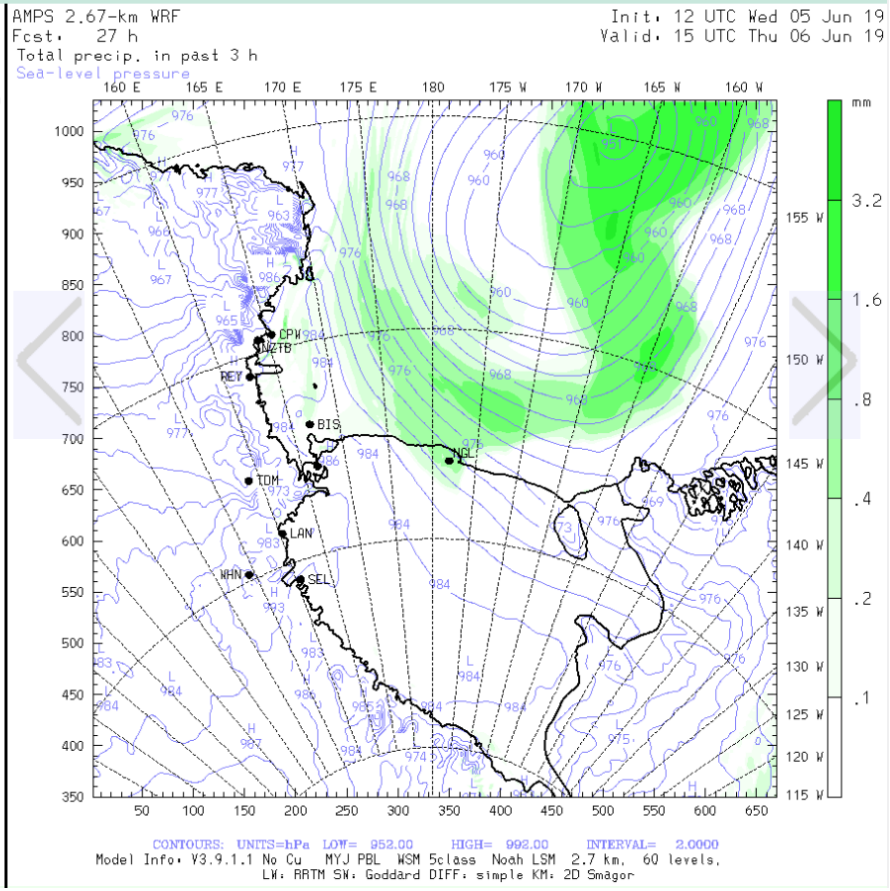
http://www2.mmm.ucar.edu/rt/amps

THE ANTARCTIC MESOSCALE PREDICTION SYSTEM (AMPS)

AMPS Info | Products Directory | GRIB | Status | AMPS-Related Links

Forecast Hr	Grid / Window	Initial Time	Product
00 h ▾	2.67 km Ross Sea ▾	2019060512 ▾	○ SFC ○ Sfc RH ○ Sfc RH (H20) ◉ SLP/Precip ○ Cloud base ○ Sea ice
Animations	○ Full	Go Left	Upper air ▾ Soundings ▾ Tables ▾
4-Panel	○ New	Go Right	Cross sections ▾ ○ PseudoSat ○ Sfc wind Meteograms ▾
	◉ Scaled		



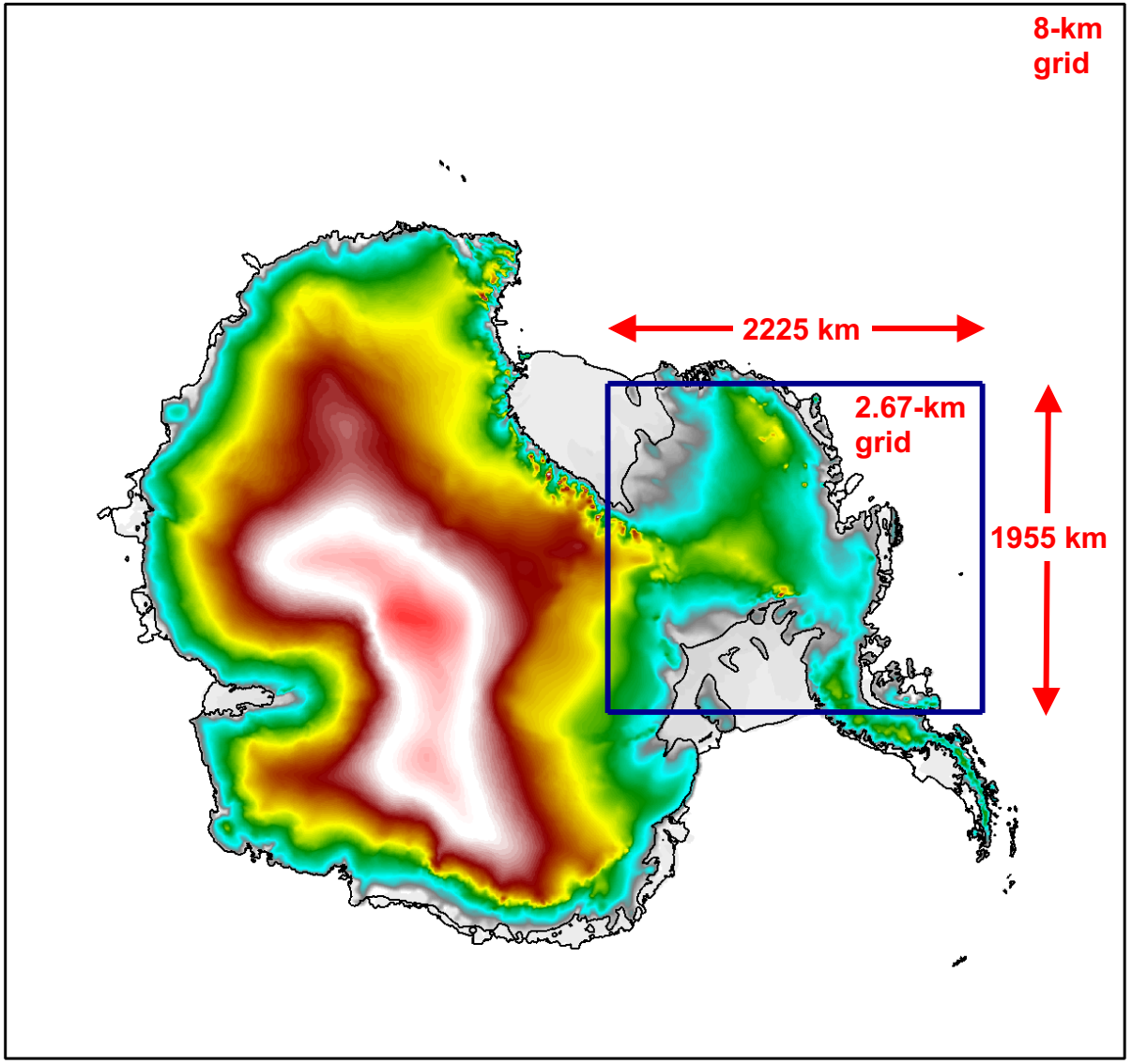


New in AMPS

NEW – Thwaites One-Way Nest

In support of forecasting for the **International Thwaites Glacier Collaboration** run by U.S. NSF and U.K. NERC

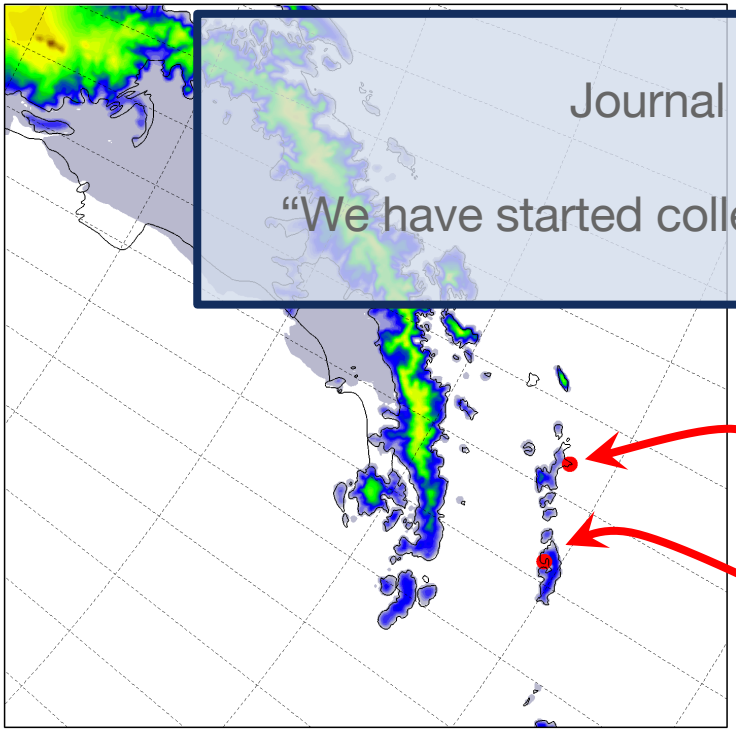
Beginning in Sept 2018, AMPS runs a one-way nest (stand-alone grid driven by AMPS 8-km output) on a 2.67-km grid spacing over Thwaites region



NEW – Field Project Support

NOAA Antarctic Marine Living Resources Program

Field camps at Cape Shirreff on Livingston Island & Copacabana on King George Island (birds and seals)

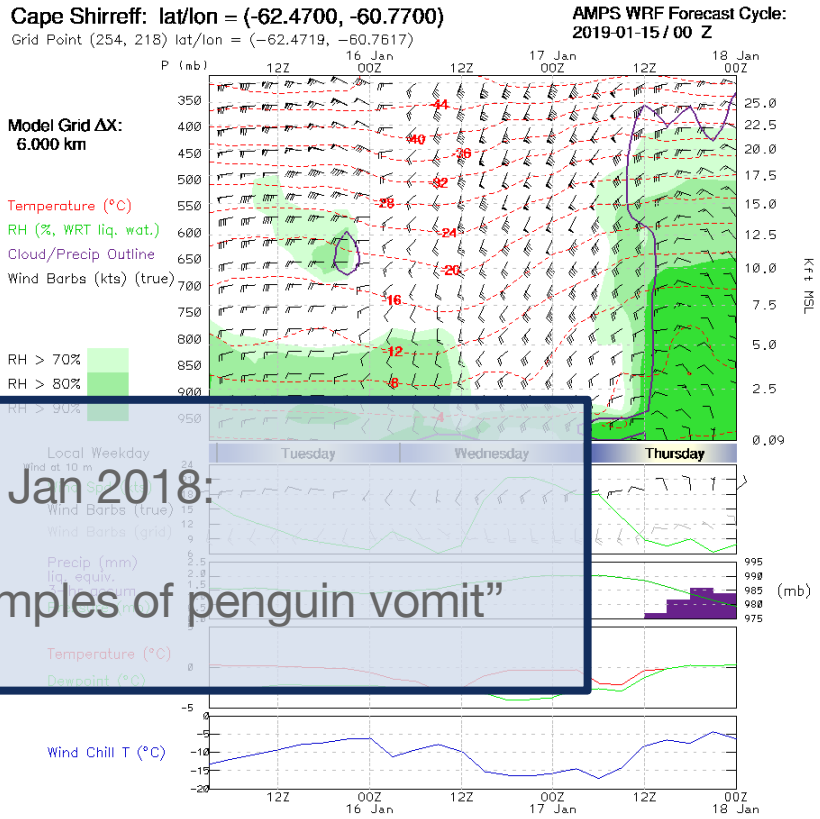


Journal entry, 15 Jan 2018:

"We have started collecting samples of penguin vomit"

Cape Shirreff

Copacabana



Cape Shirreff Testimonials

"The biggest benefit of these forecasts comes from the ability to coordinate our schedule to accommodate activities that necessitate 'good weather', like UAS flights, structure maintenance/painting, and some of the sampling procedures."

"This is… the NOAA field camp manager writing from Cape Shirreff…. Your daily weather reports have [been] extremely useful to us and [we] would like to continue getting them…. We are very grateful to have your reports."

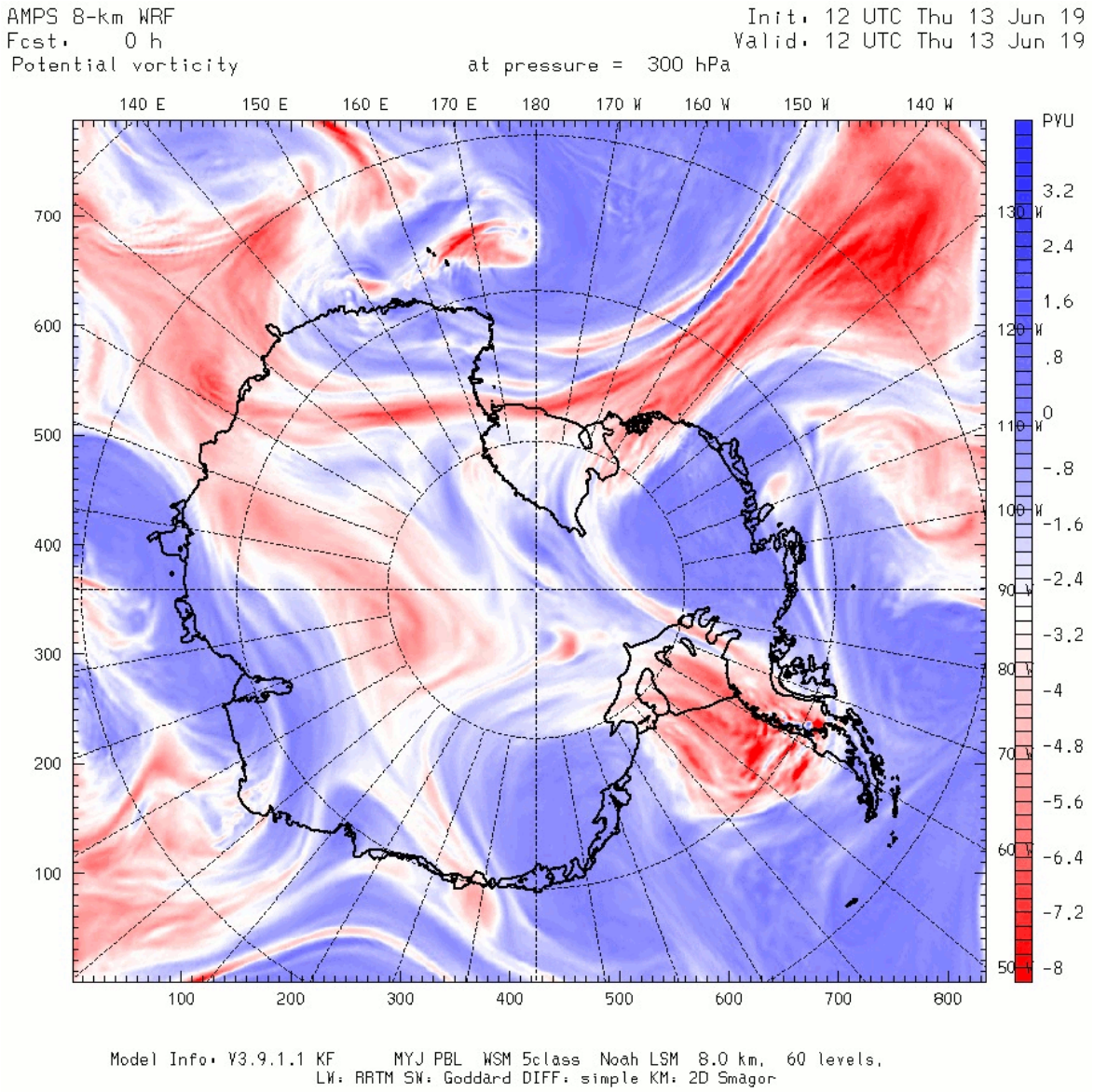
"First of all, I was down in the Antarctic earlier in the year and your weather forecasts were both accurate and incredibly helpful."

NEW – Potential Vorticity Charts

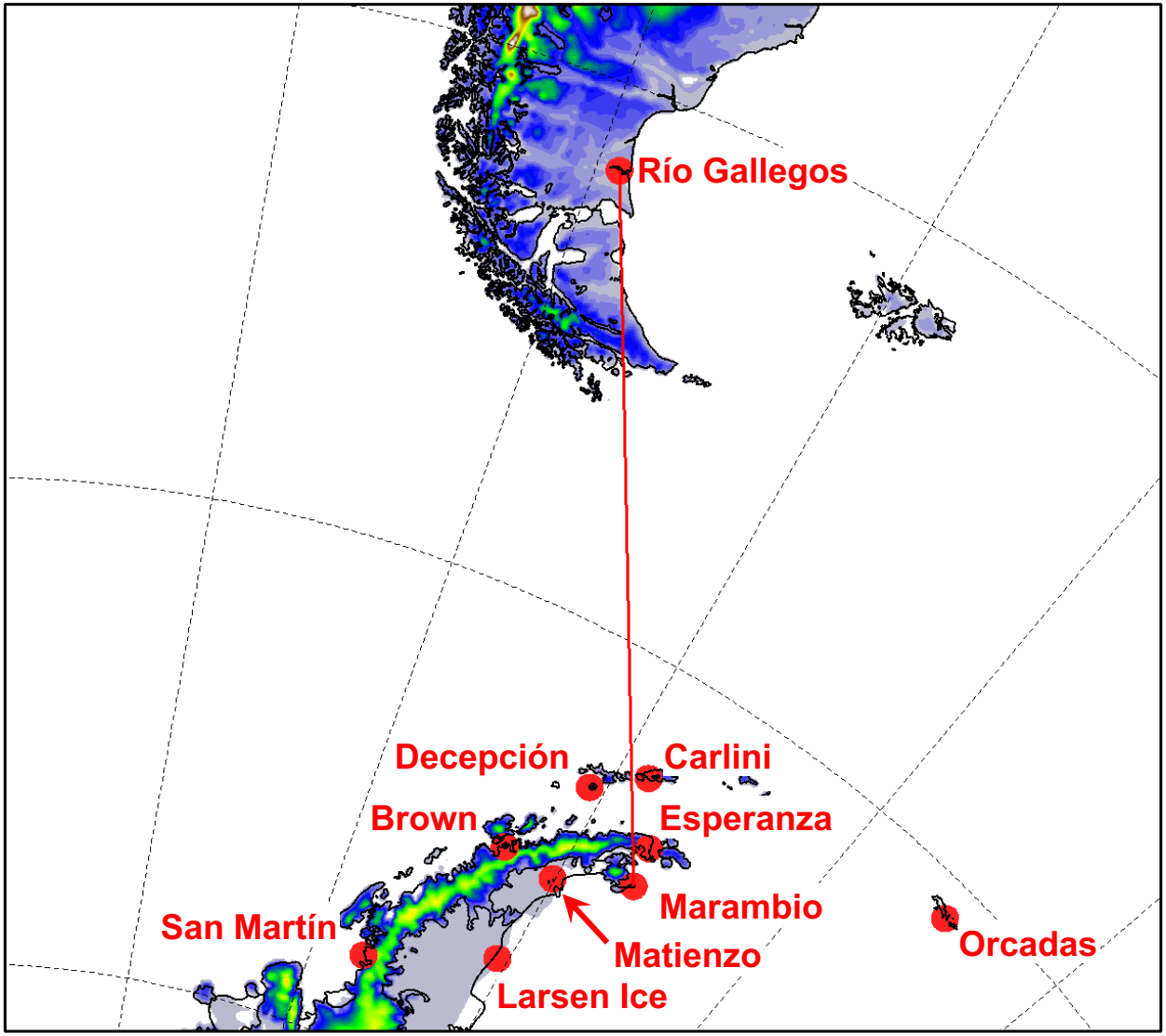
By special request of a Charleston-based forecaster

Implemented on a trial basis: “Let’s see what we can learn.”

Available on larger-scale grids (24-km and 8-km) at selected pressure and isentropic levels



NEW – Argentinian Station Requests



NEW – NCEP's GFS now runs FV3

A change external to AMPS that could have significant effect on AMPS

NCEP updated its Global Forecast System (GFS) to use the new FV3 (Finite-Volume Cubed-Sphere) dynamical core on 12 June 2019

GFS has a new model with its own biases, tendencies, climatology

AMPS uses GFS to derive its initial conditions and lateral boundary conditions

So ….

AMPS will inherit some new biases and tendencies from the new model in GFS

AMPS Computing Update

AMPS computing funded by NSF Office of Polar Programs

Computing support provided by
NCAR's Computational and Information Systems Laboratory (CISL)

Computing Status

AMPS runs on “Cheyenne”, NCAR’s principal supercomputer shared among NCAR and university users (3000+ user accounts)

AMPS has a high-priority queue for real-time jobs

AMPS has high priority in CISL tasking

Cheyenne now much more stable than its first two years

Small machine “Laramie” available as a fallback to Cheyenne

CISL providing for cloud computing accounts as secondary fallback

Plan for new computing to replace Cheyenne (expected sometime 2021-22)

Upcoming for AMPS

Upcoming – Update Models for AMPS

Both WRF and MPAS are due for model version updates in AMPS

Choices of physical parameterization options in WRF (and MPAS) are due for evaluation

Continue collaboration with OSU/BPCRC on evaluation and testing, especially of model physics options

Possible adjustments to AMPS data assimilation (DA) strategies, as informed by results of YOPP-SH project

Thanks to…

NSF Office of Polar Programs
-- funding for AMPS and AMPS computing resources

U.S. Antarctic Program forecasters

NCAR's Computational and Information Systems Laboratory (CISL)
-- supercomputing support

OSU / Byrd Polar and Climate Research Center – Polar Meteorology Group
-- experience and research in polar NWP
-- Polar-WRF modifications and tunings

University of Wisconsin / Antarctic Meteorological Research Center
-- real-time observations and data archives

British Antarctic Survey
-- real-time observations feed

Broad community of Antarctic forecasters and researchers
-- encouragement, feedback, good ideas, questionable ideas, bad ideas….