

The AMPS Archive: An Atmospheric Resource for the Antarctic Research Community

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In response to the need for improved weather prediction capabilities in support of the U.S. Antarctic Program's Antarctic field operations, the Antarctic Mesoscale Prediction System (AMPS) was implemented in October 2000. AMPS employs the Polar MM5, a version of the Pennsylvania State University / National Center for Atmospheric Research Fifth Generation Mesoscale Model (MM5), optimized for use over ice sheets by the Polar Meteorology Group (PMG) of the Ohio State University's Byrd Polar Research Center. AMPS is a collaborative effort between the National Center for Atmospheric Research's Mesoscale and Microscale Meteorology (MMM) group and the PMG. The role of MMM is to run AMPS twice a day, provide a web interface and model products to the U.S. and international forecasting community, and maintain the model code. The role of PMG is to continue development of the model physics and to evaluate the system's performance.

AMPS consists of several domains ranging in horizontal resolution from 90 km covering a large part of the Southern Hemisphere, to 3.3 km over the complex terrain surrounding McMurdo, the hub of U.S. operations. Several published studies have shown the model performs with good skill on hourly to seasonal timescales. On seasonal timescales the intraseasonal and interseasonal variability in pressure, temperature, wind, and moisture are particularly well resolved.

In addition to the real-time applications of AMPS, a continually evolving database of archived forecasts is now beginning to yield high-resolution climatological fields that may be of use to the broader Antarctic research community. For example, temperature, 3-dimensional winds, and several moisture proxies are available for about 30 levels in the atmosphere from twice-daily forecasts at 3-hourly temporal resolution on a 30-km grid covering the entire continent. Precipitation, cloud fraction, and complete energy flux fields are also available at this time and space resolution. These forecasts can be joined together in order to compute time-mean fields on monthly, seasonal, and annual timescales. Applications of these fields over West Antarctica will be highlighted.