

Atmospheric Modeling of the High Southern Latitudes with Polar WRF

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The polar version of the Weather Research and Forecasting (Polar WRF) model is widely used by the global scientific community for weather and climate studies of both polar regions. Here a comprehensive study of the optimal atmospheric physics suite for the Antarctic and Southern Ocean environment is explored with an extensive series of sensitivity simulations involving the cloud microphysics, convective parameterization, boundary layer scheme, and the “land surface model” that handles both ice-sheet and sea-ice conditions. This research is stimulated by a wide range of recent Antarctic and Arctic Polar WRF validation studies often involving the most advanced atmospheric instrumentation available, such as with the ARM West Antarctic Radiation Experiment (AWARE). For short-term prediction, the relative skill of simulations “cold started” from global reanalyses versus those that additionally derive the initial conditions using regional data assimilation of conventional and remote sensing observations is explored.