P76 Sea ice thickness and snow depth over sea ice in Polar WRF

Hines, Keith, David Bromwich, Lesheng Bai, *Ohio State University;* Jordan Powers, Kevin Manning, *National Center for Atmospheric Research;* and Cecilia Bitz, *University of Washington*

User-specified, time and space-dependent sea ice thickness and snow depth over sea ice are tested in Arctic winter simulations of the polar-optimized code for WRF, known as "Polar WRF" which is distributed by The Ohio State University's Byrd Polar Research Center (BPRC). Polar WRF is a code supplement to the WRF-ARW available from NCAR. Variable sea ice thickness and snow cover over sea ice, which were options in earlier versions of Polar WRF, are now options in the standard release of WRF beginning with V.3.5. WRF users can implement fields of ice thickness and snow depth through the WRF Preprocessing System (WPS) or select their own specified uniform values. Previously difficult to obtain, gridded distributions of Arctic ice thickness and snow depth over sea ice have become recently available.

Their local and remote impacts are tested with Polar WRF V.3.5 in two case studies. First, 20-km resolution model results for January 1998 are compared with observations during the Surface Heat Budget of the Arctic Ocean (SHEBA) . It is found that Polar WRF using analyzed thickness and snow depth fields simulates January 1998 slightly better than WRF without polar optimization. Sensitivity tests show the impact of realistic variability in simulated sea ice thickness and snow depth on near-surface temperature is several degrees, as the heat flux through the snow and ice is a key term in the surface energy balance. Motivating a second case study, there has recently been considerable debate on the non-local impacts of decreasing Arctic sea ice. Multiple studies have shown significant remote impacts to decrease in sea ice extent and/or sea ice fraction. In new 40-km resolution simulations covering Eurasia and the Arctic Ocean it is shown that remote impacts of Arctic sea ice thickness on mid-latitude synoptic meteorology develop within two weeks during a January-February 2012 blocking event.