

Predictability of an Intense Arctic Cyclone in August 2016 within the KPOPS-Weather System

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An intense Arctic cyclone of minimum central pressure of 967 hPa was observed over the Arctic Ocean in August 2016. Characteristics of formation, development, and dissipation stages for this cyclone are analyzed using European Centre for Medium-range Weather Forecasts (ECMWF) ERA Interim reanalysis data. In order to investigate predictability of this Arctic cyclone, a series of experiments are conducted using the Korea Polar Weather Prediction System (KPOPS-Weather). The KPOPS-Weather is based on the polar-optimized version of the Weather Research and Forecasting (Polar WRF) model, and it also has a data assimilation system based on the WRF Data Assimilation (WRFDA) although data assimilation is not used in this study. A total of 13 experiments with different forecast initial times are conducted, and cyclone track, intensity, and mechanisms for cyclone intensification, maintenance, and decaying are analyzed using forecast results. Baroclinic instability, upper-level potential vorticity, and surface turbulent fluxes are found to be important in intensifying and maintaining stages of this Arctic cyclone. How well these key environmental factors are simulated determines the predictability of this Arctic cyclone in terms of its track and intensity temporal variations.

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