

Impact of resolution on the representation of polar lows in the Weather Research and Forecasting Model

Polar lows are intense mesoscale cyclones that develop over the ocean at high latitudes during marine cold air outbreaks. Current global climate models are too coarse in spatial resolution to represent many of these systems, whose typical diameter ranges from 250 to 450 km. The objective of this project is to analyze the impact of the atmospheric model horizontal resolution on the representation of polar lows (e.g., track, lifetime, intensity). We will conduct simulations of one winter season with the Weather Research and Forecasting (WRF) Model using horizontal resolutions of 50, 25, and 12.5 km. The Crawford and Serreze (2016) storm tracking algorithm will be used to detect and track polar lows in the simulations. The characteristics of the detected polar lows will be compared across simulations and to prior polar low datasets. The results of this project will shed light on the cost/benefit of increasing the resolution of atmospheric models to better capture polar lows.

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