



Verifications of the medium-range forecasts by the Korea Integrated Model

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The Korea Institute of Atmospheric Prediction System, KIAPS, has been carrying out a national project in developing the next generation global model from 2011 to 2019. With the comprehensive effort so far, the Korea Integrated Model (KIM) was developed and is supposed to replace the current operational system at the Korea Meteorological Administration in 2020. The 12-km KIM system, consisting of a spectral-element non-hydrostatic dynamical core on a cubed sphere grid and a state-of-the-art physics parameterization package, has been launched in a real-time forecast framework, with initial conditions obtained via the advanced hybrid four-dimensional ensemble variational data assimilation (4DEnVar) over its native grid.

In this study, performance of KIM forecasts is evaluated both for the period of the selected testbed cases and for the semi-real time operational period, to examine the model improvement along with the upgrades and to figure out the remaining issues. Standardized statistical verification is also conducted including verification against analyses and observations (e.g., sonde or surface synoptic observations and precipitation data). At the same time, forecast results with different initial conditions are compared to find the systematic bias of the model and data assimilation. It was found that skill of the KIM-WARM run with its data assimilation (DA) exhibits a relatively larger monthly variation than that of the KIM-COLD (initialized by independent analyses) because the skill of the cycle run is influenced by the accuracy of DA in addition to the performance of the model itself. Thus, it is challenging to distinguish the impact of the DA and model improvement on the differences in forecasting skill between KIM-WARM and KIM-COLD. Besides the quantitative verification, the subjective verification is performed to complement the statistical verification results and assure the usefulness of the model which will be providing forecast guidance to the operational forecasters.