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Assessment of Korean Integrated Model (KIM) quantitative precipitation forecasts

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Rainfall forecasts can be verified a number of ways. Traditionally, several statistical scores, such as Equitable Threat Score, can be used diagnosis of quantitative precipitation forecasts (QPFs) errors, but these methods exhibit some problems, including double-penalty and domination of score by small-scale features. Especially verification of high resolution forecasts using traditional metrics often suggests poor forecast skill due to the lack of exact matches among the forecast/observation pairs. So, we need new spatial verification techniques which can account for the position of the rain system, shape and size of the rain pattern, and magnitude of intensity of rainfall. The Method for Object-based Diagnostic Evaluation (MODE) is a class of spatial verification methods that enables one to extract features of interest from a forecast (and analysis) field and compare only these features based on a number of attributes such as the location and orientation error, and area ratio.
The aim of this study is a comparison, using MODE, of numerical forecasts made by Korean Integrated Model (KIM), which is next generation global model under developed by Korea Institute of Atmospheric Prediction Systems (KIAPS) since 2011. 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. KIM was run with initial fields from ERA-5 datasets on horizontal grid lengths of 25 km. MODE was used to evaluate 24-h rainfall accumulations during the period from 1 July to 31 August 2017. The observation data for comparison is 30-min global precipitation data, IMERG version 5, collected given in 0.1º resolution, over 60 ºS-60 ºN.