Impact of the Korea Rapid Developing Thunderstorms (K-RDT) product nudging to the convective parameterization over the Korean Peninsula

Namgu Yeo¹, Eun-Chul Chang¹, and Ki-Hong Min²

¹Department of Atmospheric Science, Kongju National University, Gongju, Korea, Republic of
²Department of Astronomy and Atmospheric Sciences, Kyungpook National University, Daegu, Korea, Republic of

In this study, Korea Rapid Developing Thunderstorms (K-RDT) product from geostationary meteorological satellite which represents developing stage of convective cells is nudged to the Simplified Arakawa Schubert (SAS) deep convection scheme using a simple nudging technique in order to improve prediction skill of a heavy rainfall caused by mesoscale convective system over South Korea in the short-term forecast. Impact of the K-RDT information is investigated on the Global/Regional Integrated Model system (GRIMs) regional model program (RMP) system. For the selected heavy rainfall cases, the control run without nudging and two nudging experiments with different nudging period are performed. Although the simulated precipitations in the nudging experiments tend to depend on the distribution of convective cells detected in the K-RDT algorithm, the nudging experiment shows improved precipitation forecast than the control experiment. Particularly, the experiment with nudging for longer time produces better prediction skill. The results present that the small-scale convective cells from the K-RDT which are detected with a 1-km resolution have clear impacts to large-scale atmospheric fields. Therefore, it is suggested that utilizing small-scale information of convective system in the numerical weather prediction can have critical impact to improve forecast skill when the model system, which cannot properly represent sub-grid scale convections.