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## Semi-Lagrangian advection scheme for the dynamical downscaling of the East Asian summer monsoon in a regional spectral model

Eun-Chul Chang<sup>1</sup>, Namgu Yeo<sup>1</sup>, and Dong-Hyun Cha<sup>2</sup>

<sup>1</sup>Department of Atmospheric Science, Kongju National University, Gongju, Korea, Republic of (eunchul.chang@gmail.com)

<sup>2</sup>School of Urban and Environmental Engineering, Ulsan National Institute of Science and Technology, Ulsan, Korea, Republic of

The regional model program (RMP) that is the regional atmospheric model component of the Global/Regional Integrated Model system (GRIMs), which has the spectral dynamical core, have been participated in the Regional Model comparison project (RMIP) and the COordinated Regional Climate Downscaling Experiment (CORDEX) East Asia. The spectral method has advantages of accuracy, because numerical problems related to the spatial truncation in the grid system does not occur. However, the spectral system has the Gibbs phenomenon, which is the problem that negative values of positive definite quantities (e.g., moisture, tracer gases) can be generated by the spectral space transformation in a spectral model system. In this study, the non-iteration dimensional-split semi-Lagrangian (NDSL) advection scheme is applied to the RMP for the dynamical downscaling of the East Asian summer monsoon. In a regional climate simulation, the RMP with the NDSL scheme simulated enhanced precipitation by improving moisture field in the lower troposphere. The improvement is also induced by the revised vertical momentum which is affected by evaporation and condensation adjustment from the corrected moisture field.