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Downscale Ensemble Experiments of a Heavy Rain Event with the JMA Nonhydrostatic Mesoscale Model

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Downscale experiments of the JMA global weekly ensemble prediction system (Global EPS) are conducted using the JMA nonhydrostatic mesoscale model. A heavy rain event on 13 July 2004 occurred in northern Japan is chosen. Affects of initial perturbation and the lateral boundary condition on the forecasts are examined. Fields of the pressure and momentum are soon affected by the lateral boundary condition, while the fields of the temperature and water vapor are relatively less sensitive to the lateral boundary condition. This tendency is attributable to the difference of the propagation speeds of perturbations on the lateral boundaries into the inside model domain. Mesoscale ensemble prediction experiments are performed using the perturbations of Global EPS, where the JMA mesoscale 4D-Var analysis is used as the initial condition of the control run. Perturbations of Global EPS are normalized by the estimated analysis error and added to the mesoscale 4D-Var analysis as the increment. Some perturbed members reproduce the observed line-shaped heavy rain. In the presentation, we also introduce results of additional downscale experiments for the typhoon track forecast.