

Non-Gaussian statistics in global atmospheric dynamics with a 10240-member ensemble Kalman filter experiment using an intermediate AGCM

*Keiichi Kondo^{1,2}, Takemasa Miyoshi²

1. Meteorological Research Institute, 2. RIKEN Center for Computational Science

In our previous work, we performed local ensemble transform Kalman filter (LETKF) experiments with 10240 ensemble members using an intermediate atmospheric general circulation model (AGCM) known as the SPEEDY (T30/L7) model. The previous study reported that the improvement in the tropics was relatively small by increasing the ensemble size up to 10240. We hypothesize that these small improvements be related to convectively dominated tropical dynamics. In this study, we found that the non-Gaussian probability density functions (PDFs) appeared in the regions with large analysis error, mainly in the tropics and storm track regions. The non-Gaussian PDFs are mainly generated by convective parametrization in the tropics and by the instability associated with advection in the storm track regions.

Acknowledgements: This study was partly supported by JST CREST (JPMJCR1312), JST AIP (JPMJCR19U2), JSPS KAKENHI (JP16K17806), and Post-K priority issue 4 of Japan Agency for Marine-Earth Science and Technology, which was promoted by the Ministry of Education, Culture, Sports, Science and Technology, Japan. Part of the results was obtained using the K computer at the RIKEN R-CCS through proposal numbers ra000015 and hp150019.

Keywords: ensemble data assimilation, non-Gaussian PDF