Spaceborne precipitation radars, such as the Tropical Rainfall Measuring Mission (TRMM) and the Global Precipitation Measurement (GPM) Core Observatory, have been important platforms to provide a direct measurement of three-dimensional precipitation structure globally. Building upon the success of TRMM and GPM Core Observatory, the Japan Aerospace Exploration Agency (JAXA) is currently surveying the feasibility of a potential satellite mission equipped with a precipitation radar on a geostationary orbit (GPR). The GPR has an advantage in its quasi-continuous observation. However, its horizontal resolution is relatively coarse (20 km), resulting in severe ground clutter due to the tilted sampling volume against the Earth surface at the off-nadir points. Although previous studies showed some success in data assimilation of radar reflectivity for convective-scale and tropical cyclone analyses and forecasts, it is not trivial what kind of impact the GPR has on NWP. This study aims at investigating the impact of GPR for a typhoon case as a first step. An observing system simulation experiment is performed with the SCALE-LETKF system (Lien et al., 2017) and a satellite simulator known as the Joint-Simulator (Hashino et al., 2013). The results show that assimilating the GPR observations improves the analyses and forecasts for typhoon intensity, but not for typhoon track. The results also show that the impact of ground clutter was minor. In the presentation, the advantages and limitations of GPR assimilation with the ensemble Kalman filter will also be discussed.

Keywords: data assimilation, radar reflectivity, tropical cyclone