雲・降水・海洋の衛星データ同化の高度化と応用

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要旨

This presentation summarizes progress of a research project started in FY2022. This research aims to advance data assimilation, analysis and prediction of clouds, precipitation and the ocean, based on the achievements from the previous projects since 2013, i.e., "ensemble data assimilation of TRMM/GPM precipitation observations" (2013-2016), "advancing data assimilation of GPM observations" (2016-2019), "advancing precipitation prediction algorithm by data assimilation of GPM observations" (2019-2022), "development of a satellite ocean data assimilation system with the JAXA Supercomputer System Generation 2" (2017-2020), and "satellite data assimilation using an ocean model" (2020-2022). We developed the global atmospheric ensemble data assimilation system called NICAM-LETKF, where NICAM stands for the Nonhydrostatic ICosahedral Atmospheric Model and the LETKF for the Local Ensemble Transform Kalman Filter. We also developed a precipitation nowcasting system called GSMaP RIKEN Nowcast (GSMaP_RNC) using the satellite-analyzed Global Mapping of Precipitation (GSMaP) dataset. We developed real-time precipitation prediction system by seamlessly merging data from the NICAM-LETKF numerical weather prediction and GSMaP_RNC and have been operating it continuously for public data dissemination. In addition, we have been operating JAXA's real-time atmospheric analysis system called NEXRA (NICAM-LETKF JAXA Research Analysis) and have been disseminating real-time level-4 analysis products using satellite data, with proven data quality by analyzing past high-impact weather events such as typhoons and heavy rainfalls. Moreover, we implemented the LETKF with an ocean model called sbPOM and developed daily-update ocean data assimilation system using dense and frequent SST data from the Himawari-8 geostationary satellite. This research will integrate these atmospheric and oceanic data assimilation projects, with the aim to deepen our integrated understanding of the earth system on clouds, precipitation and the ocean and to advance analysis and prediction, and their real-life applications.