Experimental platform for design and advance evaluation of frequent satellite observations to innovate weather, ocean and land surface predictions

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We propose to develop a unique platform with an advanced data assimilation technology, realizing numerical simulation experiments for advance evaluation of future satellite missions in their design phase. This will provide a scientific, objective approach to an effective design of future satellite missions to maximize the benefit to practical applications such as hydrometeorological prediction and resource control of fisheries. The authors have been leading data assimilation research to explore the best mix of computer model simulations and real-world data for weather forecasting, taking advantage of new-generation technologies such as the K computer and Himawari-8 satellite. The authors' previous research revealed that every-10-minute Himawari-8 observations could lead to a large improvement of typhoon and heavy rainfall predictions, though every-30-minute observation was insufficient. We would expect that frequent observations would also be beneficial for ocean and land surface prediction. Therefore, we aim to develop a platform for numerical experimentation to evaluate potential future satellite missions such as quasi-zenith orbiters and small cube-sat constellations for frequent observation over Japan and its surrounding area. This platform will be useful for designing future satellite missions with high cost-benefit performance.

Keywords: satellite mission planning, numerical simulation experiment, data assimilation

