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# Big Data Assimilation: Real-time Demonstration Experiments of 30-second-update Forecasting in Tokyo in 2020 and 2021

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## Abstract

The Japan's Big Data Assimilation (BDA) project started in October 2013 and ended its 5.5-year period in March 2019. Here, we developed a novel numerical weather prediction (NWP) system at 100-m resolution updated every 30 seconds for precise prediction of individual convective clouds. This system was designed to fully take advantage of the phased array weather radar (PAWR) which observes reflectivity and Doppler velocity at 30-second frequency for 100 elevation angles at 100-m range resolution. By the end of the 5.5-year project period, we achieved less than 30-second computational time using the Japan's flagship K computer for past cases with all input data such as boundary conditions and observation data being ready to use. The direct follow-on project started in April 2019. We continued the development to achieve real-time operations of this novel 30-second-update NWP system for demonstration at the time of the Tokyo 2020 Olympic and Paralympic games. The games were postponed, but the project achieved successful real-time demonstration of the 30-second-update NWP system at 500-m resolution during July 31 and August 7, 2020 using a powerful supercomputer called Oakforest-PACS operated jointly by the Tsukuba University and the University of Tokyo. This presentation will summarize the real-time demonstration in 2020 and early results from the planned 2021 experiment during the Tokyo 2021 games using the world's leading supercomputer Fugaku.

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**Keywords:** ensemble Kalman filter, phased array weather radar, radar data assimilation