

”Big Data Assimilation” Revolutionizing Severe Weather Forecasting

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In 2013, the Japanese government started a strategic funding program for the Big Data science, and the ”Big Data Assimilation” project for severe weather forecasting started. Here, 30-minute forecasts at a 100-m resolution are refreshed every 30 seconds, 120 times more rapid than the current hourly-updated systems. This will help prepare for sudden local torrential rain-falls that may cause flash flood and river outflow only within 10-20 minutes.

This revolutionary NWP is only possible due to the most advanced sensing and computing technologies to date. The recent Phased Array Weather Radar can make a volume scan in 10-30 seconds at a 100-m radial resolution with 100 elevation angles. Also, the Japan Meteorological Agency’s new geostationary satellite Himawari-8 has a capability of the super-rapid scan every 30 seconds for a limited region. These sub-minute data would be frequent enough to capture the nearly linear evolution of rapidly changing convective activities. Assimilating the 30-second data into a high-resolution NWP model may lead to accurate representations of the lifecycles of each convective cell. However, these new observing platforms provide two orders of magnitude more data, and an effective use of these Big Data in very short range NWP is a challenge and may be possible with the Japanese 10-petaflops ”K computer”.

This presentation will discuss the concept and the most recent results of the pioneering ”Big Data Assimilation” research.

Keywords: big data assimilation, severe weather prediction, ensemble kalman filter, numerical weather prediction, data assimilation, high performance computation