

# Multiscale-Multilayer Data Assimilation System for Smart Weather Forecasting

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A multiscale and multilayer data assimilation (M2DA) technique has been developed for smart weather forecasting that can bring new information infrastructure for future smart society. The present M2DA integrates the forecasting simulations on different layers (i.e., different scales (or resolutions) and hardware platforms) via the optimal interpolation. The upper layer simulation is for wider domain that can cover the domain of the lower layer. The simulation resolutions are finer for the lower layers than those for upper layers. The fine resolutions, with typically O(10-100m) horizontal length, of the lower layers can utilize the IoT sensor data, which do not usually represent km or larger areas. In the present talk, we explain an idealized mathematical analysis to clarify the benefit of the M2DA with showing that the M2DA can easily cope with the machine learning. We also introduce our current activity on operational forecasting experiments using the Earth Simulator at JAMSTEC and edge servers consisting the edge computing platform lead by NTT.

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