30-second cycle LETKF assimilation of dual phased array weather radar observations to short-range convective forecasts

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The assimilation of Doppler velocity and reflectivity observations from phased array weather radar (PAWR) have been widely studied for the use of short-range numerical weather prediction (NWP) and have been found to have positive impact to analyses and forecasts e.g. Maejima et al. 2017. However, these studies assimilated observations from a single PAWR and the use of multiple PAWR observations for NWP has not yet been explored. With the recent development of PAWR at sites in Osaka and Kobe a common observation region exists where we are able to observe convective storms across an area where they can develop very rapidly bringing intense, hazardous rainfall. This study represents the first attempt at assimilating dual PAWR observations for the purpose of improved short-range weather forecasts of a sudden convective rainfall event. We focus on a case that occurred on 20 August 2016, which generated heavy rainfall and was well observed by both radars. Simulations are performed with 30-second-cycling of PAWR observations within a high-resolution 100-m mesh using the SCALE-LETKF system (Lien et al., 2017). We aim to develop an effective data assimilation method which fully exploits the availability of having two PAWR systems to observe a single convective rainfall event and show how the data can be optimally combined to improved analyses and short-range forecasts compared to assimilating observations from a single PAWR.

References

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