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Department of Atmospheric Sciences Seminar Announcement

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Impact of including observation error correlation for assimilating radar radial wind and its impact on heavy rainfall prediction

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You are invited to a Zoom meeting.
When: March 10, 2021 at 3:30PM HST

Register in advance for this meeting:

<https://hawaii.zoom.us/join/9568775>

After registering, you will receive a confirmation email containing information about joining the meeting.

Abstract:

In conventional data assimilation, high-resolution data is often re-sampled with strategies like superobbing or data thinning to fulfill the assumption of uncorrelated observation errors. This also sacrifices the advantage of high spatial resolution observations that can provide essential detailed structures, such as the intensification of the convection. However, assimilating the high-resolution data without considering the observation error correlation can lead to overfitting and thus degrade the performance of data assimilation and forecast. This study proposes a strategy to include the observation error correlation for assimilating the radar radial velocity under the framework of the WRF Local Ensemble Transform Kalman Filter Radar Assimilation System. The impact is investigated based on a short-term precipitation prediction of the heavy rainfall case on 2nd June 2017 in Taiwan.

The introduction of correlated observation error for radar radial winds exhibits more small-scale features in the wind analysis corrections compared to the experiment using the independent observation assumption. The modification on wind corrections leads to stronger convergence accompanied by higher water vapor content, and enhances local convections, resulting in more accurate simulated reflectivity. Consequently, these modifications lead to a better forecast in terms of reflectivity, precipitation and probability quantitative precipitation forecast (PQPF).