

P34

**Optimal Assimilation of Hyperspectral IR and MW Soundings for Regional Numerical
Weather Prediction**

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Regional numerical weather prediction (NWP) model can handle high spatial and temporal resolution forecast when the initial fields are in a reliable state nowadays. The meteorological satellite could provide critical data when convectional observation is coarse. The advanced infrared (hyperspectral) infrared (IR) and microwave (MW) sounders, such as AIRS and AMSU onboard NASA's Aqua satellite, could retrieve the best estimation of atmospheric thermodynamic state, which will help to improve the initial fields through data assimilation technique. However, the soundings from these two sensors have some limitations when use both of them. The AIRS could provide finer spatial resolution data than AMSU. It is anticipated the spatial gradient could retain in AIRS. However, AMSU could provide atmospheric profiles in cloudy sky. In this presentation, we would like to discuss the optimal assimilation of both of them for improving the NWP. It demonstrates a better handling of both sensors' data could provide positive impact over than use either sensor alone.