**Analysis of Using Different Microphysics Schemes for the Cloud-Resolving Ensemble forecasts during SoWMEX-IOP8**

Speaker: Chin-Hung Chen

Adviser: Kao-Shen Chung and Shu-Chih Yang

**Abstract**

In this study, we aim to understand the ensemble characteristics of using different bulk microphysics schemes [including single- (SM) and double-moment (DM) schemes] in the cloud-resolving ensemble forecasts. We focus on the comparison of the ensemble-based error structures and investigate the sensitivity of the initial conditions to different microphysics schemes. Simulation for a mesoscale convective system (MCS) during Southwest Monsoon Experiment intensive observing period 8 (SoWMEX-IOP8) case is examined with WRF model. All ensembles are initialized from the WRF-LETKF analysis but with four different microphysics schemes—SM Goddard (GCE), DM Morrison (MOR), WRF SM 6-category (WSM6), and WRF DM 6-category (WDM6).

The rainfall pattern of ensemble mean is similar among these schemes. However, the distribution of hydrometers is very different, especially with the ice-related variables and similar features are observed in the evolution of ensemble spread. Besides, analysis of the thermodynamic and dynamical variables also shows difference between the microphysics schemes, particularly near the southwestern coastal region where strong convections took place. Uncertainties of the rain mixing ratio and lower level temperature is larger in the WDM6 scheme while other variables are quite larger in the GCE scheme resulting from the larger vertical velocity and thus generate larger latent heat release and affect the uncertainties of dynamics and thermodynamics variables. The results of this study reveal that the microphysical processes can affect the thermodynamics and dynamics performances through the latent heat release which can further provide explanations about the effectiveness of assimilating radar data under the ensemble data assimilation framework and its impact on precipitation prediction.

**Key words:** Microphysics scheme, forecast error