P29 Comparison of the hydrometeor budgets of microphysics parameterization schemes in WRF

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In this study, we used the Weather Research and Forecasting (WRF) model to investigate the impact of parameterized warm-rain processes in four widely-used bulk microphysics parameterization schemes on the model-simulated tropical cyclone (TC) development. The schemes investigated, ranging from a single-moment simple 3-category scheme to a complex double-moment 6-category scheme, produce different TC intensification rates and average vertical hydrometeor distributions, as well as different accumulated precipitation. By diagnosing the source and sink terms of the hydrometeor budget equations, we found that the differences in the warm-rain production rate, particularly by conversion of cloud water to rain water, contribute significantly to the variations in the frozen hydrometeor production and in the overall latent heat release above the freezing level. We will show that the hydrometeor budget analysis of the four schemes indicates that the assumed pathways to the production of frozen hydrometeors and corresponding latent heat release are quite sensitive to the amount of available super-cooled rain water and, thus, the uncertainties in the parameterized warm-rain processes can affect the intensification and structure of the model-simulated tropical cyclone.