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Modeling Rapid Intensification of Typhoon Saomai (2006) with the Weather Research and Forecasting Model and Sensitivity to Cloud Microphysical Parameterizations

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Typhoon Saomai (2006) was one of the most severe typhoon landfalls in China from 1956 to 2010. The rapid intensification process of Typhoon Saomai is simulated with the advanced research version of the Weather Research
and Forecasting (ARW) modeling system using different cloud microphysical parameterization schemes.
The horizontal spacing of the finest nested mesh is 1.5 km. The intensity, precipitation, and inner-core structures of the simulated typhoons are verified against the observations. The performances of various cloud microphysical parameterization schemes are compared. It is found that varying the microphysics scheme generates little sensitivity
in track, but results in pronounced deviations in intensity and inner-core structures. The results indicate the condensation and depositional growth of graupel or snow of the suitable cloud microphysical parameterization scheme enhances the diabatic heat releasing in the inner core region. The released diabatic heating determines the intensity and inner-core structures of typhoon. Furthermore, a positive feedback associated with the diabatic heating plays an important role in the intensification of the simulated storm with a suitable cloud microphysical parameterization scheme.