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Sensitivity analysis of hurricane Paulette with convection-permitting ICON simulations

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Tropical cyclones are impressive phenomena of tropical meteorology and form spatially highly organised structures. To shed more light on microphysical sensitivities of hurricanes, we present the initial outcomes of a sensitivity analysis of hurricane Paulette simulated with the German weather and climate model ICON. Paulette occurred in the North-Atlantic basin in September 2020 and was simulated with variable settings for model parameterisations and horizontal grid spacings down to hectometre. The study especially explores the microphysical details of the simulated hurricane case. In our examination, we find interesting sensitivities to Cloud Condensation Nuclei (CCN) type and concentration and to vertical resolution. Changes in the top-of-the-atmosphere radiation fluxes are presented in detail. Insights gained from this analysis contribute to the broader understanding of model performance in simulating microphysical processes such as the formation of cloud ice and precipitation.