Numerical Simulations of the Evaporating Sea Surface Under Extreme Winds

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Since air-sea enthalpy and momentum fluxes control a tropical cyclone's intensification rate, increasing the accuracy of the associated bulk parameterizations is crucially important for improving forecast skill. Despite the powerful influence that sea spray has on air-sea enthalpy and momentum fluxes, most state-of-the-art tropical cyclone forecast models do not incorporate the microphysics of sea spray evaporation into their boundary layer flux schemes. We present the results from direct numerical simulations of the evaporating sea surface subject to a strong wind forcing to help evaluate the parameterizations of bulk exchange coefficients of momentum and enthalpy. By developing microphysics-based bulk parameterizations, the influence that sea spray exerts on tropical cyclone intensification can be more accurately simulated and intensity forecasts could be improved.