



The effect of secondary ice process parameterizations on a simulated cold frontal rain band

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Secondary ice production may affect mixed-phase clouds directly through their supercooled liquid fraction or indirectly through their precipitation intensity. In a case study, we investigate how parameterizing secondary ice production affects both metrics for a cold frontal rain band from the APPRAISE campaign over the UK in 2009. Both shattering upon droplet freezing and breakup upon ice hydrometeor collision are included in simulations with the COSMO-5 meteorological model. Distributions of generated fragment number are constructed based upon laboratory data, and sensitivity tests are performed, adjusting the parameters of these distributions and the hydrometeor classes involved in both processes. Output precipitation intensity and altitudinal profiles of ice crystal number are also compared, respectively, to radar and in-situ measurements from APPRAISE to determine which sensitivity test best reproduces observations.