A new 2-moment microphysical scheme for studying hail initiation and growth: model-observation comparison over Southweest of France

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Southwestern France is an important wine region where hail-producing storms could cause considerable economic loss. To study the initiation and growth of hailstone, a new microphysical scheme based on the LIMA (Liquid, Ice, Multiple Aerosols, Vié et al., 2016) has been developed. The original LIMA only contains two-moment scheme for rain water, cloud water, and ice crystal. Whereas, the other ice hydrometeors are described by a single-moment scheme. The new scheme adds a full two-moment framework to snow, graupel, and hailstone, thus allowing a better representation of the microphysical processes than the original partial two-moment approach could offer. A large area of southwestern France is actually covered by hailpad network. Results from this network alongside other data thus have been used to evaluate the performance of the single-moment ICE3 scheme, the partial two-moment LIMA scheme, and the new full two-moment scheme in reproducing the evolution of observed hail-producing storm cases. The difference as well as similarity in modeled structures of the storms including hailstone development by different microphysics schemes are examined and will be presented.