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The effect of dissipation intermittency on the turbulent collision statistics of cloud droplets LIAN-PING WANG, University of Delaware, WOJCIECH GRABOWSKI, NCAR — Atmospheric cloud turbulence has a Taylor microscale flow Reynolds number typically in range of 10^4 to 10^5, therefore, the local fluid acceleration and local dissipation rate are highly intermittent. The collision rate of cloud droplets and related pair statistics (i.e., the radial relative velocity and radial distribution function) are affected by these local flow intermittency, therefore, it has been speculated that the flow intermittency might have a significant impact on the turbulent collision of cloud droplets. In this talk, we argue, however, that this speculation may not hold for several reasons. First, collision is a binary interaction and its average statistics are governed by second-order statistical moments, the average impact of intermittency is not significant for these lower order statistics. Second, while the intermittent regions of high flow acceleration and high local dissipation rates do occur, they occupy a very insignificant volume with short lift time. Third, for given droplet sizes, the range of scales governing the pair statistics is limited. An analysis is developed to assess the effect of flow intermittency on the average collision kernel, showing that the flow intermittency does not have a significant effect. Other related works and results from direct numerical simulations will also be used to support this finding.

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