

Condensing Droplets in Turbulent Flows: The Quest for Similarity Scaling in Turbulent Aerosol Flows Through Large-Scale Simulations

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Abstract: Aerosols are an integral part of Earth's weather and climate and are central to processes of industrial and technological importance. Since most flows are turbulent, aerosol/turbulence interaction is a key process. For example, turbulence seems to control macroscale aerosol yields and system-level behaviors, such as cloud formation and dispersion of dust in the atmosphere. However, such coupling is not well understood. This Grand Challenge funded research seeks to study the time- and space- resolved evolution of aerosol systems in turbulent flows via large-scale simulations together with realistic physical models. If successful, the research will further the physical understanding of aerosol dynamics and pave the way for advanced modeling strategies.

