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Study of microphysical and radiative properties of contrail cirrus using large-eddy simulations ROBERTO PAOLI, ODILE THOURON, DANIEL CARIOLLE, CERFACS — Contrails are ice clouds that form by condensation of water vapor exhaust from aircraft engines and develop further in the wake as they are entrained by the airplane trailing vortices. When contrails spread to form contrail cirrus, they can persist for hours resulting in additional (artificial) cloud cover that adds to the cover due to natural cirrus. This talk presents recent results from large-eddy situations (LES) of contrail cirrus dispersion that are carried out using the atmospheric model Méso-NH. The objective is to investigate whether and how the ambient conditions and the microphysical and optical properties of ice crystals (e.g. shape, albedo), affect the three-dimensional structure and the overall microphysical and radiative characteristics of the contrail. The analysis is carried out by changing the radiative properties of the atmosphere (e.g. day/night conditions) for a given level of atmospheric turbulence. The turbulent field is generated by means of a stochastic forcing technique that reproduces the atmospheric conditions encountered in the upper troposphere. In addition to helping understanding the physics of contrails, the LES data retrieved from this study may provide useful inputs to the parameterization of contrail cirrus into global or climate models.

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