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Modelling of cirrus clouds – Part 1b: Structuring cirrus clouds by dynamics

P. Spichtinger[1] and K. M. Gierens[2]
[1] Institute for Atmospheric and Climate Science, ETH Zurich, 8092 Zurich, Switzerland
[2] Deutsches Zentrum für Luft- und Raumfahrt, Institut für Physik der Atmosphäre, Oberpfaffenhofen, Germany

Abstract. A recently developed and validated bulk microphysics scheme for modelling cirrus clouds (Spichtinger and Gierens, 2009), implemented into the anelastic non-hydrostatic model EULAG is used for investigation of the impact of dynamics on the evolution of an arctic cirrostratus. Sensitivity studies are performed, using variation of large-scale updraughts as well as addition of small-scale temperature fluctuations and wind shear. The results show the importance of sedimentation of ice crystals on cloud evolution. Due to non-linear processes like homogeneous nucleation situations can arise where small changes in the outer parameters have large effects on the resulting cloud structure. In-cloud ice supersaturation is a common feature of all our simulations, and we show that dynamics is as least as important for its appearance than is microphysics.

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