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The effects of 3D radiation on the dynamical, microphysical and radiative properties modifying tropical cirrus evolution.

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Tropical cirrus clouds are climatically very important because of their large spatial coverage, high altitude, and long lifetime. These clouds develop in the upper troposphere from the outflow of mixed phase deep convective clouds.

The focus of the presentation is to show the effects of 3D radiation on the evolution of the deep convective core and the resulting anvil. Emphasis in the work is on the impact on the dynamics and microphysics and the resulting impact on the time evolution of the radiative properties.

This research is largely a modelling study but will be initialized with observations from the Cirrus Regional Study of Tropical Anvils and cirrus Layers - Florida Area Cirrus Experiment (CRYSTAL-FACE). The study utilises a 3D radiation scheme interactively coupled to the UK Met Office LEM model. The CRYSTAL-FACE experiment is one of the most comprehensive tropical cirrus cloud campaigns. It took place July 2002 in Florida and the surrounding region. It included six aircraft with various observational instruments, satellite overpass observations and two ARM sites. The observations measured the chemistry, microphysics and radiative properties of the convective clouds and their associated anvils, as well as meteorological variables and ambient aerosol profiles.