



The climate impact from contrails and cirrus clouds – overview from the CONCERT (CONtrail and Cirrus ExpeRiment) campaign

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Contrails and cirrus clouds were detected during the CONCERT-2CONTRAILS campaign (CONtrail and Cirrus ExpeRiment) in November 2008 with the research aircraft Falcon. The Falcon was equipped with instruments to measure particle properties such as particle size distribution, extinction and particle shape as well as trace gas distributions of ozone, reactive nitrogen and halogen species and sulfur dioxide.

During 5 mission flights over Western Europe numerous cirrus clouds and contrails were probed at altitudes between 9 and 11.5 km and temperatures between 213 and 237 K. 22 contrails from 11 different aircraft with ages below 10 minutes were detected in the vortex and early dispersion regime near and slightly below ice saturation. The contrail data are compared to nearby cirrus observations in terms of particle size distribution, shape, optical depth and extinction to discuss differences in their climate impact.

In particular we present new observations of the contrail from a large aircraft, the A380. The evolution of the A380 contrail within its first 6 minutes of its lifetime has been observed. The A380 contrail observations are compared to contrail measurements from smaller aircraft in order to investigate the influence of the aircraft type on climate active contrail properties under similar meteorological conditions.

Further, the specific climate impact from each of the measured contrail cases is assessed with the help of a new contrail cirrus prediction tool (CoCiP). The model computes the integral of the radiative forcing of the contrail over the computed life-time of the contrail and is tested with the detected contrails. It will be shown that the climate impact of contrails depends on both aircraft and meteorological parameters.