



## **Extinction, optical depth and radiative forcing from linear contrails – new results from in-situ measurements from the CONCERT campaign**

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One factor limiting the understanding of the climate impact from contrails is the accurate determination their optical depths. To this end 14 contrails have been detected with instruments onboard the research aircraft Falcon during the CONCERT - CONtrail and Cirrus ExpeRimenT - campaign in November 2008. The contrails were produced by a fleet of 9 different aircraft, amongst them the largest operating passenger aircraft A380, a B767 and several B737s, A340s and smaller aircraft such as a CRJ2.

The contrails were observed at altitudes between 8.8 and 11.1 km, temperatures between 214 and 224 K, and relative humidities with respect to ice between 102 and 70%. The observed contrails have a mean ice water content of 2 mg m<sup>-3</sup>, effective radii of 2.6  $\mu$ m and number concentrations of 120 cm<sup>-3</sup>. The measured scattering phase function suggests that the dominant particle shapes are ellipsoids with an aspect ratio of 1:2.

Probability distribution functions of the contrail extinction and optical depth are derived from the in situ measurements. Radiative transfer estimates with the measured contrail optical depths lead to a new estimate of the radiative forcing from linear contrails.