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**Title:** Measurements of upper tropospheric humidity at low temperatures during CRYSTAL-FACE

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**Abstract:** Aircraft condensation trails (contrails) and thin cirrus were studied by instruments on the NASA WB-57F high-altitude aircraft during contrails and optically thin cirrus are contrasted by different levels of supersaturation with respect to ice. During the July 13, 2002, flight of the WB-57F aircraft intercepted visible contrails produced by both the WB-57F and ER-2 aircraft. These contrails were located immediately below the local tropopause, where ambient temperatures were very low (-76 degree C). The contrails were clearly indicated by an abrupt increase in NO and a simultaneous, abrupt decrease in ice supersaturation. Within the contrail, the relative humidity was close to 130% with respect to ice, higher than expected from theory. Outside the contrails was a persistent layer of subvisible cirrus extending from approximately 13 to 15 km altitude. This layer was characterized by significant supersaturations because the ambient concentrations of ice particles were insufficient to significantly deplete the ice supersaturation. We will discuss in situ measurements and model simulations of humidity.

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