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Cirrus clouds, contrails, and ice supersaturated regions: observations by lidar and radiosonde in Lindenberg/Germany

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From April to October 2003 measurements have been performed with a mobile Aerosol Raman Lidar (MARL) at the Meteorological Observatory in Lindenberg (14.5° E, 52.5° N). The aim of this extensive campaign was the investigation of tropospheric water vapour, cirrus clouds and contrails over a longer period of time. The lidar system detects aerosols and clouds in the troposphere and lower stratosphere. Cirrus clouds are detected by the large depolarisation of the backscattered laser beam. The lidar operates day and night, during daytime contrails may be identified with the help of a video camera. In the upper troposphere cirrus has been detected in 55% of the measured time. Radiosonde (Vaisala RS 80) data are available four times a day from the routine observational program at the site. They frequently detect ice supersaturated regions (ISSR) in the upper troposphere. The comparison of the RS 80 and the MARL data shows that the correlation between ISSR and the occurrence of cirrus and contrails is rather weak. On the other hand there is a strong link between the occurrence of subvisual cirrus and contrails in the upper troposphere.