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Atmos. Chem. Phys., 4, 639-647, 2004

www.atmos-chem-phys.net/4/639/2004/

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On the distribution of relative humidity in cirrus clouds

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Abstract. We have analysed relative humidity statistics from measurements in cirrus clouds taken unintentionally during the Measurement of OZone by Airbus In-service airCRAFT project (MOZAIC). The shapes of the in-cloud humidity distributions change from nearly symmetric in relatively warm cirrus (warmer than -40°C) to considerably positively skew (i.e. towards high humidities) in colder clouds. These results are in agreement to findings obtained recently from the INterhemispheric differences in Cirrus properties from Anthropogenic emissions (INCA) campaign (Ovarlez et al., 2002). We interpret the temperature dependence of the shapes of the humidity distributions as an effect of the length of time a cirrus cloud needs from formation to a mature equilibrium stage, where the humidity is close to saturation. The duration of this transitional period increases with decreasing temperature. Hence cold cirrus clouds are more often met in the transitional stage than warm clouds.

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Citation: Spichtinger, P., Gierens, K., Smit, H. G. J., Ovarlez, J., and Gayet, J.-F.: On the distribution of relative humidity in cirrus clouds, Atmos. Chem. Phys., 4, 639-647, 2004. ▣ [Bibtex](#) ▣ [EndNote](#) [Reference Manager](#)

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