

EGU22-3789

<https://doi.org/10.5194/egusphere-egu22-3789>

EGU General Assembly 2022

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Relative Humidity (RH) distribution in the extratropical upper troposphere and lowermost stratosphere: Long-term evolution derived from in-situ observations of the combined IAGOS and MOZAIC time series

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The European research infrastructure IAGOS (In-Service Aircraft for a Global Observing System; www.iagos.org) and its predecessor MOZAIC (Measurement of Ozone and Water Vapor by Airbus In-Service Aircraft) is a global observation system for atmospheric composition by deploying autonomous instruments aboard a fleet of commercial passenger aircraft. The combined time series spans now more than 25 years and is comprised of more than 60000 flights. This makes it ideally suited for atmospheric research on a statistical basis.

Previous results, investigating the MOZAIC period, have already given insights into the seasonal and regional variability of the Relative Humidity (RH) distribution and the regions with ice-supersaturated air masses (ISSR). Thereby, significant ISSR occurrence exists in the Ex-UTLS (Petzold et al., ACP, 2020, doi.org/10.5194/acp-20-8157-2020), a region in which the distribution of water vapour shows a large spatial and temporal variability.

In the present study, we extend this study by using the combined time series from 1996 to 2020 for the long-term characterization of RH distribution in the Ex-UTLS. We will focus on comparing the distribution of RH for different years and seasons and analyzing the time series for potential long term trends.