



15 years of upper tropospheric relative humidity in-situ measurements by the MOZAIC programme

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Water vapour is a major parameter in weather prediction and climate research. However, the interaction between water vapour in the upper troposphere and lowermost stratosphere (UT/LS) and tropopause dynamics are not well understood. Furthermore, the knowledge about potential trends and feedback mechanisms of upper troposphere/lower stratosphere water vapour is low because of the large variability of observations and relatively short data records. A continuous measurement of upper tropospheric humidity (UTH) is still difficult because the abundance of UTH is highly variable on spatial and temporal scales, which cannot be resolved, neither by the global radiosondes network nor by satellites.

Since 1994, UTH data with high spatial and temporal resolution are provided by the in-situ measurements aboard civil passenger aircraft from the MOZAIC/IAGOS-programme (www.iagos.org). The measurement system is based on a capacitive hygrometer with a simultaneous temperature measurement installed in a conventional Rosemount housing. In recent studies the MOZAIC Capacitive Hygrometer (MCH) and its improved successor IAGOS Capacitive Hygrometer (ICH) are compared against research-grade water vapour instruments during airborne field studies. The qualification of the Capacitive Hygrometer for the use in long-term observation programmes is successfully demonstrated and the continuation of high data quality is confirmed for the transition from MCH to ICH.

After the reanalysis of the relative humidity data from 1994 to 2009, this extensive and unique data set is examined by criteria of continuity, homogeneity and quantity of data coverage, to identify global regions suitable for UTH climatology and trend analyses.

For the identified target regions time series and climatologies of, e.g., relative humidity with respect to ice, temperature, and absolute humidity are investigated. First results of this study will be presented.