

**GCOS Reference Upper Air Network (GRUAN): Steps towards assuring future records of vertically resolved upper air essential climate variables**

Holger Voemel<sup>†</sup>; Greg Bodeker; Peter Thorne; Franz Immeler; Michael Sommer

<sup>†</sup> DWD, Germany

Leading author: [Holger.Voemel@dwd.de](mailto:Holger.Voemel@dwd.de)

Historical observations of atmospheric column characteristics are bedeviled by uncertainties arising from changes in instrumentation and practices, be they from in-situ soundings, ground-based remote sensing instrumentation or satellites. This makes it very difficult to ascertain the necessarily unique real-world changes for a large number of climatically relevant parameters, in particular temperature and humidity. It is highly likely that similar changes will pervade the future record from the global observing system. For over a decade efforts have been undertaken by the climate community to initiate a reference quality network to ensure the future record. These efforts were crystallized in the GCOS Implementation Plan and have been taking shape as the GCOS Reference Upper Air Network. This presentation will discuss the rationale behind the network, progress thus far and future plans. Specific focus will be given to what defines a reference observation, recognizing that because a perfect measurement is never achievable, providing a robust and traceable uncertainty on each measurement is essential. Key aspects of a GRUAN measurement will be outlined within this framework, which revolves around the process for establishing traceable uncertainty estimates and measurement technology redundancy to allow independent cross-checking. More information on GRUAN can be found at [www.gruan.org](http://www.gruan.org) and in the poster cluster in session C15: Atmospheric Observations Including Upper Troposphere and Stratosphere