**An overview of the GCOS Reference Upper-Air Network (GRUAN)**

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Measurements of primary state variables of the troposphere and stratosphere (primarily temperature, water vapor and pressure) are typically made to provide the input required by numerical weather prediction models. These same measurements then also constitute the primary source for meteorological reanalysis and climate analyses. The balloon-borne, ground-based and satellite-based systems used to make these measurements often undergo changes in instrumentation, data processing methods, retrieval techniques and calibration. These changes are often poorly documented and very are measurement series reprocessed to ensure long-term homogeneity of the climate data record. Such unphysical discontinuities in measurement data can lead to the deterioration of the quality of meteorological reanalyses. To address this specific deficiency of the global climate-monitoring network, WMO and GCOS called for the establishment of a new state-of-the-art global network of high quality measurements of essential climate variables in the upper atmosphere. The establishment of GRUAN (GCOS Reference Upper-Air Network) has now been underway for several years and sites are providing reference quality measurements that adhere to GRUAN operating protocols.

This presentation will provide an overview of the achievements of GRUAN to date, including:

* protocols that have been established to ensure that measurements are of reference quality
* what measurement systems are and will be operating at GRUAN sites
* what data products are expected to flow from those systems
* an overview of data currently flowing from GRUAN sites
* technical advancements within GRUAN to meet the needs of users of GRUAN data products

GRUAN's goal is not only to produce long-term, carefully calibrated measurements with well-defined measurement uncertainties, but to also produce high-quality data suitable for focused process studies. How GRUAN balances operational and research goals will be included in the presentation, as well as the challenges that GRUAN faces, and plans for overcoming these challenges.