

The GCOS Reference Upper Air Network (GRUAN)

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The global upper-air observing network has provided observations for operational weather forecasting for decades, but these observations have shown to be limited to understand upper air climate change. Consequently, the scientific community faces uncertainty on such key issues as the trends of upper air temperature or water vapor. To address these shortcomings, and to ensure that future upper air climate records will be more useful than records to date, the Global Climate Observing System (GCOS) program initiated the GCOS Reference Upper Air Network (GRUAN). This network will provide reference observations of a number of essential climate variables in the troposphere and stratosphere, in particular temperature and water vapor. When fully implemented, GRUAN will be a network of about 30 observatories with a representative sampling of global climatic regions. The network will strongly build on existing networks and utilize existing capabilities, while expanding on upper-air reference observations of key climate variables, such as temperature, water vapor, geopotential height, wind, and a number of additional parameters. GRUAN will strongly focus on vertically resolved measurement uncertainties as a tool for quality quantification. It will use a combination of routine and specialized radiosondes together with complementary remote sensing instrumentation to assure long-term stability, to identify observational weaknesses, and to manage instrumental change, which is one of the most difficult challenges for long-term climate observations. The network will not be globally complete but will serve to constrain and adjust data from more spatially comprehensive global observing systems including satellites and the current radiosonde networks.

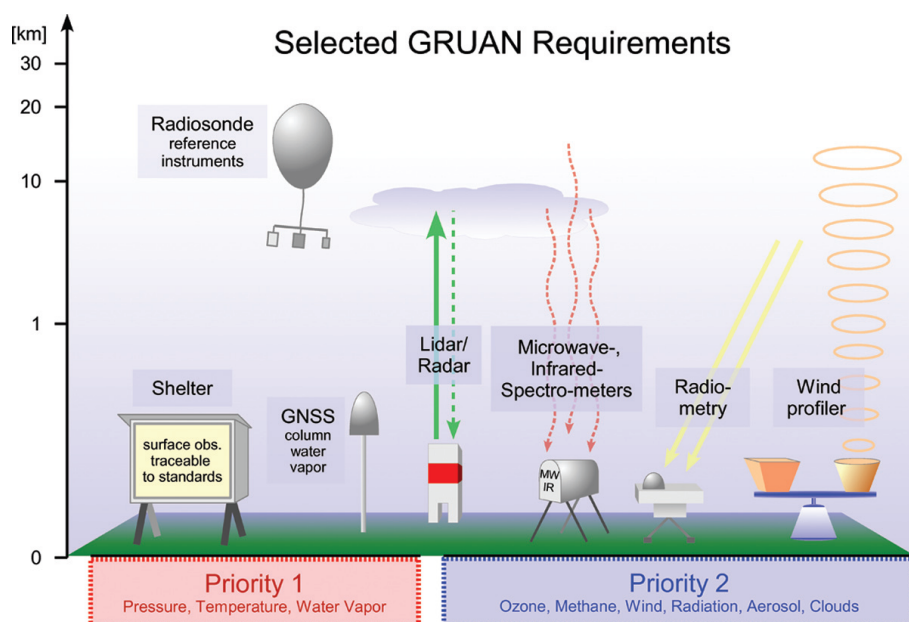


Figure 1. Proposed instrument suite at a typical GRUAN site.