

Reference radiosonde program

In January 2009, Vaisala made a corporate commitment launching a program to develop an operational reference-grade radiosonde that could be used in GRUAN and other applications where enhanced radiosonde sensor performance is required. The program is being implemented in close collaboration with the meteorological research community, and the benefits will be shared equally with all countries. Vaisala has also set aside commercial gain from this program in keeping with its Corporate Social Responsibility Program.

The relevance of an operational reference radiosonde

Today's radiosonde network serves numerical weather forecast need. The same network provides also important in-situ measurements for climatology purposes. It is evident that atmospheric research and climatology can benefit and further evolve with help of even more accurate - reference level - in-situ measurements. These reference



level measurements are done spatially and timely more seldomly than more dense basic measurements. Both are essential for climatology purposes.

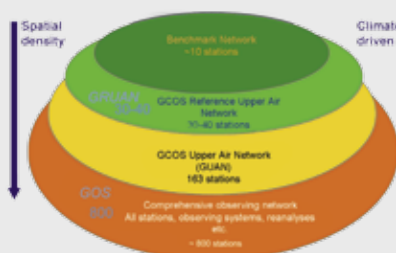
Humidity is the most abundant and subsequently one of the most important greenhouse gases in the earth's atmosphere. Understanding the changes in its concentration are imperative to facilitate a better understanding of global warming. However, it is also one of the most difficult parameters to measure with high precision and accuracy, especially in the upper troposphere and stratosphere where conditions are extremely cold and dry.

The initial parameter that the Vaisala reference radiosonde program concentrates on is humidity. The first prototype of the operational reference radiosonde is based on the Vaisala RS92 radiosonde sensors and Vaisala's DRYCAP® Frostpoint Sensor capable of measuring extremely low humidity levels.

WHAT ARE GCOS AND GRUAN?

A globally coordinated monitoring system for the climate, the Global Climate Observing System (GCOS) was set up in 1992. Information obtained through the GCOS network is used for climatological observations globally, and also as an input for climatological models that help estimate how the climate will change in the future. In keeping with GCOS' mission, i.e. to produce the highest quality long-term climatological data as well as calibrate data from other global systems such as satellites and existing radiosonde networks, the GCOS Reference Upper Air Network (GRUAN) was set up. The overall goal of GRUAN is to establish 30-40 stations

which will use the operational reference radiosonde in addition to other instrumentation, representing different climatological conditions around the world.



Courtesy of WMO

The DRYCAP® Frostpoint Sensor is designed to observe humidity at altitudes to 30 km. It has frost point range from -30°C to -90°C thus supplementing well the conventional RS92 Humicap sensor by providing an independent humidity measurement.

Vaisala Radiosonde RS92 is one of the radiosondes already widely used in Global Climate Observing System (GCOS) network. The network consists of 163 sounding stations and usually performs 2 soundings per station per day. Together with our partners we are looking for optimum balance between accuracy, usability and observation price. All these definitions are already available with RS92, now to be implemented also in reference radiosonde.

What is a radiosonde?

Radiosondes are meteorological devices that perform pressure, temperature and humidity measurements using sensors designed to cover all atmospheric and weather conditions in every climate zone. The measurements are done by a high tech measurement device attached to Hydrogen or a Helium balloon that lifts the radiosonde



through the atmosphere - radiosondes typically measure the atmospheric conditions up to 20 to 40 km height. To guarantee measurement accuracy, these sensors are individually calibrated against reference standards traceable to international standards. Wind data is computed from radiosonde movements during ascent. The movement is measured utilizing either navigation signals such as GPS or radiodirection finding.

Vaisala in brief

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- Worldwide presence 25 offices around the world: Australia, China, Finland, France, Germany, India, Japan, Malaysia, Sweden, the UK, the United States, and the United Arab Emirates.
- Customer base We serve national meteorological and hydrological institutes, aviation and road organizations, defense forces and wind parks. Our customers also include industrial companies whose operations require precise environmental measurements, such as clean rooms and chambers, building automation, dryers and chosen industrial applications. Vaisala has customers in over 120 countries.
- Research and development The key to Vaisala's success is its diverse research and development activity. Vaisala invests some 10 % of its net sales to R&D. The Group's R&D activities are located in Finland, the USA, the UK, and Germany. Approximately 20 percent of Vaisala's personnel work in R&D.

VAISALA

For more information, visit www.vaisala.com or contact us at sales@vaisala.com

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