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WMO Intercomparison of Radiosonde Systems in China

Latest developments in Vaisala's sounding software include new algorithms for finetuned humidity and temperature measurements.

The 8th World Meteorological Organization Intercomparison of Radiosonde Systems gathered all leading radiosonde manufacturers to Yangjiang, China on 12-31 July. The Intercomparison, organized every 4-5 years, is a continuous four-week sounding campaign, designed to be an objective venue for assessing the qualities and performance of different radiosonde systems.

The last two Intercomparisons were held in Mauritius (2005) and Brazil (2001). This year the campaign, hosted by the China Meteorological Administration, was held at the Yangjiang Observing Station, about 200 kilometers from Hong Kong.

Vaisala participated in both categories of the Intercomparison. Vaisala Radiosonde RS92-SGP was entered into the Operational Radiosondes group and the Vaisala Reference Radiosonde RR01 prototype into the Scientific Sensor Intercomparison (SSI) for experimental instruments.

"We're happy with the performance of the RS92 in the Intercomparison", says Johanna Lentonen, Product Area Manager to Vaisala's sounding systems. "Thanks to our continuous quality efforts, overall quality and data availability were on a very good level, and the modifications we have made on the measurement algorithms have improved accuracy as planned."

Bigger Event than Ever

More radiosondes than ever before were entered into the Intercomparison – ten models from eight different countries were flown in the Operational Radiosondes group, and five models from four countries participated in the Scientific Sensor Intercomparison.

For Vaisala, the campaign began with preliminary soundings on July 12. During the next three

weeks, a total of 46 soundings were performed: 34 with the RS92 in the Operational Radiosondes group, and 12 with the RR01 prototype in the SSI group. Observations were made during both day and night time.

The WMO will publish the results of the Intercomparison in 2011.

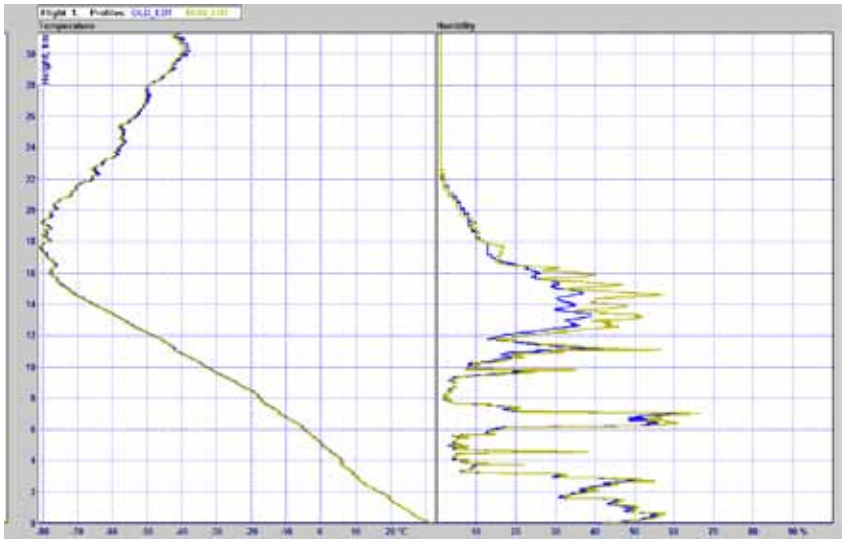
Improved Humidity and Temperature Measurement Accuracy

New algorithms have been added to the Vaisala DigiCORA® Sounding System MW31 software to finetune humidity and temperature measurements. According to the preliminary feedback received during the Intercomparison, the modifications have improved both daytime and night time humidity measurement.

Humidity measurement accuracy was improved by taking into account more details than before. First, time lag correction was added, which improves performance especially in cold temperatures, where the time constant of the humidity sensor is greater. This improves measurement accuracy in both daytime and night time soundings. Second, an algorithm was added to correct the effects of solar radiation during daytime soundings.

Both solar radiation and time lag correction algorithms have the biggest impact in measurements taken in high humidity conditions in the upper troposphere, at altitudes of approximately ten to fifteen kilometers. Thanks to the improvements, humidity profile is now enhanced and fine structures of clouds can be observed.

In addition to the humidity measurement improvements, the solar radiation correction of the temperature measurement was finetuned as well. The solar radiation table, which is used to compensate for the effect of solar radiation on temperature measurement, was changed so that it now takes better into account the sensor's movements in different sounding riggings and ascent rates.



A day-time sounding profile from Malaysia, showing the effects of the improved algorithms on the humidity and temperature measurements.

Upgraded Software Available by End of 2010

All changes described above were made on the sounding system algorithms, and the Vaisala Radiosonde RS92 itself remains unchanged. The upgraded software version will be available to customers by the end of the year, and all the modifications made will be reported in detail on Vaisala's data continuity website at the same time.

For those interested to study the effects of the modifications by themselves, soundings can be done with the old algorithms also after having upgraded to the new software version.

Further information:
www.vaisala.com/soundings
www.vaisala.com/weather/products/datacontinuity.html