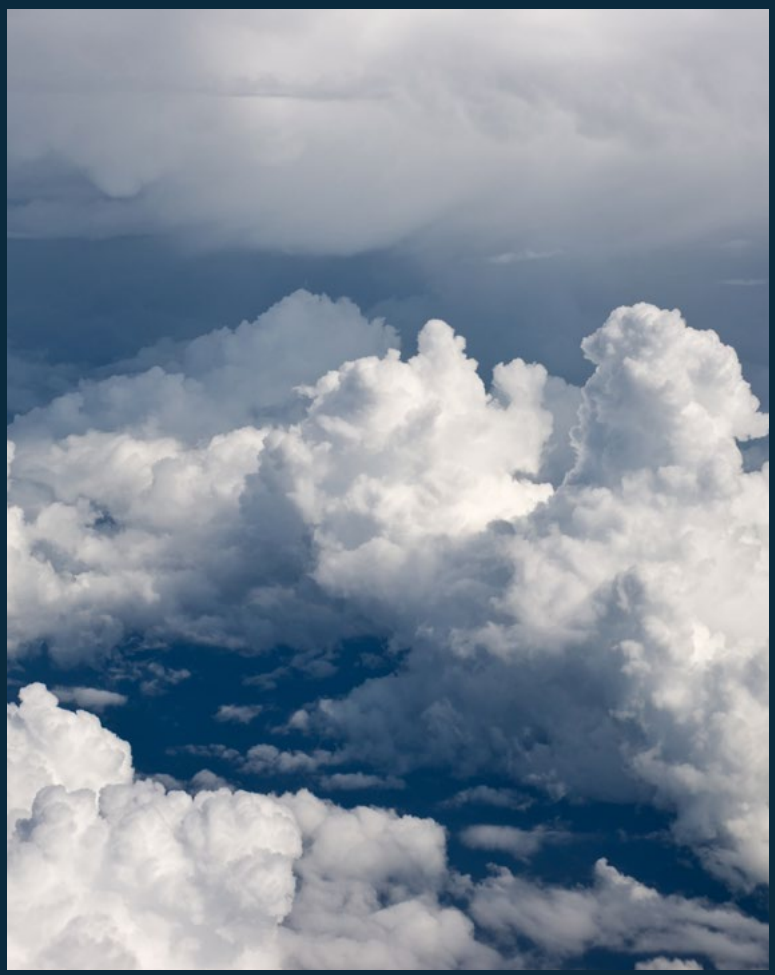
VAISALA

WMO has published Final Report of the WMO Upper-Air Instrument Intercomparison 2022

Soundings Application Note

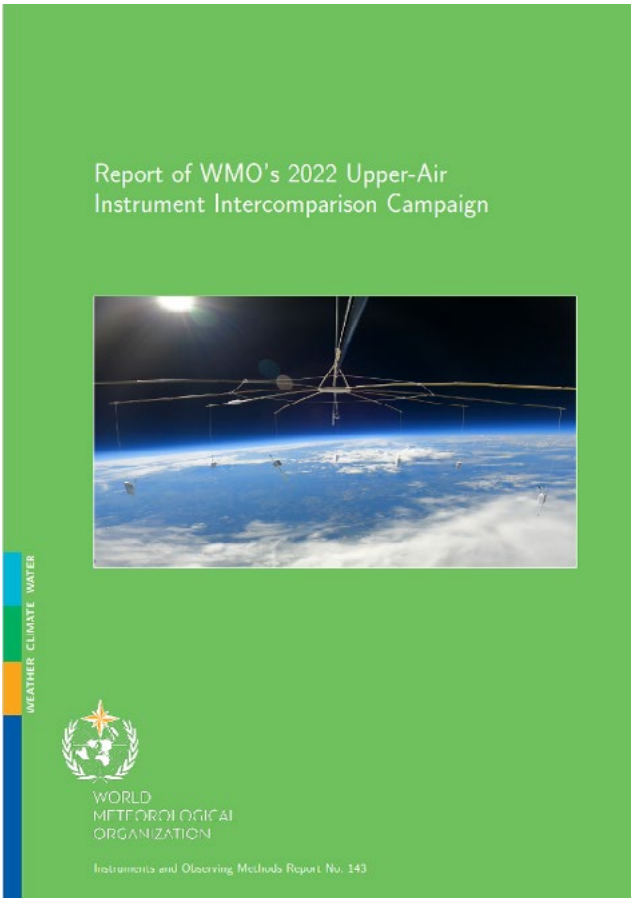
Radiosondes, providing in situ upper-air data, are the most important surface-based observation system for global numerical weather prediction and subsequently for many application areas in meteorology [1]. WMO's OSCAR (Observing Systems Capability Analysis and Review Tool) Observation Requirements specify requirements for upper-air measurements for Global Numerical Weather Prediction and Real-time Monitoring, Atmospheric Climate Forecasting and Monitoring, Nowcasting / Very Short-Range Forecasting and Aeronautical Meteorology [2].



In 2022, WMO's Task Team on Upper-Air Instrument Intercomparison conducted a comprehensive intercomparison study of 10 radiosondes that are in operational use. The final report "Report of WMO's 2022 Upper-Air Instrument Intercomparison Campaign", WMO Instruments and Observing Methods Report No. 143, was published in March 2024. The intercomparison consisted of laboratory phase and field intercomparison, during which 40 soundings per system were performed.

In the field intercomparison a working standard reference was created by using two independent GRUAN Data Products from certified radiosondes. The soundings were conducted by personnel from meteorological organizations from 10 countries, and the operators did not operate a system they knew beforehand. This ensures that the usability of the systems was studied in a neutral and unbiased manner during the study.

Several factors were assessed in the study. Achieved measurement uncertainties of the radiosondes during flights in varying conditions were assessed against the GRUAN Data Product based reference. Radiosonde behavior and performance in challenging measurement conditions, such as flights through dense clouds, were assessed and reported. Reliability of the radiosondes during the pre-launch preparations, ground check, and flight, as well as the capability of the sounding systems to produce high resolution BUFR messages for use of the data were assessed. In addition, the need for the operators to contact suppliers for support was recorded. These all provide very valuable data for the users of the radiosonde systems when considering their requirements and operational practices for this very important data set in their operations.



It is Vaisala's view that this intercomparison is of high quality and was conducted with scientific rigor. The intercomparison provides a very useful study on the performance of the contemporary radiosondes.

Of special merit are the facts that radiosonde measurement accuracy was evaluated against certified GRUAN Data Products that provide the best possible independent reference, the systems were operated by ordinary radiosonde operators who were not previously acquainted with the specific system they operated, and the radiosonde and sounding system reliability is transparently reported as part of the report. We encourage all persons in the meteorological community that plan or operate radiosonde observations to get acquainted with the final report of the study, which is available from the WMO web site [3].

[1] Seventh WMO Workshop on the Impact of Various Observing Systems on Numerical Weather Prediction, Final Report. https://community.wmo.int/en/meetings/NWP-7
[2] WMO Observing Systems Capability Analysis and Review Tool. https://space.oscar.wmo.int/observingrequirements
[3] Report of WMO's 2022 Upper-Air Instrument Intercomparison Campaign. WMO Instruments and Observing Methods Report No. 143. Available with search phrase "IOM-143" from https://library.wmo.int/

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