

HMEI and Standards in a Changing Climate

The phrase 'Changing Climate' here alludes not only to the well publicized issues of higher temperatures and more severe weather, it also alludes to a 'changing climate' within the weather, climate and environmental industries, on the accuracy and kinds of measurements and information on which weather and climate science are based.

“However well established the standards and guidelines for measurements are conceived, there remains the question of how do we know if an instrument or piece of equipment truly meets this standard?”

How do we ensure that the data we base our science on is good quality for accurate decision making? Well the most obvious answer is to make sure you know where the data comes from, what method is being used to create the data and how that data can be verified as correct. These qualities are enshrined in the term 'Traceability'. How do we ensure Traceability? The short answer is 'Standards'; but whose standards and how are they ensured?

HMEI is an association committed to facilitating communication between the makers of instruments and systems that collect data for the weather, climate and environmental communities, and those who use the data for scientific and operational purposes. As part of that communication, and part of its original association mandate, HMEI promotes and contributes to worldwide standards in the weather, water and climate fields by its cooperation with World Meteorological Organization (WMO) and by HMEI working with the International Standards Organization (ISO).

From the start of the operational office and secretariat of HMEI in 2003 until now, there has truly been a 'changing climate' in the way measurements and data for hydro-meteorology have been considered; the changing needs of the world have seen new concerns for the accuracy and consistency of data.

At the inception of the Association of HMEI, hydrological/meteorology measurements, especially in relationship to fulfilling the measurement needs for the National Hydrological and Meteorological Services (NMHSs) who are customers of HMEI members, were specified to fulfil the concerns of weather forecasting at a short to medium time scale. This concern has now expanded to include the wider issues of climate. With this expansion of vision, the needs of the data to inform the world's environmental decision making have become critical and often, as in the case of climate prediction, traceable accuracy on a fine scale is now more than ever essential.

After being granted liaison status with WMO in 2002, HMEI started its official cooperative operations with WMO in 2003. At that time the WMO

guides and particularly the Commission for Instruments and Methods of Observation (CIMO) Guide gave the recommended level of accuracy and "best practice" for instrumentation and equipment for use by WMO members, the NMHSs. However these recommendations were at that time in no way official 'Standards'. HMEI members of course were well aware of the WMO CIMO Guide, but found some specific problems with the CIMO Guide. Firstly the CIMO Guide was not without significant cost. Secondly the process of updating the CIMO Guide was laborious owing to the need for revisions to be approved at the 4 yearly CIMO sessions. This meant that updates were not timely, in a time of rapid development of instruments and equipment development. Thirdly there was restricted ability for the manufacturers themselves to make input into the CIMO Guide. Also HMEI members, who actually make the instruments and equipment, knew that some meteorological services did not necessarily follow the recommendations as stated by the CIMO Guide when specifying instrumentation.

The HMEI Secretariat had, since its inception, put the views of its membership to WMO regarding the CIMO Guide. It was thus with great satisfaction that HMEI saw, at the 15th session of CIMO in 2010, that the process of updating the CIMO Guide was amended to enable continuous review and regular updating by a CIMO Guide Editorial Board and on which HMEI on behalf of the private industry was invited to provide member representation. The HMEI representative can and does receive suggestions from HMEI members for CIMO Guide updates, which he can then submit to the board for consideration. Also since 2008 WMO has made the CIMO Guide available on the WMO website at no cost. HMEI members are now extremely pleased to be able access the CIMO Guide, to inform their manufacturing practices, freely available and with timely updates.

In 2004 HMEI began to be involved with ISO, seeing the value of international standards for the hydro-meteorological industry. HMEI attended its first International Organisation for Standardisation meeting, the ISO/TC 146 Air Quality - Sub-committee 5 in Sweden, September 2004 and subsequently was granted liaison status with ISO.



WMO Intercomparison of High Quality Radiosonde Systems, Mauritius, February 2005 (Courtesy Meteolabor)



Meeting of Participants - WMO Field Intercomparison of Rainfall Intensity Instruments, Vigna di Valle, Italy, May 2008 (Photo courtesy of HMEI)

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HMEI member representatives are and/or have been involved with several ISO standard setting working groups (WG):

ISO TC 8/SC 6/WG 13

- Ships and marine technology —
Marine wind vane and anemometers

ISO/TC 146/SC 5/WG 6

- Air quality/Meteorology - Ground-based remote sensing of visual range by lidar
- Air quality/Meteorology - Doppler wind lidar
- Air quality/Meteorology - Siting Classification

The standard for marine windvane and anemometers and the standard for ground-based remote sensing of visual range by lidar have both now been approved and adopted for operational use.

Since 2003, HMEI's close collaboration with WMO has included many discussions on an unofficial basis, particularly between the CIMO Secretariat and the HMEI Secretariat, about the need perceived by HMEI for official standards for the industry rather than depending on the recommendations from the CIMO Guide. HMEI considered that the CIMO Guide recommendations did not have the strength that industry standards, particularly those approved through ISO, would have. HMEI saw ISO standards as having industry credibility. Manufacturers who can make instruments and equipment to accredited ISO standards have the potential to make equipment in a larger number, and therefore at a lower cost per item, and be secure in the knowledge that the instruments and equipment will have a market because they fulfil the accredited level sought by buyers. In the past instruments and equipment were more likely to be made in specific amounts as needed, fitting individual specifications which buyers selected, or not, from the recommendations of the CIMO Guide. Alternatively instrumentation and equipment was procured from off the shelf offerings from the manufactures, which may or may not have accorded with the CIMO Guide.

HMEI has been very pleased to see that since 2008 WMO has become an ISO recognised international standardisation body, with procedures for the "accelerated adoption of WMO documents as ISO standards"¹.

However well established the standards and guidelines for measurements are conceived, there remains the question of how do we know if an instrument or piece of equipment truly meets this standard? One of the classic ways of making this known is by

Intercomparisons. Equipment and instrumentation can be compared in rigorous parallel conditions, with well established parameters, to determine to what level and accuracy the equipment or instrument measures and how it compares with others of its kind. HMEI and its members have been greatly committed over the years to participating in various Intercomparisons; especially those conducted under the auspices of WMO, whose methodology and rigorousness are well founded and respected.

It is to be noted that many current members of HMEI have been involved with WMO Intercomparisons for years before the inception of HMEI, which is a mark of their integrity as manufacturers and their dedication to unbiased scientific knowledge about their instruments.

Previous to the formation of the Association of HMEI, WMO Intercomparisons were restricted to those instruments in operational use in meteorological services and that were nominated for comparison by a WMO member meteorological service. However, with the collaboration of HMEI with WMO, HMEI has sought expansion of the involvement of manufacturers in the Intercomparisons. HMEI is now able to nominate HMEI member instruments for the WMO Intercomparisons. This has the advantage of expanding the knowledge of the quality of instrumentation by manufacturers outside the current range of those used by meteorological services. Further it has allowed instruments being newly developed to be included in the Intercomparisons; thus encouraging manufacturers to meet WMO's stated need to explore new and better solutions and data to meet requirements for predicting changes in the world's climate.

HMEI has facilitated the involvement of its members in the following Intercomparisons:

- WMO Solid Precipitation Inter-Comparison Experiment (SPICE), Canada, 2012. (This is a follow up Intercomparison of screens, temperature and humidity sensors to be held in the Arctic.)
- 10th International and Regional Pyrheliometer Intercomparison, Switzerland, September-October 2005.
- WMO Field Intercomparison of Rainfall Intensity Instruments, Vigna di Valle, Italy, mid 2007-mid 2008.
- LUAMI (Lindenberg Upper-Air Methods Intercomparison) Campaign, Germany, November 2008.
- WMO Combined Intercomparison of Thermometer

Screens/Shields in conjunction with Humidity Measuring Instruments, Algeria, mid 2008-mid 2009.

- WMO Intercomparison of Radiosondes, Yangjiang, China, July 2010.

HMEI members will also be involved in the following upcoming Intercomparisons:

- WMO Solid Precipitation Inter-Comparison Experiment (SPICE), Canada, 2012.

This is a follow up Intercomparison of screens, temperature and humidity sensors to be held in the Arctic.

- RQOI - Radar Quality Control and Quantitative Precipitation Intercomparison, chaired by Canada.

HMEI continues to suggest and support further extensions to the WMO Intercomparison program, with the aim of constantly improving the accuracy and reliability of scientific 'Weather, Water and Climate' observations.

About the Association of Hydro-Meteorological Equipment Industry (HMEI):

HMEI is an association originally formed at the suggestion of the then Secretary General of the World Meteorological Organization (WMO), to facilitate interaction between WMO and private-industry manufacturers of instruments.

HMEI has a head office located in the WMO building in Geneva. However it is an independent non-profit association, funded only by its members.

HMEI promotes the perspective of the private industry makers of instruments, equipment and systems in the meteorological, hydrological, environmental, climate and related fields, who are its members.

HMEI particularly represents the hydro-meteorological instruments, equipment and systems industry views on standards by its liaison statuses with WMO since 2002 and with ISO since 2004.

To contact HMEI our email is hmei@wmo.int. For more information about HMEI see our website at www.hydrometeoindustry.org

¹WMO Info Note 47, www.wmo.int/pages/mediacentre/infonotes/info_47_en.html