



Act now to ensure Network Data Quality – identify and commission alternatives to mercury instruments



The **UNEP Minamata Convention on Mercury** comes into force globally in 2020¹, and **bans** all production, import and export of **observing instruments** (thermometers, barometers, etc.) **containing mercury**.

Our meteorological observing networks have long involved the use of mercury-containing instruments, but now, to facilitate the rapid entry into force of the Minamata Convention, WMO's goal is to see the **progressive replacement** of these instruments well before 2020.

The Dangers of Mercury

Mercury is a very toxic substance, which has serious effects on both human health and the environment. Inhalation of mercury vapours can cause harmful effects on the nervous, digestive and immune systems. It can also cause neurological and behavioural disorders, and symptoms such as insomnia, memory loss, neuromuscular effects, headaches, and cognitive and motor dysfunction.

Within the environment, Mercury vapour can travel long distances before settling into the atmosphere where it bio-accumulates, further volatilizes, or is converted to methyl mercury by microorganisms.



Minamata Convention on Mercury

This agreement is a global treaty to eliminate the use of mercury to protect both human health and the environment from the adverse effects of mercury. It was agreed at the 5th session of the Intergovernmental Negotiating Committee in Geneva, in January 2013.

The major features of the Minamata Convention on Mercury are a ban on new mercury mines, the phase-out of existing mines, control measures on air emissions, and prohibition of the manufacture, import and export of mercury products. This prohibition includes the production, import and export of mercury-in-glass barometers and thermometers.

The name 'Minamata' honours the many residents of the Japanese city of Minamata, who were victims of severe mercury poisoning after industrial wastewater leaked from a chemical factory and polluted the local environment in the mid-20th century.

The dangers of meteorological instruments containing mercury

Metallic mercury is the substance used in mercury-in-glass barometers and thermometers. Unlike other forms of mercury, metallic mercury poses the biggest threat to health in that it vaporizes and can therefore be inhaled.

¹Similar legislation came into force in Europe on 10 April 2014 and a number of manufacturers there are already unable to provide mercury-based instruments.



Despite great care in their handling, mercury barometers and thermometers can break, and although the pieces may be cleaned up in a timely manner, it is common that the mercury from these instruments can ball up and escape into small cracks or concealed places. It can also cling to objects such as brooms or shoes, and so swiftly spread from one place to another. Undetected mercury vaporizes and can be inhaled by those nearby, thus entering their bloodstream.

Disposal of mercury and mercury-in-glass instruments must follow national procedures in place for its safe disposal.

What impact will the convention have on our observing networks?

Well before the specified phase-out date of 2020, NMHSs are strongly encouraged to take appropriate measures to put in place a migration strategy to enable them to move away from the use of all instruments containing mercury.

It's time to act now: we need to transition away from the use of mercury-containing instrumentation and learn to rely instead on alternative technologies.

Recent advances in electronic and digital technologies provide such a way forward. Digital electronic barometers, thermometers and hygrometers can provide an economical, accurate and reliable alternative to their dangerous, mercury-based precedents and offer other significant advantages in terms of data storage and real-time data display.

And for those ill-equipped to transition to electronic solutions, other more classical solutions are available that do not involve the use of mercury.

A roadmap for replacement of mercury-containing instrumentation:

Successfully transitioning away from the use of mercury requires carefully planning and implementation, but this can be achieved by taking a number of sequential steps:

- **Involve participatory stakeholders in the observing network ;**
- **Identify replacement instruments meeting national performance requirements;**
- **Conduct comparative study to ensure the effectiveness of the alternative devices;**
- **Safe removal and disposal of mercury measuring devices in accordance with National Environmental or Health and Safety Legislation;**
- **Periodic maintenance and calibration in accordance with WMO and manufacturer guidelines.**

The WMO Commission for Instruments and Methods of Observation is developing further guidance material for WMO Members on how to transition away from the use of mercury containing instrumentation, and on the alternative technologies now available. As it becomes available, it will be posted on the WMO Instruments and Methods of Observation programme website at:

www.wmo.int/pages/prog/www/IMOP/IMOP-home.html

For further information, see also:

Minamata Convention: www.mercuryconvention.org/

Handling and disposal of mercury: www.knmi.nl/samenw/geoss/wmo/mercury/