



World Calibration Center for Sulfur Hexafluoride

WCC-SF₆
World Calibration Center



Current Status and Future Plans of WCC-SF₆

- Status of WCC-SF₆ in Korea Global Atmosphere Watch Center
 - ① Several systems for operation of WCC-SF₆ established (Refer to the pictures below)
 - ② Outstanding work force and advanced techniques for preparing SF₆ laboratory standards secured
 - ③ World's leading ability for greenhouse gas measurements developed
- Infrastructure for WCC-SF₆



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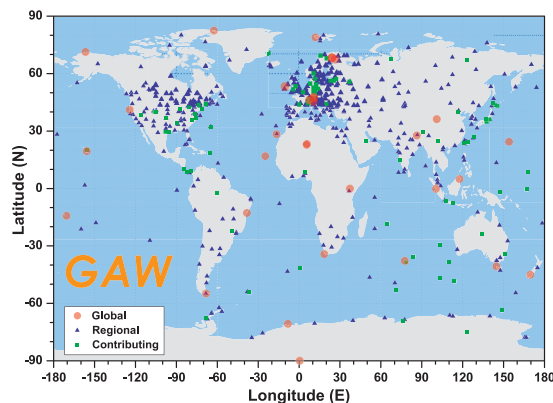


- Future plans of WCC-SF₆
 - ① To develop standard operation procedures to maintain laboratory standards traceable to the WMO reference scale
 - ② To perform intercomparison campaigns and system/performance audits for stations to improve the quality of observation data
 - ③ To expand the SF₆ observation network including the *in-situ* and/or flask sampling analysis supported by advanced measurement technique of WCC-SF₆
 - ④ To provide the technical training course for GAW stations to enhance the capability building for SF₆ observation

○ Through these activities, WCC-SF₆ would like to improve the quality of global SF₆ observation data, and play a leading role in greenhouse gases observation.

Global Atmosphere Watch Programme of World Meteorological Organization (WMO/GAW)

- To understand and control the increasing influence of human activity on the global atmosphere, the World Meteorological Organization initiated the Global Atmosphere Watch programme in 1992 by coordinating several global networks of observing stations and supporting facilities. About 410 stations from 80 countries of WMO Members are participating in the GAW programme, and monitor the greenhouse gases, reactive gases, surface and stratospheric ozone, aerosols, atmospheric wet deposition, and UV radiation.



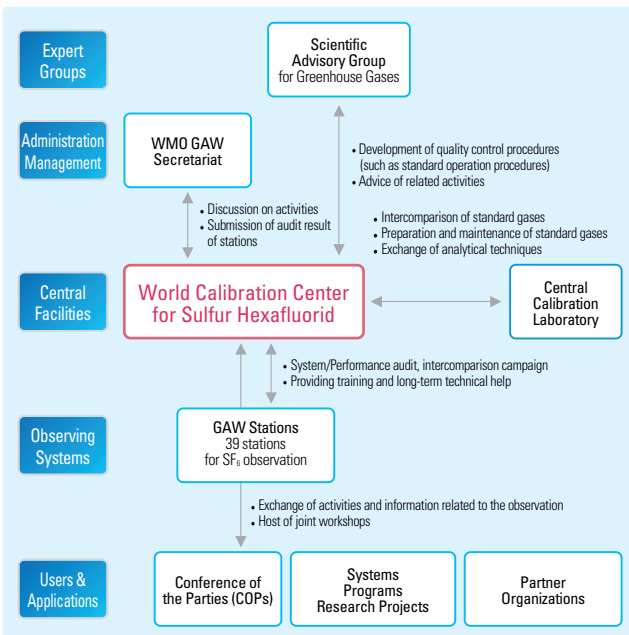
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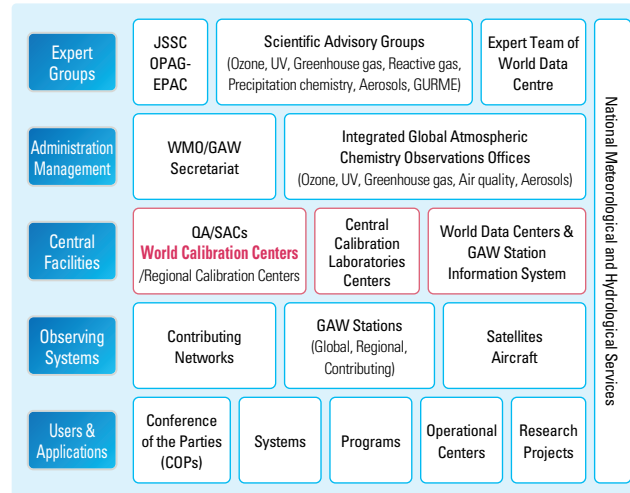
- World Calibration Center (WCC) is one of five types of central facilities to assure the quality of observation data produced by a number of stations which contribute to the Global Atmosphere Watch (GAW) Programme of World Meteorological Organization (WMO). A key role of WCC is to assist stations in establishing observations traceable to the WMO/GAW reference scale.
- The important missions of WCC are as follows:
 - To develop and publish quality control procedures required to support the quality assurance of measurements
 - To prepare and maintain laboratory standards which are traceable to the WMO reference scale
 - To perform intercomparison campaigns, system/performance audits, and provide a training and long-term technical help for those who work for WMO/GAW stations
- Korea Meteorological Administration (KMA) has operated the World Calibration Center for Sulfur Hexafluoride (WCC-SF₆) in its Korea Global Atmosphere Watch Center (KGAWC) since 2012.



Workflow of WMO World Calibration Center



Components of the WMO/GAW programme



※ JSSC OPAG-EPAG: Joint Scientific Steering Committee of the Open Programme Area Group on Environmental Pollutions and Atmospheric Chemistry
 ※ GURME: Urban Research and Meteorology Experiment
 ※ QA/SACs: Quality Assurance / Science Activity Centers

WMO/GAW Central Facilities on Greenhouse Gases

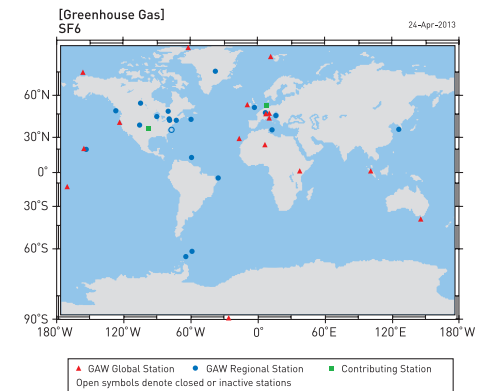
(April, 2013)

Variable	Quality Assurance / Science Activity Center	Central Calibration Laboratory	World Calibration Center (Regional Calibration Center)	World Data Center
Carbon dioxide	JMA	NOAA/ESRL	NOAA/ESRL (Round Robin) Empa (Audit)	JMA
Methane	Empa (Americas, Europe/Africa) JMA (Asia, South-West Pacific)	NOAA/ESRL	Empa (Americas, Europe/Africa) JMA (Asia, South-West Pacific)	JMA
Nitrous oxide	UBA	NOAA/ESRL	IMK-IFU	/
CFCs HCFCs HFCs	/	/	/	JMA
Sulfur hexafluoride	/	NOAA/ESRL (since 2010)	Korea Meteorological Administration (since 2012)	JMA

※ JMA: Japan Meteorological Agency, Japan
 ※ NOAA/ESRL: National Oceanic and Atmospheric Administration / Earth System Research Laboratory, USA
 ※ Empa: Swiss Federal Laboratories for Materials Science and Technology, Switzerland
 ※ UBA: German Environmental Protection Agency, Germany
 ※ IMK-IFU: Institute of Meteorology and Climate Research, Karlsruhe Institute of Technology (KIT), Germany

Global Observation of Sulphur Hexafluoride

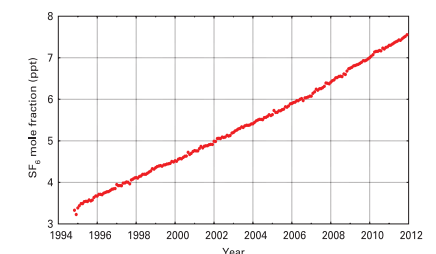
- Atmospheric sulphur hexafluoride (SF₆) has been steadily increasing since the late 20th century. As more use of SF₆ is expected from a variety of industries, the long-term observation becomes more important to monitor the variation of SF₆ concentration in the atmosphere.



SF₆ observation sites (total 39 stations)
 Global station (16), regional stations (21), and contributing stations (2)

- Sulfur Hexafluoride (SF₆): SF₆ is one of the six main greenhouse gases covered by the Kyoto Protocol. The concentration of atmospheric SF₆ is much smaller than carbon dioxide, which is the most important contributor to the greenhouse effect of the earth, but radiative forcing of SF₆ is much larger than carbon dioxide because of its long lifetime of more than thousands of years in the atmosphere. This material is exhausted only from an anthropogenic sources, such as metal production, electrical equipment, and manufacture of semiconductors/electronics. In the 1970s, global concentration of atmospheric SF₆ was approximately 0.3 ppt, but it reached 7.5 ppt in 2012 (Refer to the figure below).

※ ppt: part per trillion



Variation of SF₆ concentration in the atmosphere
 ※ Reference: WMO Greenhouse Gas Bulletin (WMO, 2012)