



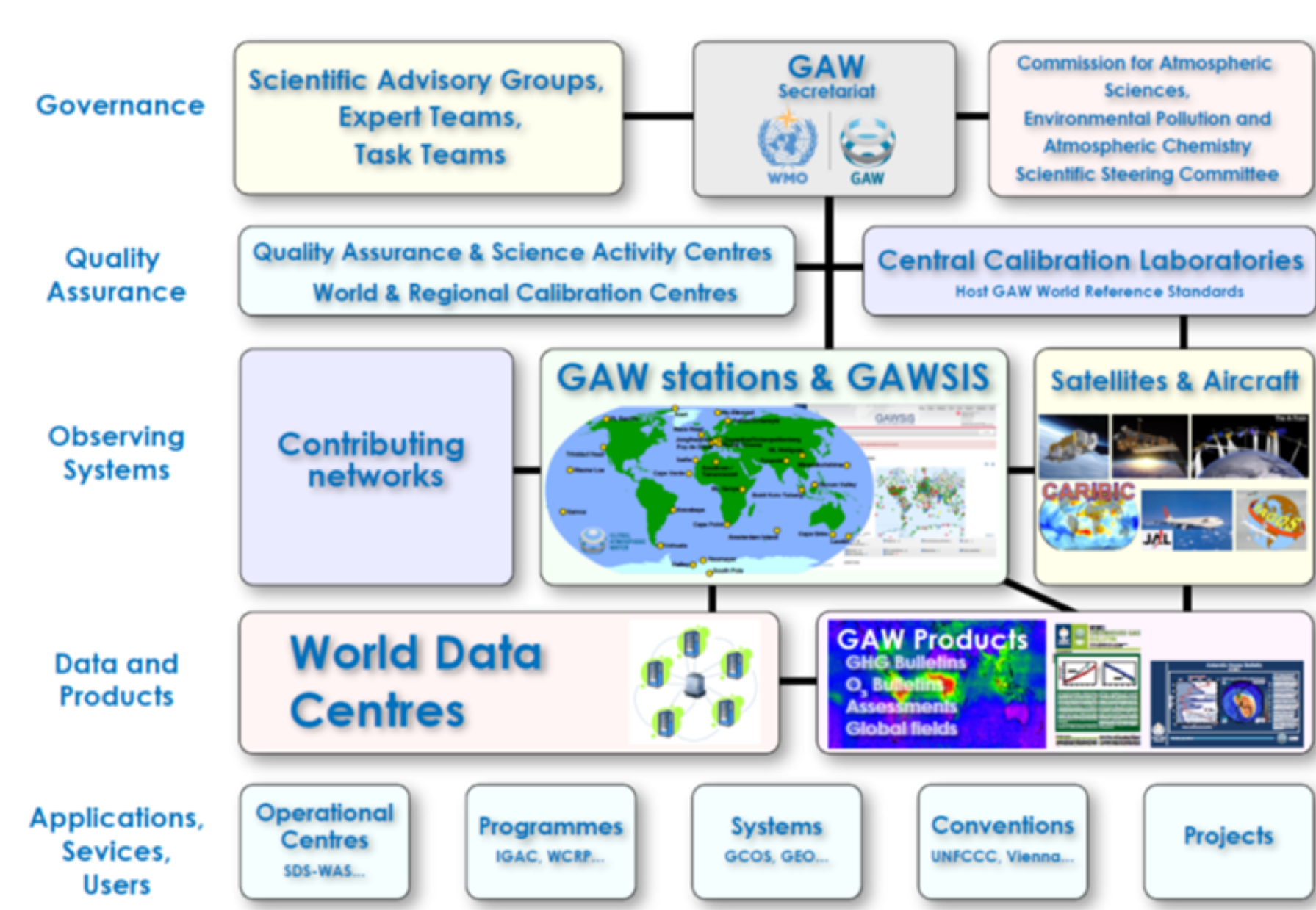
Global Atmosphere Watch Programme: role of the national programmes in supporting the global value chain



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The **Global Atmosphere Watch (GAW) Programme** of the World Meteorological Organization (WMO) is the long-term international global research programme that coordinates observations and analysis of atmospheric composition changes. The GAW Programme is a collaboration of more than 100 countries and it relies fundamentally on contributions of WMO Members to help build a single coordinated global understanding of atmospheric composition and its change.

Atmosphere composition observations support multiple applications, including climate change, weather forecasting, human health, terrestrial and aquatic ecosystems service, agricultural productivity, aeronautical operations, etc



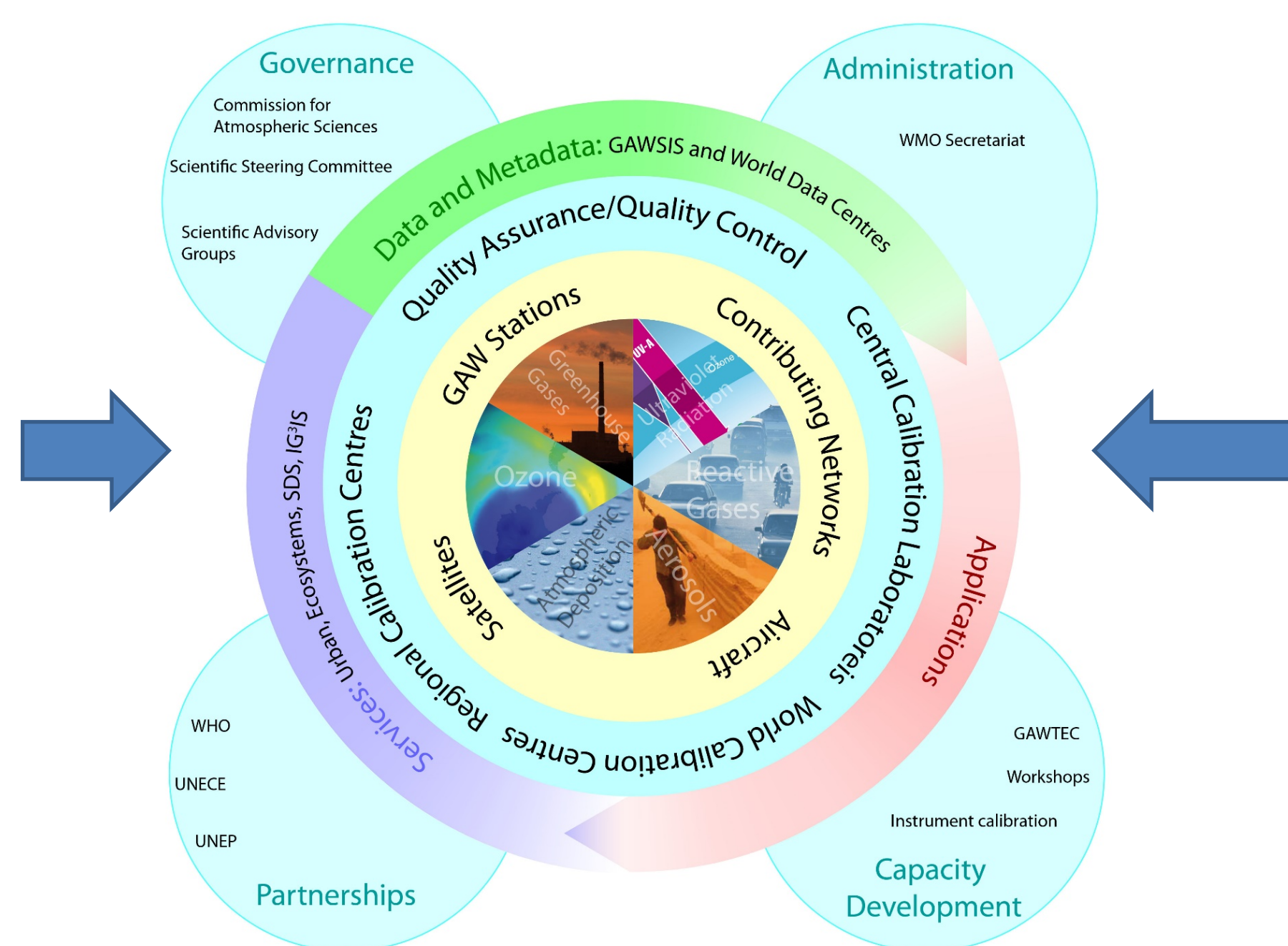
Objectives of the GAW Programme

Meeting the growing need for atmospheric composition information and related services requires:

- Increased efforts towards enhancing observing systems with broader use of GAW observations and research activities to support the development of services with high societal impact;
- Enhanced modeling efforts;
- Improved information management infrastructure;
- Stronger efforts towards building collaborations, capacity and communications.

The GAW Programme includes:

- observing systems
- set of Central Facilities supporting the quality assurance system
- a data management system
- advisory groups, expert teams and a steering committee.



High-quality observations constitute the core of GAW.



GAW currently focuses on **six groups of variables** (also called focal areas):

- Greenhouse Gases
- Ozone
- Aerosol
- Selected Reactive Gases
- Total Atmospheric Deposition
- Ultraviolet (UV) Radiation

Information on GAW stations is available in the GAW Station Information System (GAW SIS)

NOAA contribution to the advanced observations

GAW observational network comprises:

- Global stations (31)
- Regional stations
- Local stations
- Mobile platform
- Contributing networks (10)

Comprehensive measurement programme includes:

- Aerosols (mass concentration, absorption and scattering in several size fractions)
- Greenhouse gases (flask sampling and continuous measurements)
- Total ozone (Dobson)
- Reactive gases (tropospheric O₃ and VOCs)
- Radiation

GAW Global stations operated by NOAA:

- Barrow
- Trinidad Head
- Mauna Loa
- American Samoa
- South Pole



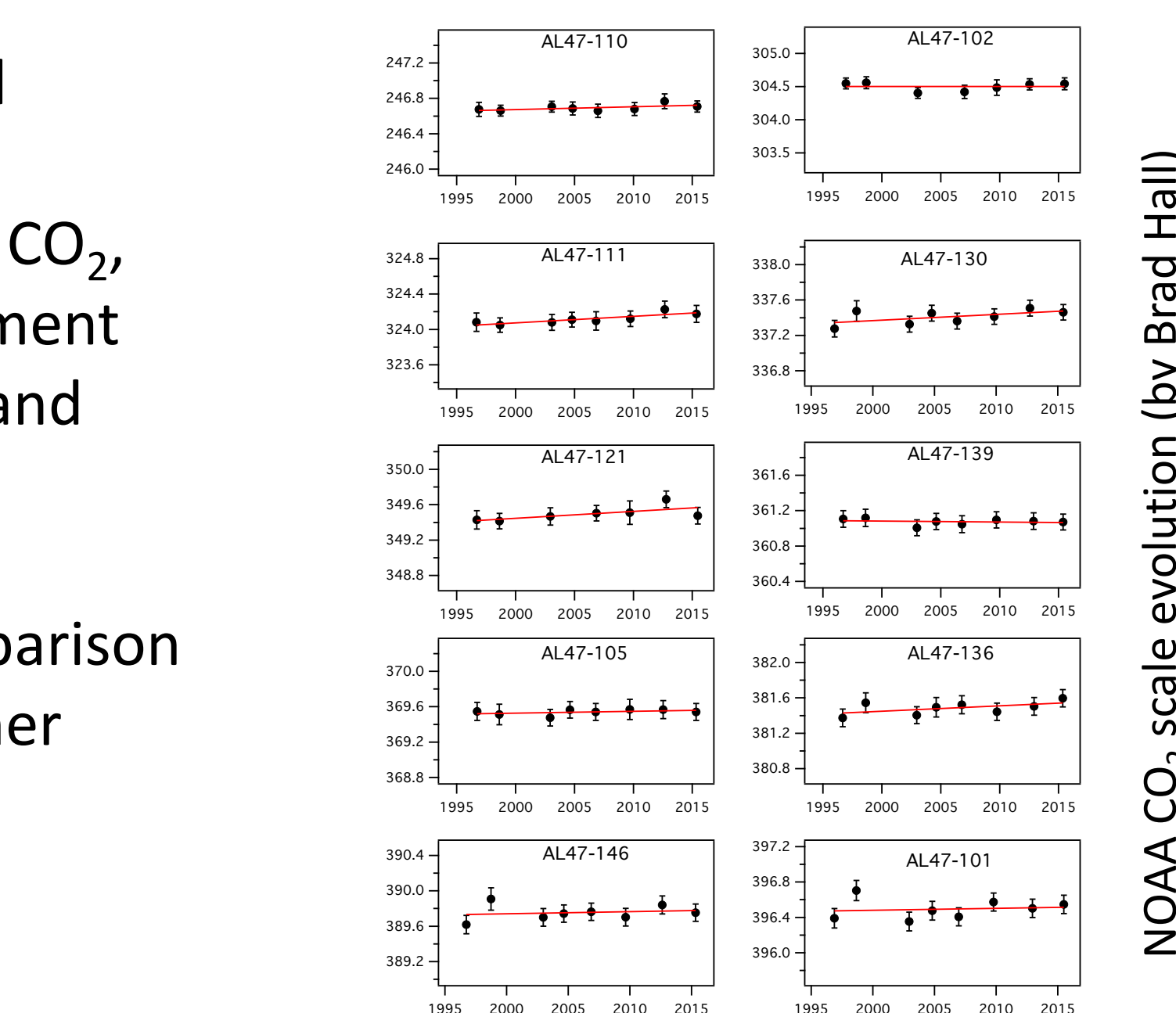
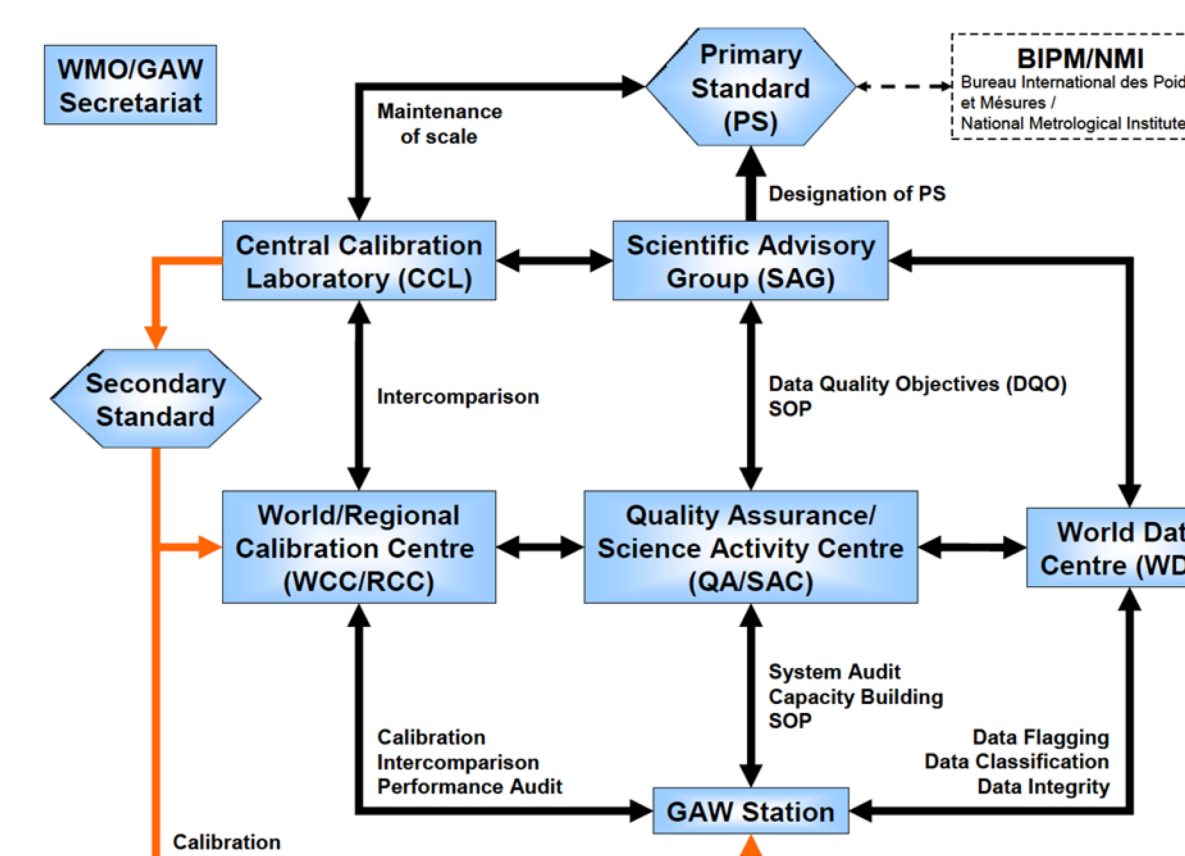
"GAW Global stations are the flagship of the programme and represent locations with both a comprehensive set of measurements and a large observational footprint. Observational programmes at these stations includes a broad spectrum of GAW parameters measured following GAW Quality Assurance/Quality Control (QA/QC) protocols. These stations perform extensive research on atmospheric composition change with an extended set of measurements. GAW Global stations serve as the centres of excellence, they host international research campaigns and actively participate in capacity development within GAW through the stations twinning initiatives. GAW Global stations have an excellent track record of data submissions in the GAW Data Centres and actively participate in NRT data exchange initiatives." (from GAW IP)

NOAA contribution to Quality Assurance system

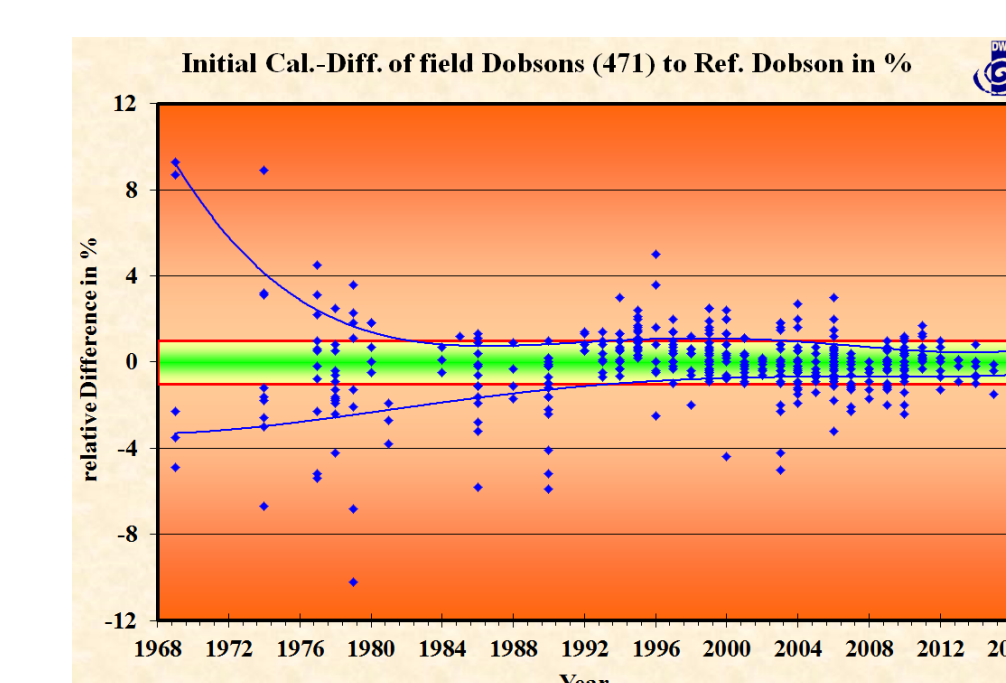
NOAA supports the following Central Facilities within GAW:

- Central Calibration Laboratory for CO₂, CH₄, CO, N₂O, SF₆, Dobson instrument
- World Calibration Centre for CO₂ and Dobson instrument

NOAA supports organization of comparison campaigns and operations of the other Central Facilities in GAW



NOAA CO₂ scale evolution (by Brad Hall)

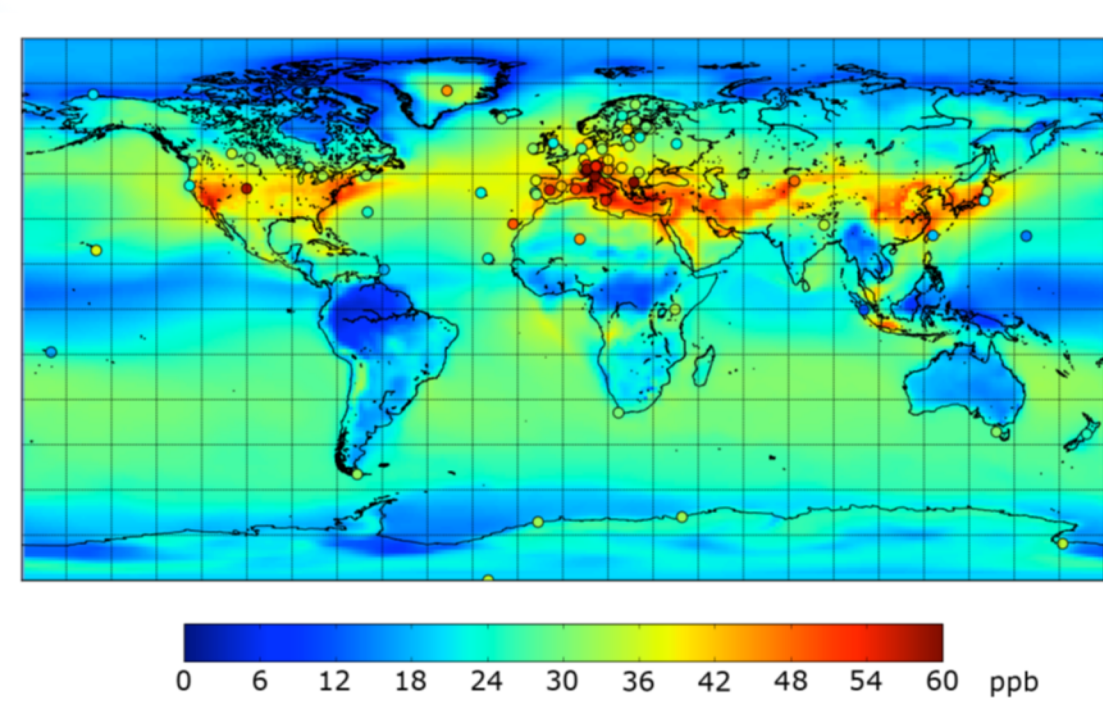
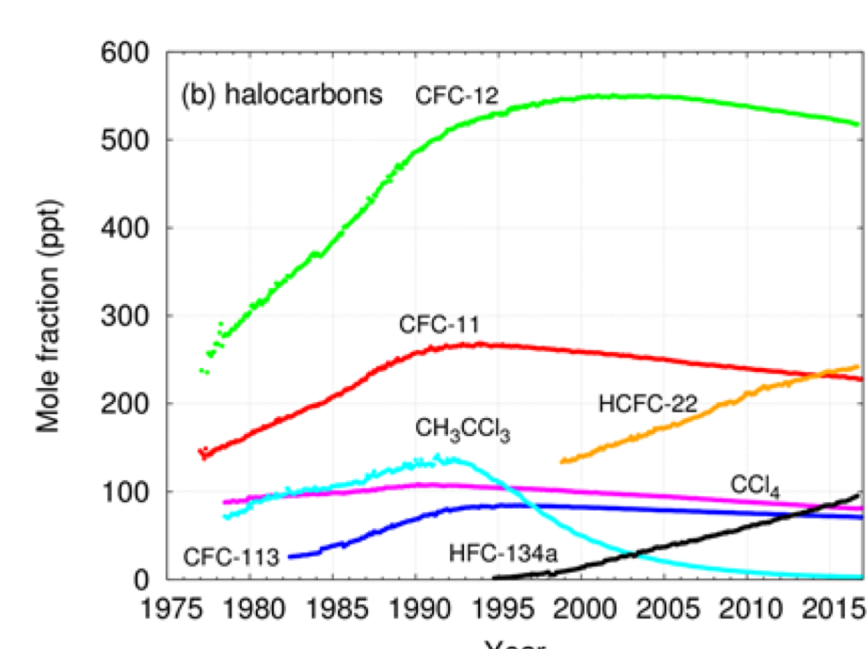
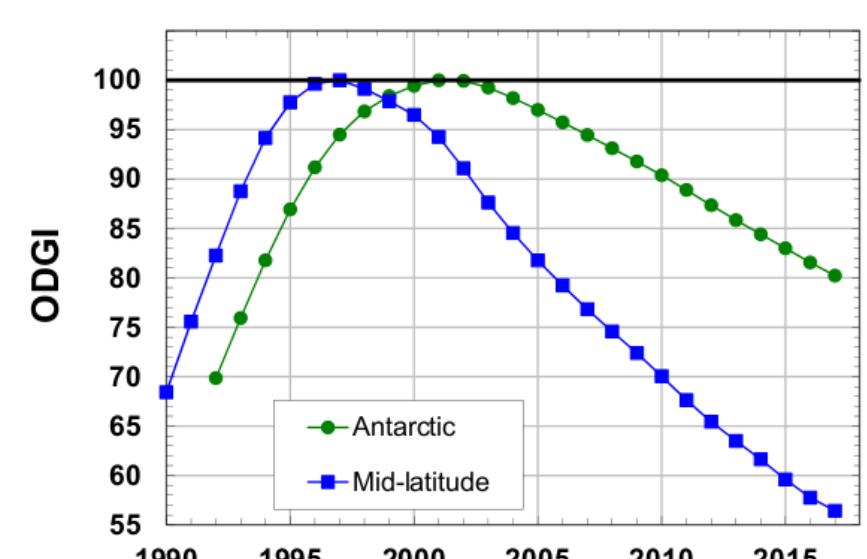
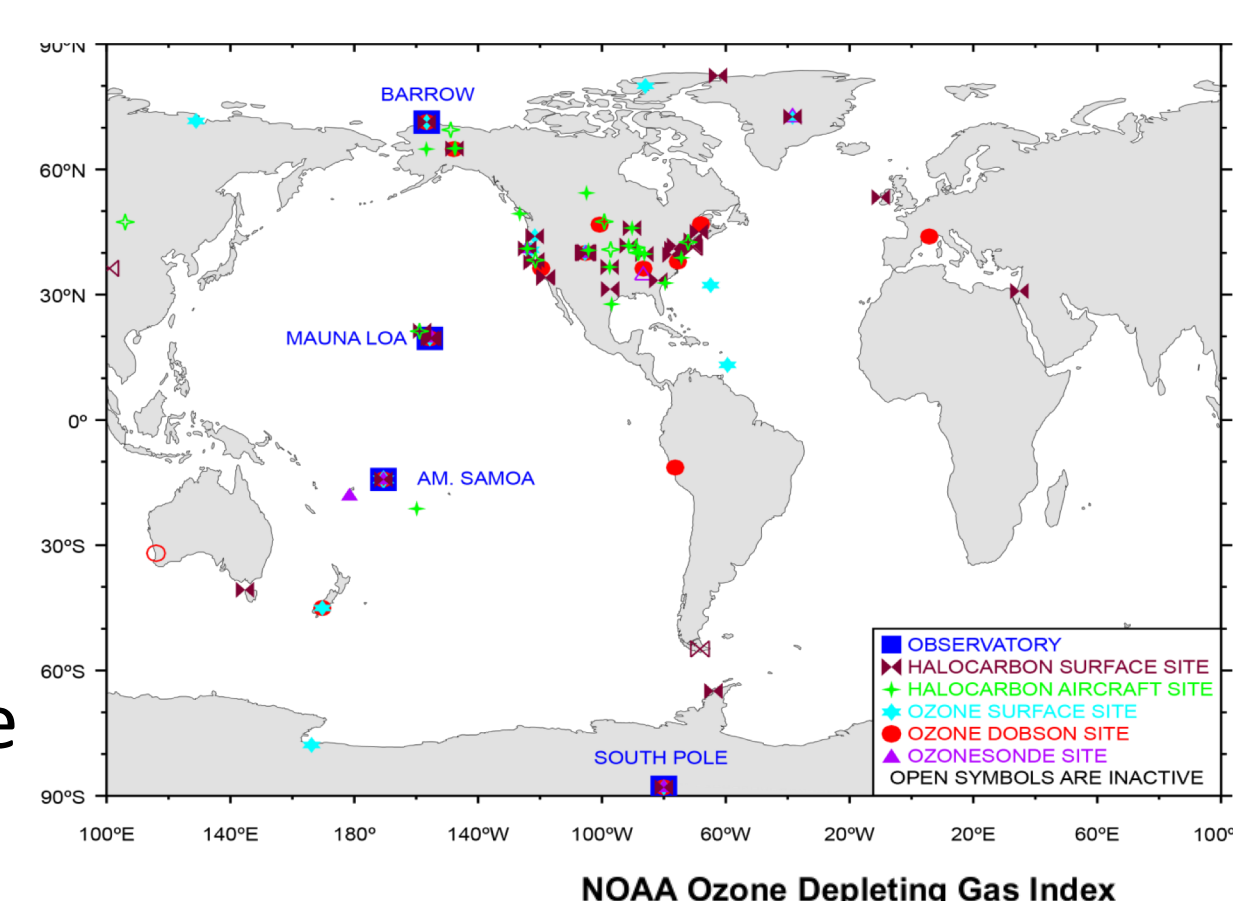


Improved network compatibility

NOAA contribution to ozone research

GMD research contribute to the following global questions:

- Levels of the ozone depleting substances in the atmosphere (contribution to the GHG Bulletin)
- Rate of the stratospheric ozone recovery (ozone depleting gas index and total ozone observations)
- Ozone recovery and changes in atmospheric dynamics (Brewer-Dobson circulation)
- Changes in oxidative capacity of the atmosphere



Measured by the GAW network stations superimposed on model simulated ozone concentrations from the MACC (Monitoring Atmospheric Composition and Climate) reanalysis. (Figure from GAW report No. 209, 2013).

NOAA contribution to greenhouse gas research

- Fifty-one WMO members countries contribute CO₂ and other GHG data to the GAW WDCGG. Approximately 46% of the measurement records submitted to WDCGG are were obtained at sites of the NOAA ESRL cooperative air-sampling network (recognized as GCOS reference networks).
- Harmonized data products (ObsPack)
- Development of the tools for the global and regional flux estimate
- Calculation of radiative forcing of greenhouse gases
- Contribution to the global capacity development (e.g. Brazil, China)

