# The Global Atmosphere Watch Programme

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#### **WMO OMM**

World Meteorological Organization
Organisation météorologique mondiale

#### Global Atmosphere Watch Programme

Provides international leadership in research and capacity development in atmospheric composition observations and analysis through:

- maintaining and applying long-term systematic observations of the chemical composition and related physical characteristics of the atmosphere,
- emphasizing quality assurance and quality control,
- delivering integrated products and services related to atmospheric composition of relevance to society.

GAW builds on partnerships involving contributors from **100** countries (*including many contributions from research community*)





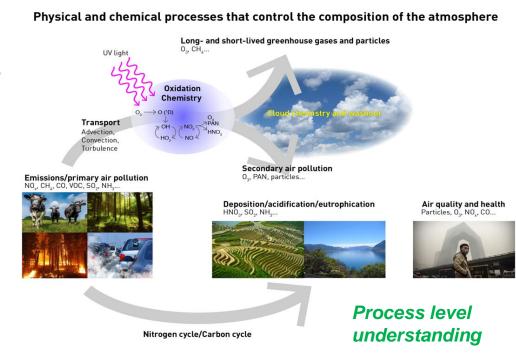






#### GAW Implementation Plan (2016-2023)

IP builds upon the premise that atmospheric composition matters - to climate, weather forecasting, human health, terrestrial and aquatic ecosystems, agricultural productivity, aeronautical operations, renewable energy production, and more.

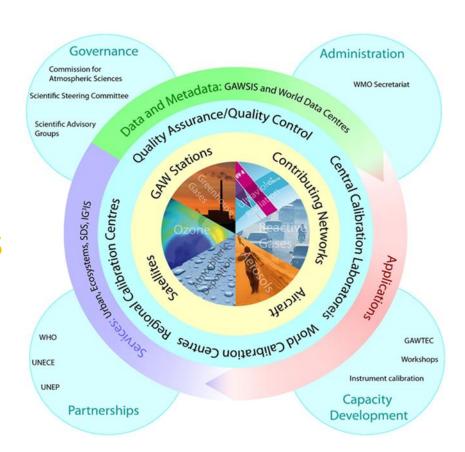


The vision for the next decade of GAW is to grow the international network of high-quality atmospheric observations across local to global scales to drive high quality and impact science while co-producing a new generation of research enabled products and services. (\$4\$)



#### Elements integrated in GAW

- Observations
- Quality assurance
- Data management
- Modeling and analysis
- Joint research
- Capacity building
- Outreach and communications



Promote a "value chain" from observations to services



# Examples of applications and service development in GAW

- Support of international environmental conventions since 1970
- Support of the services for ecosystem
- Support of health services

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- Support of transport security: volcanic ash forecasting
- Food security: atmospheric composition and agriculture

Development of the new services is driven by the CLEAR USER community







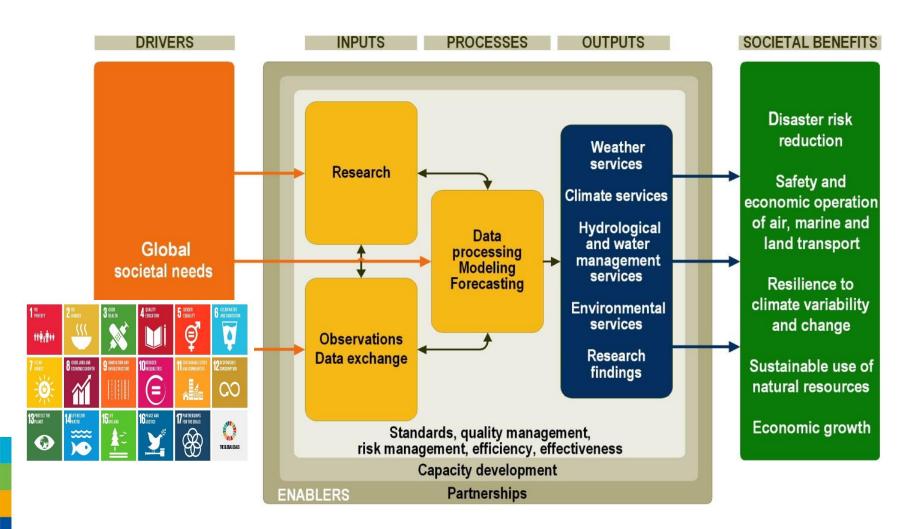
# Cross-cutting thematic projects to develop new services :

- •Integrated Global Greenhouse Gas Information System - IG<sup>3</sup>IS (support of climate services)
- Measurement-model fusion for total deposition (support of the ecosystem assessment and food security)
- MAP-AQ (support of the health sector)

Contribution to the integrated urban service



### Overarching Objective - Improve Prediction Capabilities via Incorporating/Integrating Composition, Weather and Climate





WMO Initiative – Seamless Prediction *Across all Relevant Temporal and Spatial Scales* (**GDPFS**)

### **Collaboration Spaces**

- Enhancing observing systems (ECV, )
  - GHG fluxes (Integrated Global Greenhouse Gas Information System (IG³IS)
  - SLCPs (aerosols, ozone, ..)
- Enhancing modelling capabilities (seamless/integrated) (including assimilation, verification, aerosol/radiation/microphysics, S2S, reanalysis, etc.) (Africa projects....)
- Strengthening applications of modern data science
- Capacity building (including young scientists)
- •Next steps ..... Continue active engagement



## **Collaboration Space**



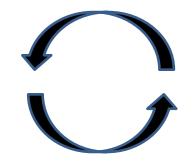
## Atmospheric Composition/Chemistry is being more Integrated with Weather and Climate Predictions

#### (Earth System Models) Towards Seamless Prediction Climate models 1975 1985 1990 1995 2005 2010-**Atmosphere Atmosphere Atmosphere Atmosphere Atmosphere** Atmosphere Land surface Land surface Land surface Land surface Land surface Ocean & sea-ice Ocean & sea-ice Ocean & sea-ice Ocean & sea-ice Seasonal prediction models Sulphate Sulphate Sulphate aerosol aerosol aerosol DA Non-sulphate Non-sulphate aerosol aerosol Carbon cycle Carbon cycle Atmospheric chemistry Atmosphere NWP models DA Land surface Atmosphere **Future direction** Atmosphere Atmosphere Ocean & sea-ice towards Environmental Land surface Land surface Sulphate **Prediction** aerosol Ocean & sea-ice Non-sulphate **ECMWF - MACC** aerosol **Met Office** Aerosols Carbon cycle Atmospheric chemistry

# GAW Program Elements: Exploring Ways to Align with New WMO Structure

#### **Services**

IG3IS Reports:
MAP-AQ GHG
MMF O3
Urban-Env



## Research Infrastructure

Observations QA/QC
Stations Calibration
Networks Data
NRT data management
exchange

#### Research

New instruments/techniques
Observing systems
Improved models
Data assimilation
Downscaling
Improved parameterizations
Emission inversion
Trends detection

Goal – working within the UN organizations and across the communities (e.g., IGAC, SPARC) to advance atmospheric chemistry research and its impacts on society.



SDS