WMO OMM

World Meteorological Organization

Working together in weather, climate and water

WMO Integrated Global Observing Systems (WIGOS) and the QA4EO

J. Lafeuille

WMO Space Programme

Outline

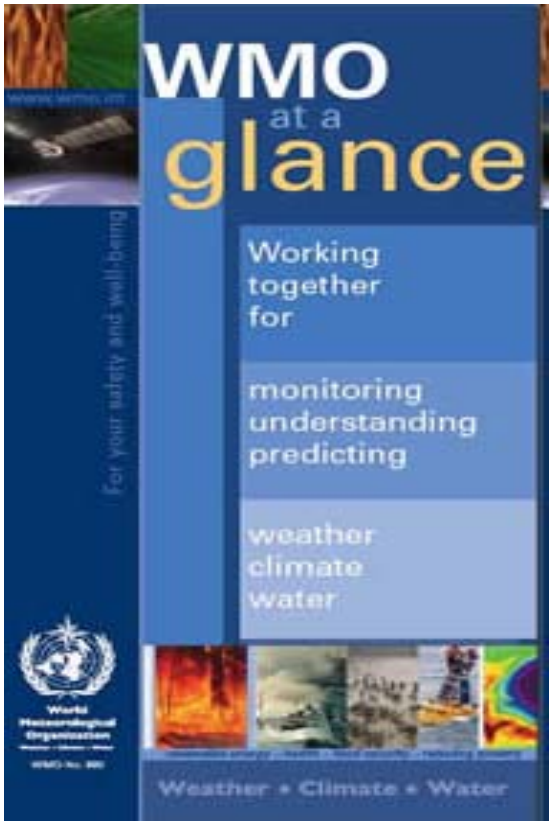
1. **WMO in brief**
2. Observing Systems
3. WMO Integrated Observing Systems
4. Relationship with QA4EO
5. Conclusions

World Meteorological Organization

WMO is the specialized agency of the United Nations for meteorology (**weather** and **climate**), operational **hydrology** and related geophysical sciences,

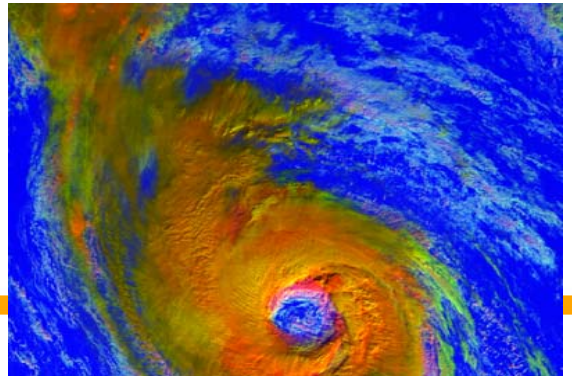
WMO has 188 Members (States and Territories)

- Fosters international cooperation
- Facilitates free and unrestricted exchange of information

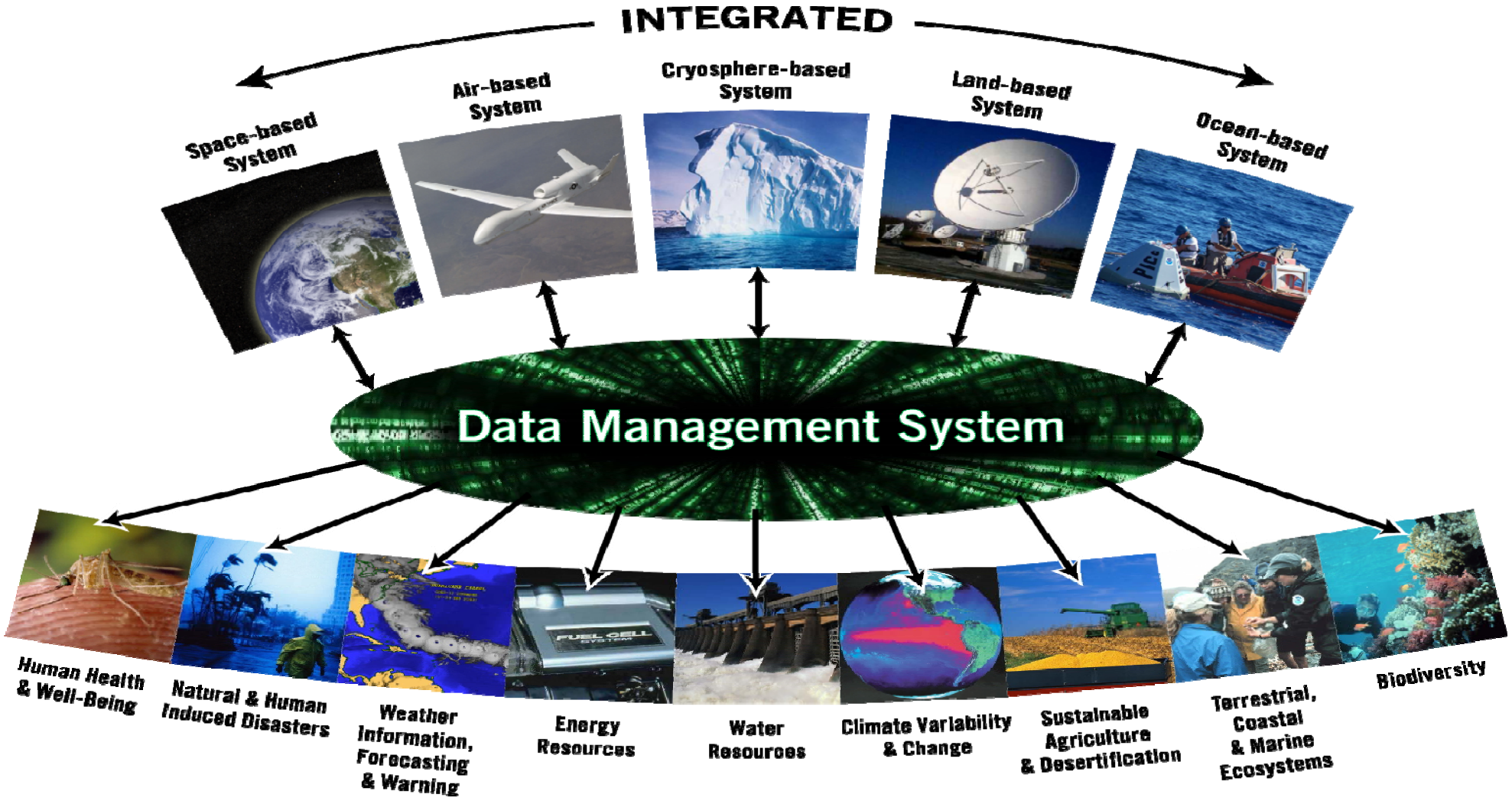


Unique contribution to sustainable development and well-being of nations

- Within WMO, National Meteorological/Hydrological Services contribute to:
  - protection of life and property against natural and man-made **disasters**,
  - **environment** protection & management, international conventions, advising governments
  - application of meteorology and hydrology to areas such as **agriculture and food security**, **water resources and flood management**, **aviation**, **shipping**, **public health**, **energy**, **public information**…

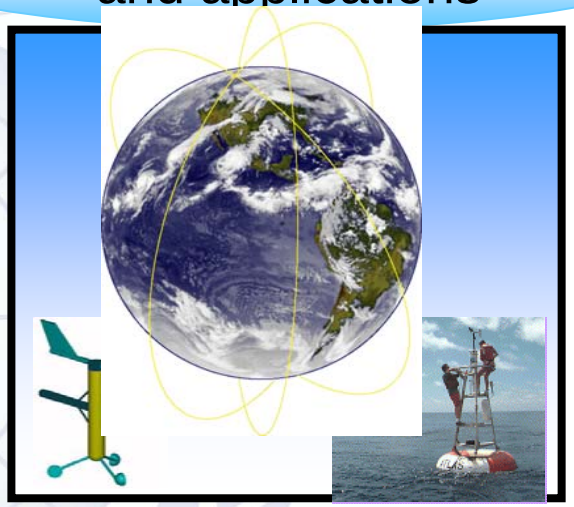


The Premise behind GEOSS



WMO Global Observing Systems serving many (if not all) GEO SBAs

WMO: Weather-Water-Climate and applications



Other observing and information systems

GEO 9 SBAs

- Weather
- Climate
- Water
- Disasters
- Agriculture
- Health
- Energy
- Biodiversity
- Ecosystems

WMO OMM

WMO establishes and coordinates global and regional networks

- Operational **observation** of meteorological, climatological, hydrological and geophysical variables,
- Operational **Data** exchange, management and standardization,
- Operational **Processing** of data to products, model outputs
- Technology transfer, training and research

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Global Observing Systems

Space-based,
surface-based remote sensing,
and in-situ measurements

WMO observing systems:

- Global Observing System (GOS)
- Global Atmospheric Watch (GAW)
- WMO Hydrological Cycle Observing System (WHYCOS)

Co-sponsored systems:

- GCOS (GRUAN),
- GOOS
- GTOS

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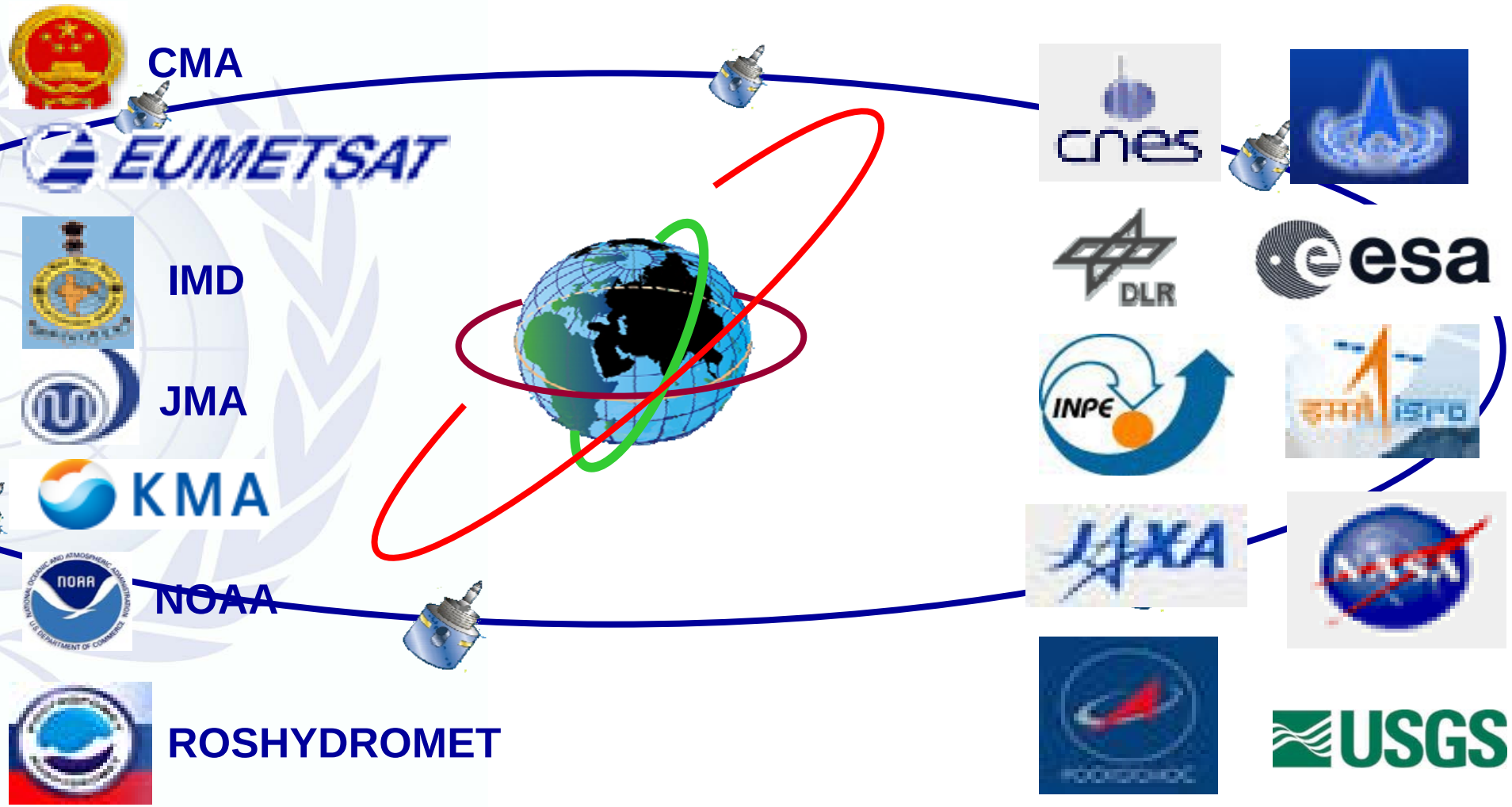
Contributions to the space-based component of the GOS



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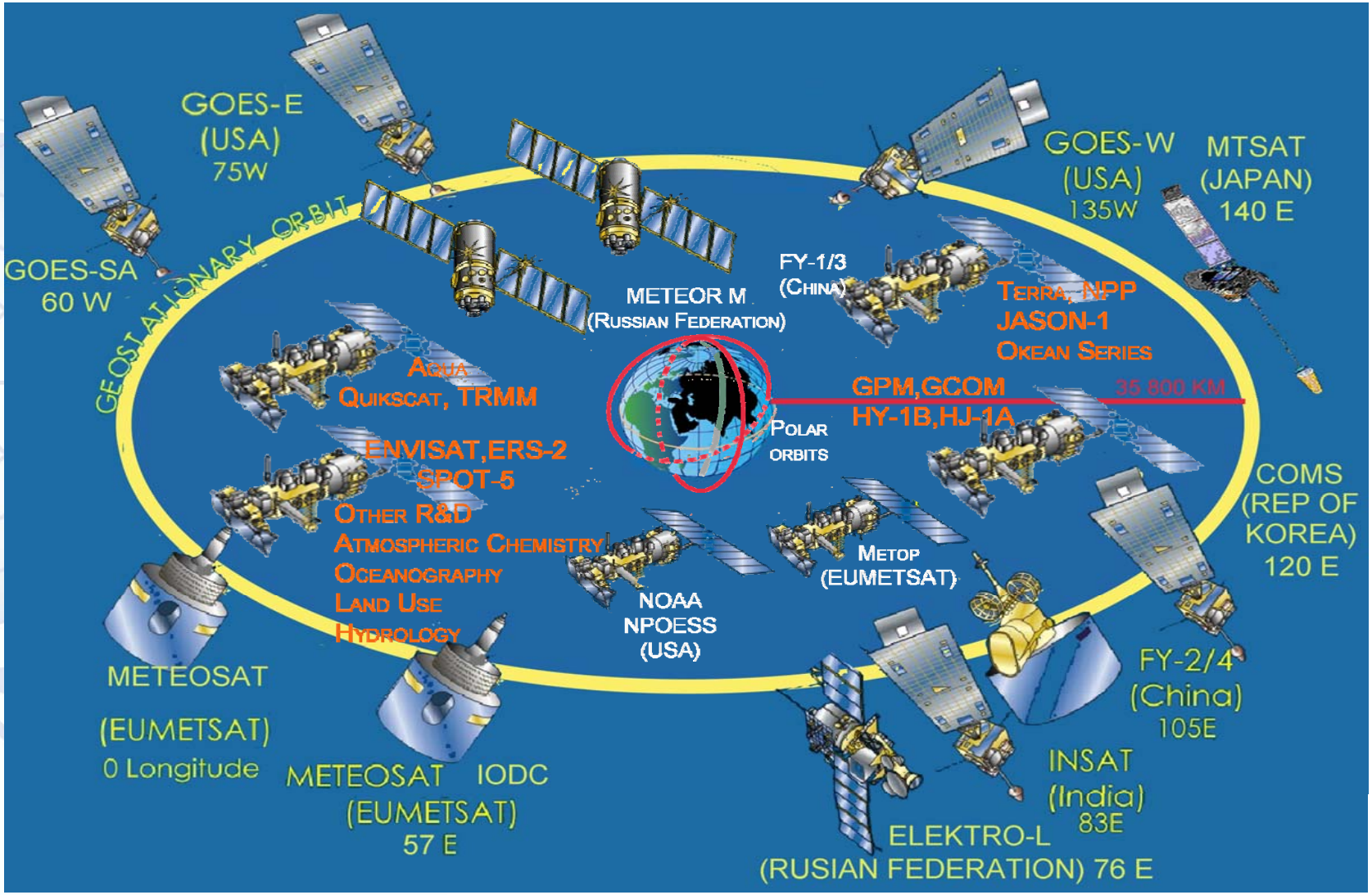
Space-based component of the Global Observing System (GOS)



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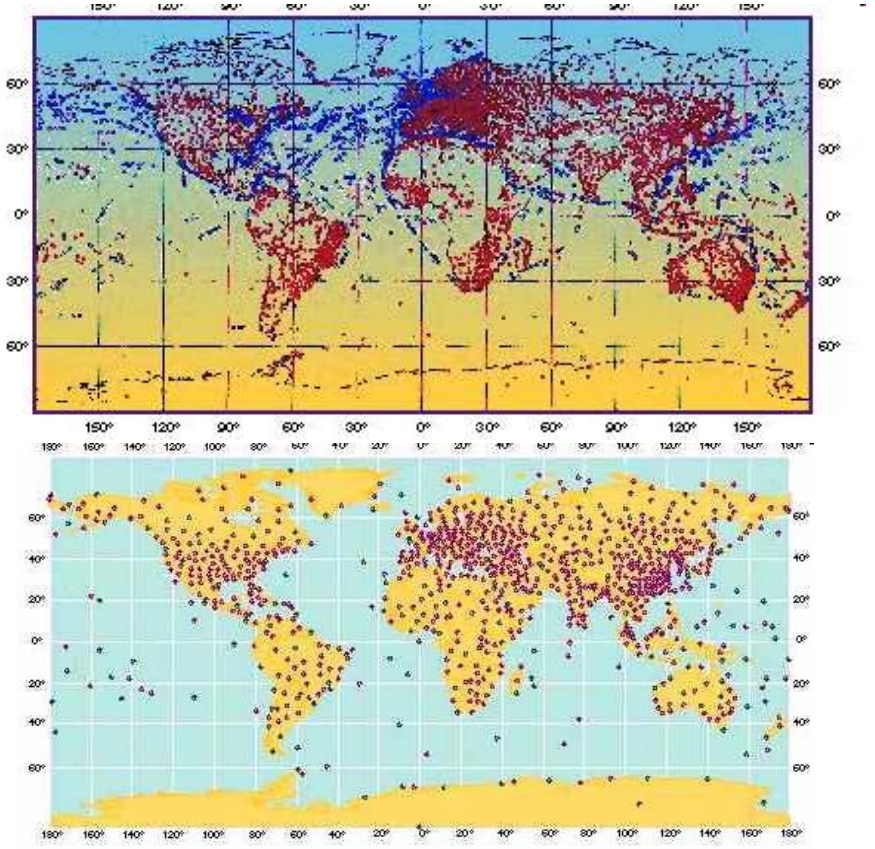
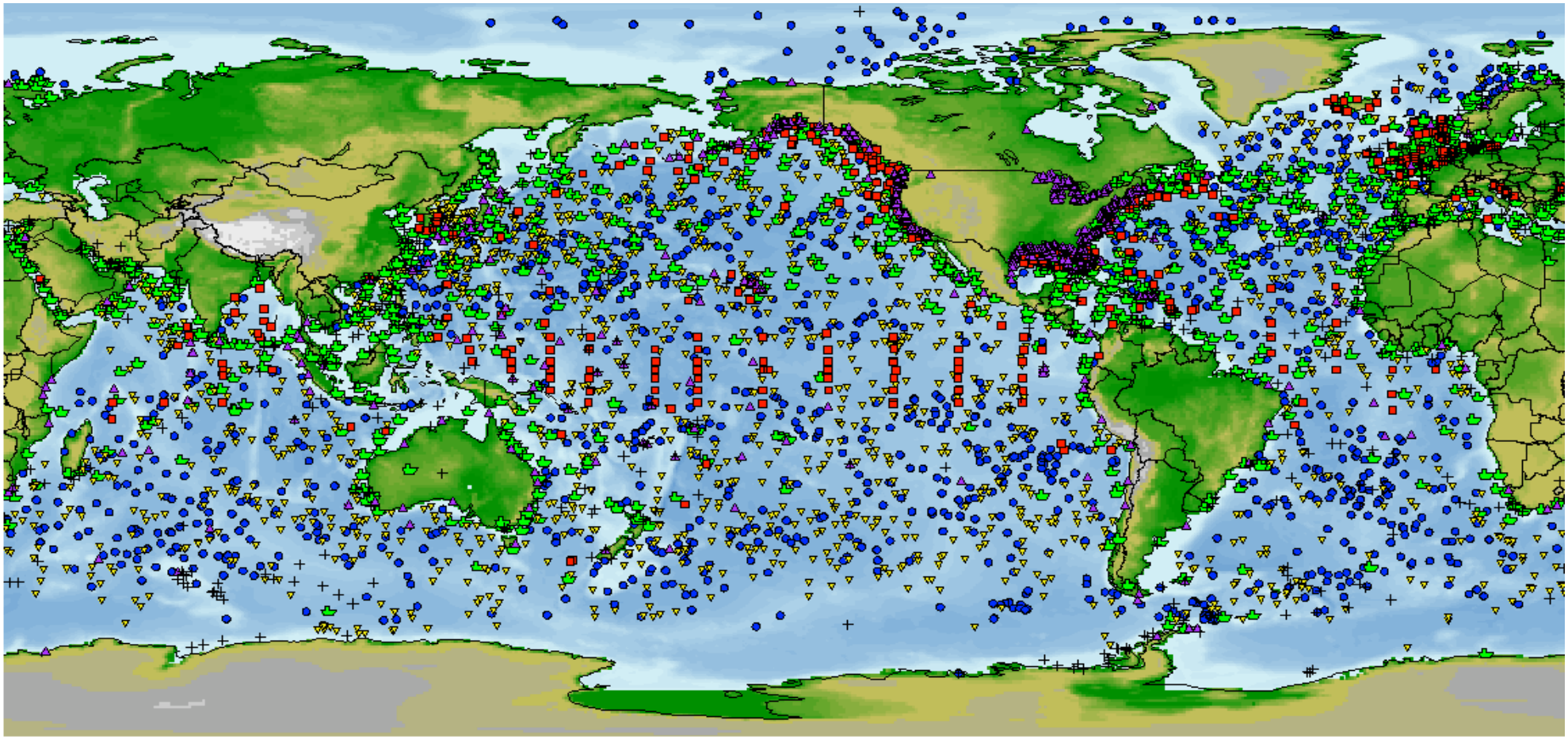
Surface-based observation components

- 11,000 surface-based stations including
  - Regional Basic Synoptic Networks (4000)
  - Regional Basic Climatological Networks (3000)
- 1300 Upper-air stations (radio-sondes)
- 3000 aircraft-based stations (AMDAR)



Initial Global Ocean Observing System for Climate
Status of the System in February : 8055 Platforms



Suppressing ship observations for most recent 48 hours

Automatic weather stations

Distribution of AWS of Guangdong Province (>700)

Shaoguan

Yangjian

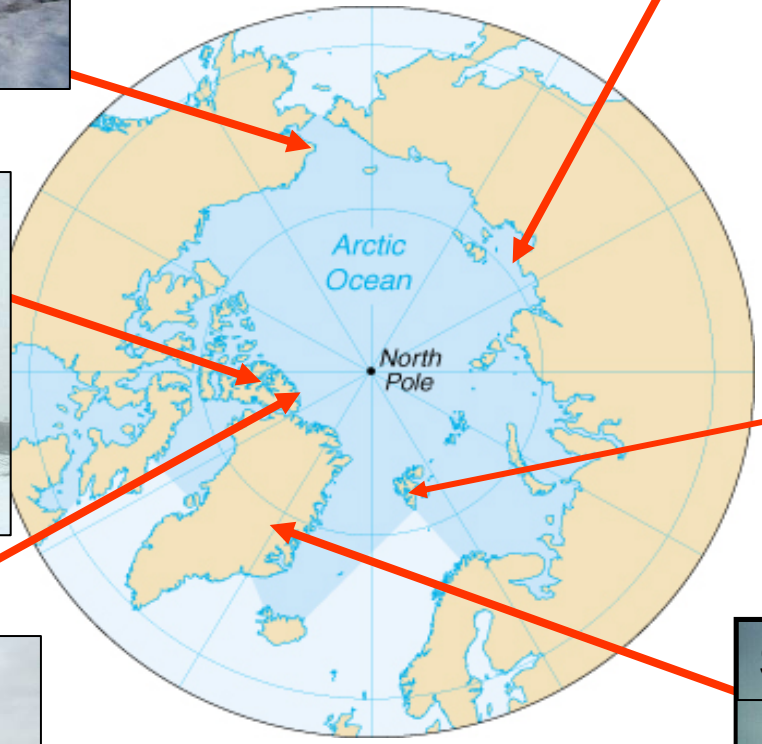
Shantou

Guangzhou

Shenzhen

Barrow, Alaska

Tiksi, Russia



Eureka, Canada

Ny-Alesund, Svalbard

Alert, Canada

Establishing Intensive Atmospheric Observatories In the Arctic is the component of NOAA/SEARCH being directed by ESRL

Summit, Greenland

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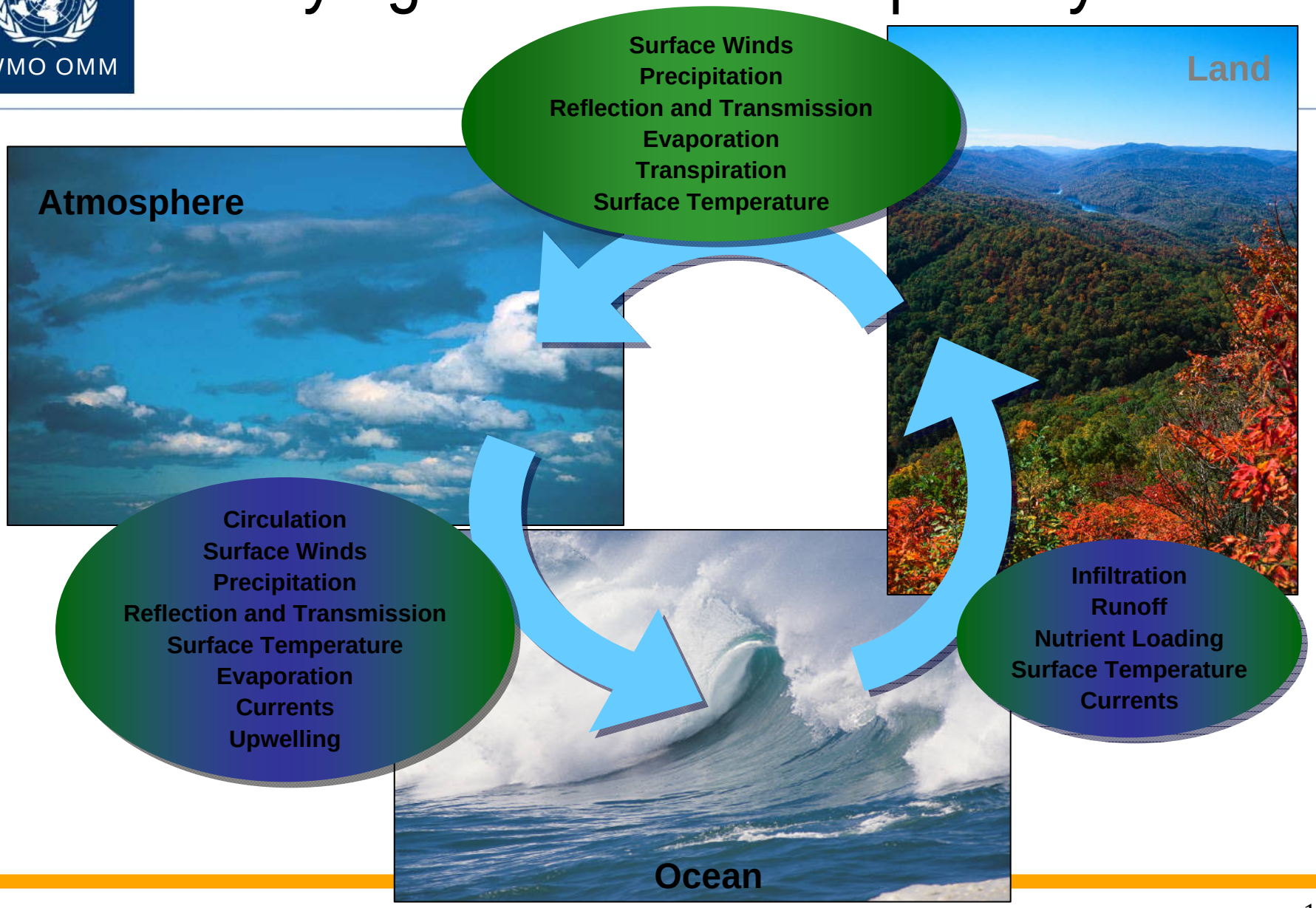
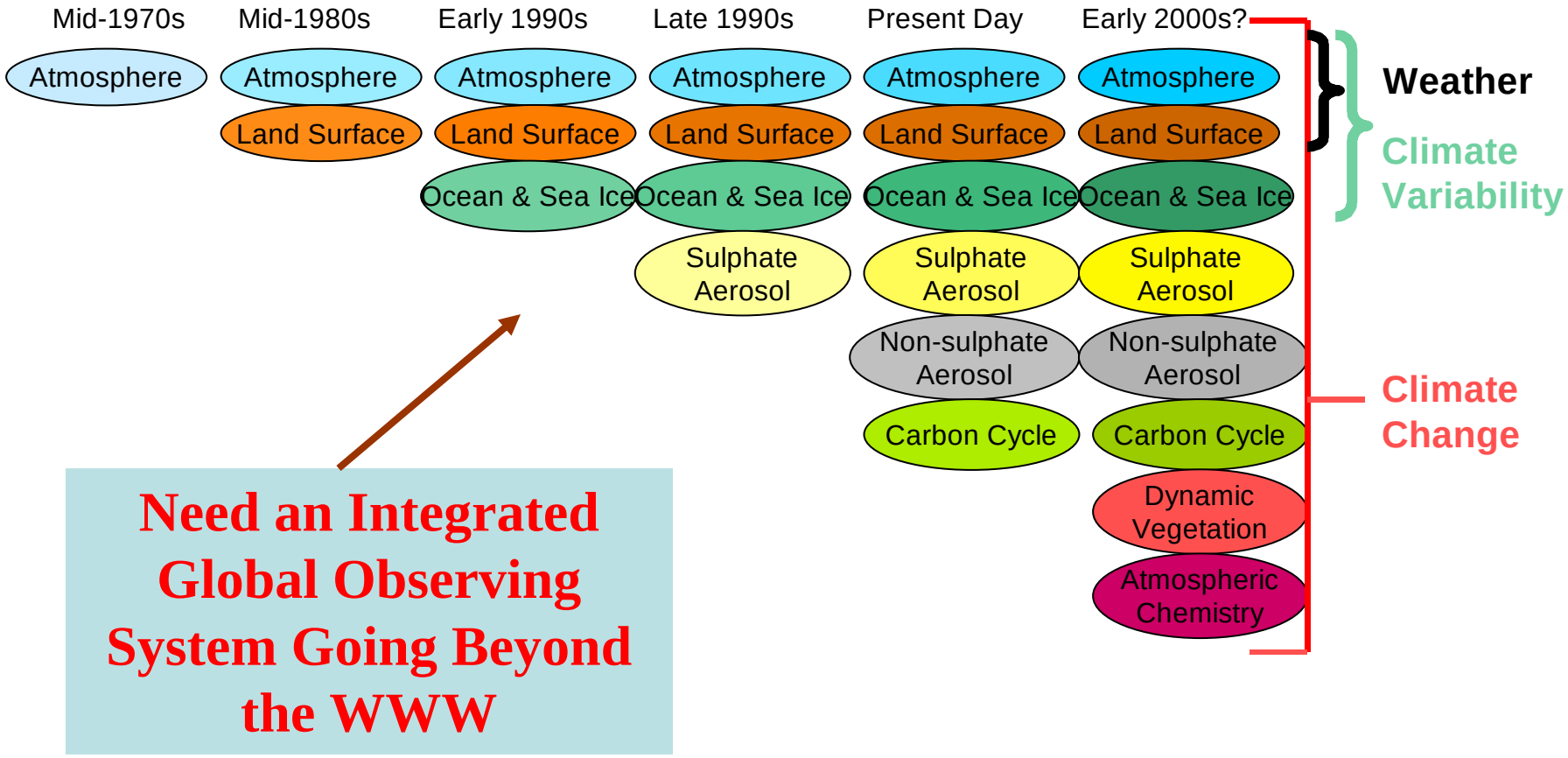
Studying Earth as a Complex System



Overview of Weather and Climate Models and the Required Observations



Need an Integrated Global Observing System Going Beyond the WWW

WMO Integrated Global Observing Systems (WIGOS)

Top level goal:

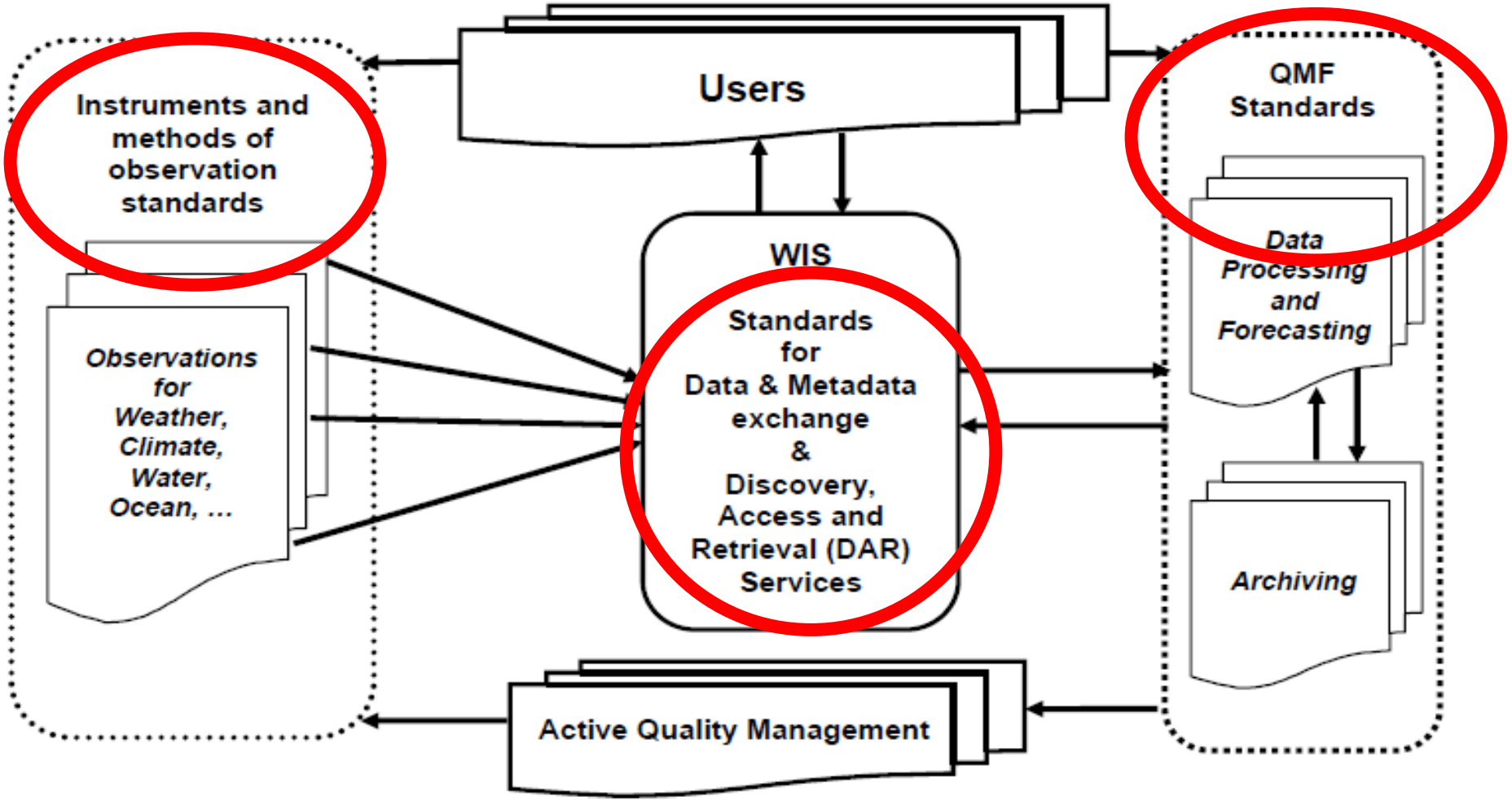
- A comprehensive observing system satisfying the evolving observing requirements of WMO Members in a cost-effective and sustained manner

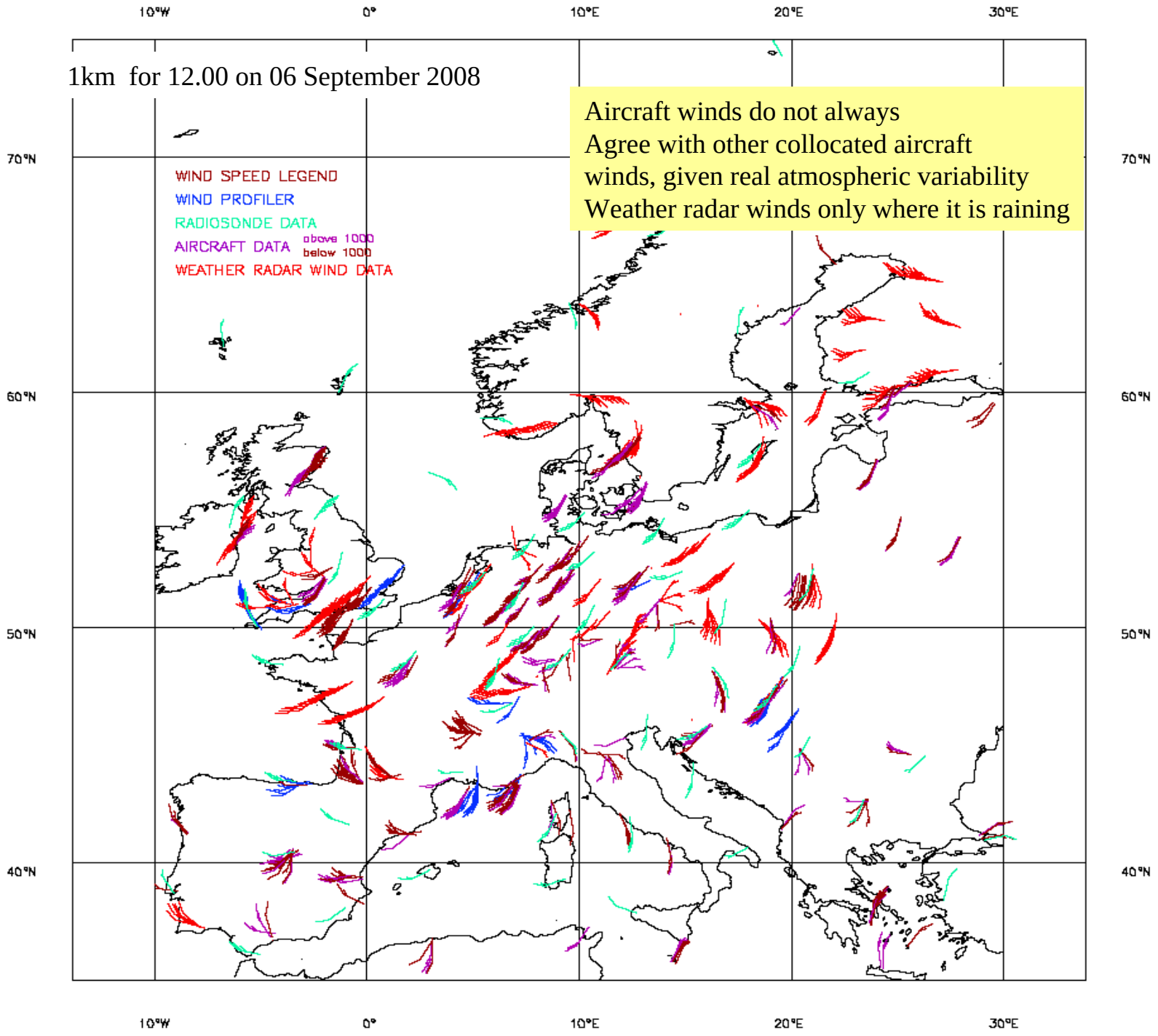
Objective : **Integration of WMO observing systems and enhanced coordination with observing systems of partner organizations**

Key requirements

- Quality management (User focus, quality assurance, traceability, documentation, capacity building, evaluation/improvement…)
- Interoperability through data sharing and standardization
- Optimization (Coordinated planning, platform opportunities, innovation..)

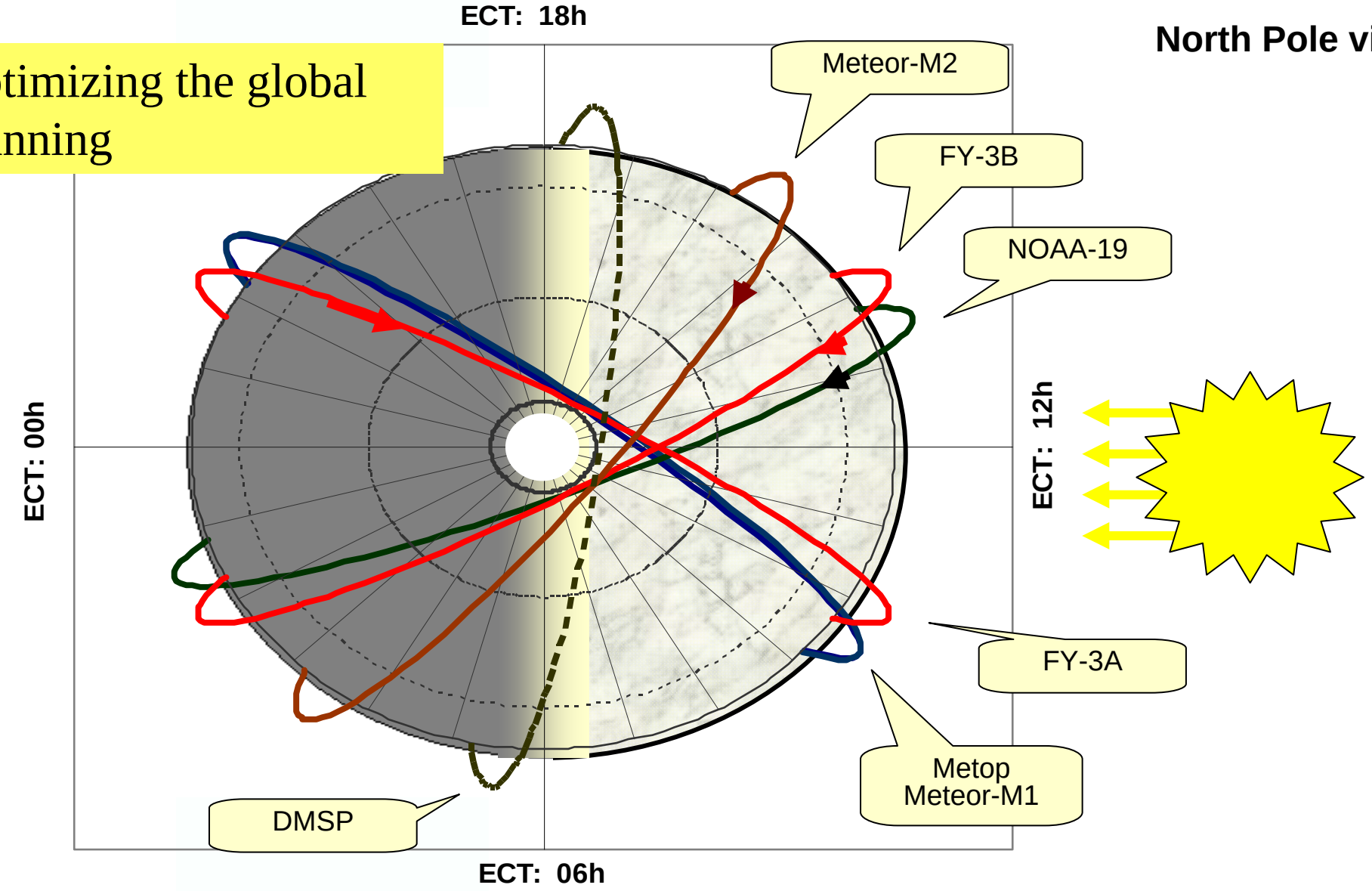
Key areas of standardization




1km for 12.00 on 06 September 2008
Aircraft winds do not always
Agree with other collocated aircraft
winds, given real atmospheric variability
Weather radar winds only where it is raining
WIND SPEED LEGEND
WIND PROFILER
RADIOSONDE DATA
AIRCRAFT DATA above 1000 below 1000
WEATHER RADAR WIND DATA
10°W
0°
10°E
20°E
30°E
70°N
60°N
50°N
40°N

Equatorial Crossing Times of planned polar orbiting missions in 2010/2011

Optimizing the global planning



Adapting to evolving requirements: The GOS evolution process

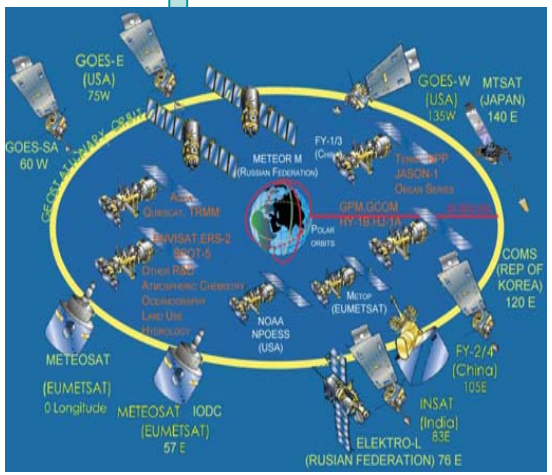
Requirements
Requirements
Requirements
Requirements

Long-term vision of the GOS

Gap analysis

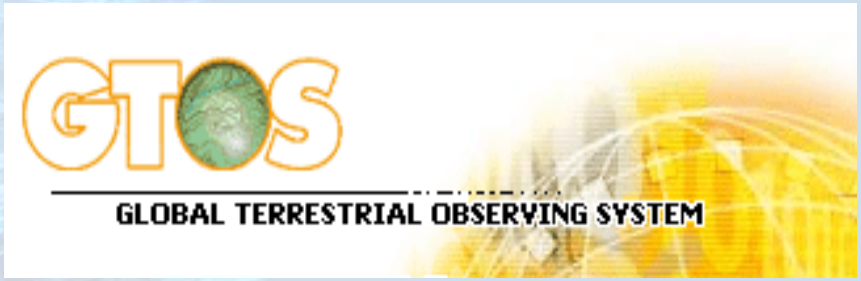
Implementation Plan

Members' Space Agencies programmes



The Co-Sponsored Observing Systems

IOC, WMO, UNEP, ICSU



FAO, WMO, UNEP, UNESCO, ICSU

WMO, IOC, UNEP, ICSU

WIGOS will build on existing networks and practices

- Rolling Review of Requirements to adapt systems to evolving needs
- Commission on Instruments and Methods of Observation (CIMO) has longstanding experience in defining standards & recommended practices
- Long experience in coordinating a globally interoperable telecom network (GTS), data representation definition and maintenance
- WIS data management standards and conventions (file naming convention, metadata profile, catalogue search)

➢ WMO standardizing body for meteorological matters (agreement with ISO)

➢ WMO Technical Regulations (*Manual on the GOS, Manual on Codes, Manual on GTS, Guide to Meteorological Instruments and Observations*)

- Other guidance documents (*Best practices for the management of the WWW operational, Guidelines of the Commission for Climatology*…)

WIGOS Implementation Process

(2007)

- 15th Congress endorsed the Integration of Observing Systems as a major objective in the new WMO Strategic Plan, together with WIS

(2008):

- WIGOS Concept of Operations (CONOPS)
- Initial WIGOS Development and Implementation Plan (WDIP)
- Start of Pilot and Demonstration Projects

(2009)

- (Draft) Comprehensive Strategy and Action Plan for WIGOS implementation

(2010)

- Finalized Strategy and Action Plan, for submission to 16th Congress

(2011-2014)

- Congress Approval and Initial implementation of WIGOS *(processes in place)*

(2014 +)

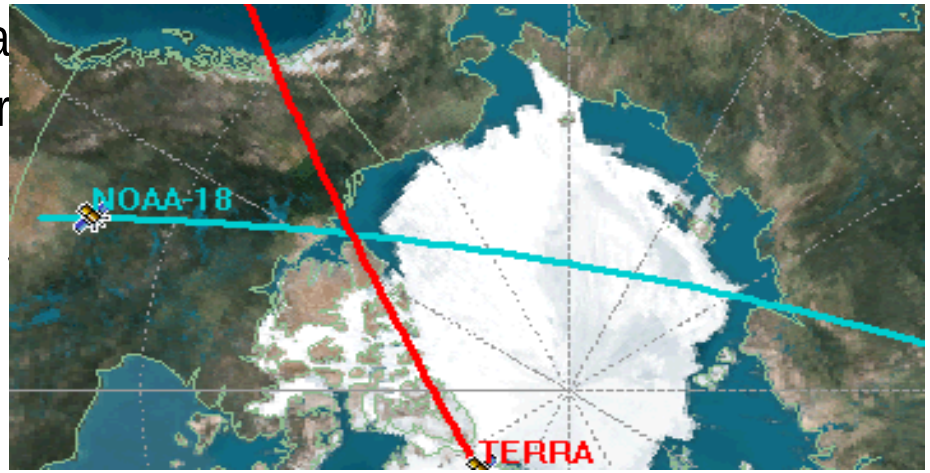
- Continuous evolution of WIGOS to meet evolving requirements

Pilot projects / demonstration projects

Demonstration projects in every WMO Region to raise awareness and identify impact

Pilot projects initiated to test the integration concept in different domains

- Dissemination of Ozone and Aerosol observations through the WIS
- Hydrological Applications Runoff Network
- Integration of AMDAR (observations aboard commercial aircrafts)
- Crosscutting role of the Instruments a
- Marine Meteorological and other appr
- GCOS Reference Upper-Air Network
- Global Space-based Inter-calibration (GSICS)



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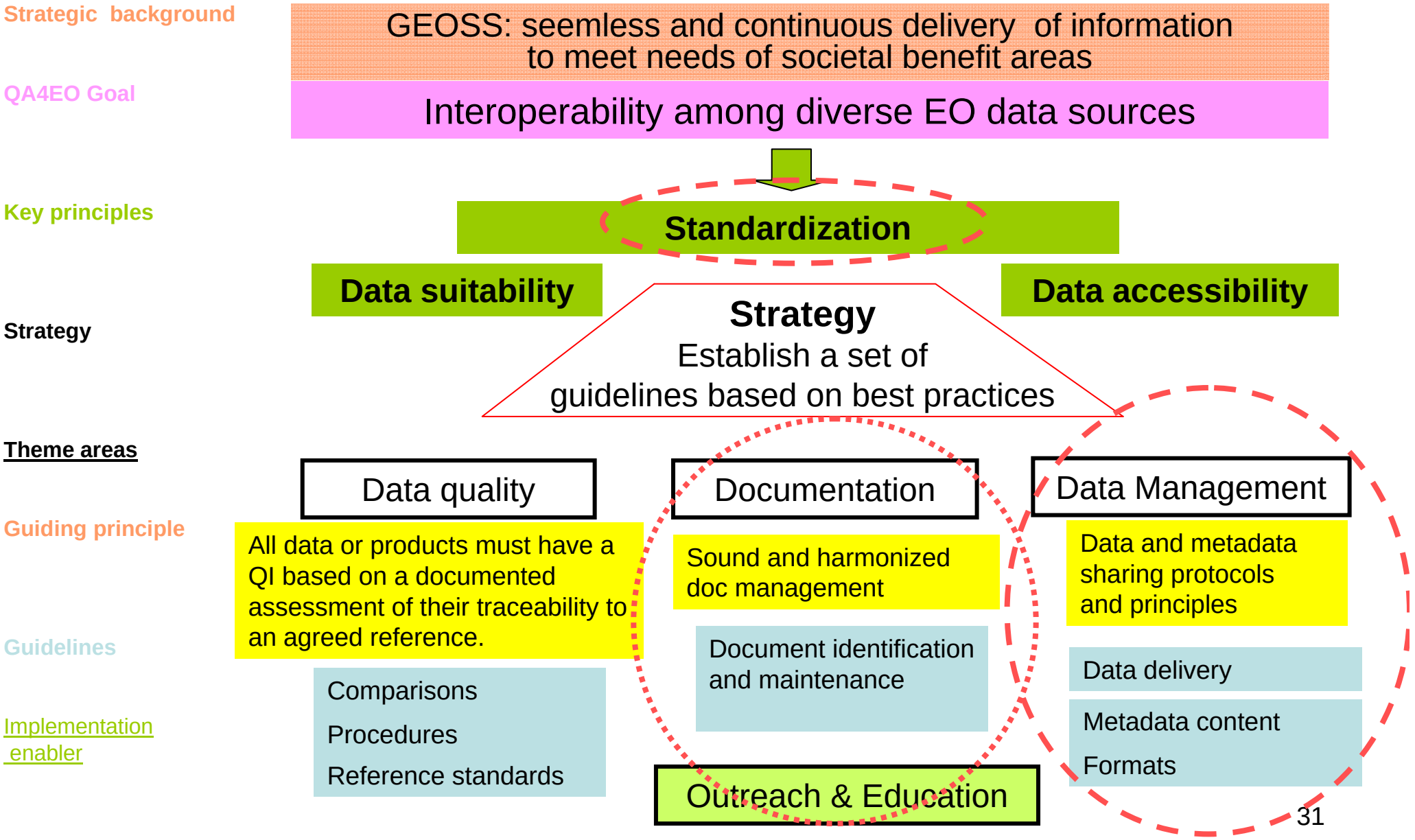
WIGOS and the QA4EO

- WMO global observing systems, WIS are components of GEOSS
- QA4EO is presented as a starting point for GEOSS Quality Assurance Strategy

➢ Convergence is being investigated between QA4EO and WMO standards and practices

Seeking convergence: QA4EO and WIGOS quality approach

Suggested amendment of QA4EO conceptual structure



Main WMO comments on QA4EO V2/V3

general points for further discussion at the workshop (1/2)

- Guiding principles of QA4EO (quality assurance, traceability, interoperability, use of reference standards, data availability, data exchange..) are excellent and in full agreement with WMO recommended practices

- Particularly relevant in the context of WIGOS and WIS

- However careful review would be needed if the QA4EO guidelines were to become mandatory provisions applicable to all GEO SBAs

Main WMO comments on QA4EO V2/V3

general points for further discussion at the workshop (2/2)

- Suggest reference to existing standards, Technical Regulations, guides and practices when available (CIMO, GOS, GTS, Codes, Climatology..)
- Avoid redundancy (within guidelines, among guidelines, with existing docs)
- Domain of application of the guidelines to be defined on case-by-case according to:
  - practicality (space-based / surface-based, network size)
  - need (taking into account existing guides or regulations)
- Clarify “status” & usage of QA4EO: guideline or requirement ?
  Intended status and usage have an impact on content, approval authority.
  (The QA4EO is approved by…QA4EO)

Conclusions

- Building on WMO's experience in global systems, WIGOS and WIS will further enhance interoperability and quality management, among WMO's and co-sponsored observing systems
- WIGOS and WIS will advance GEOSS objectives in WMO's areas of activities
- Convergence between WIGOS /WIS quality approach and QA4EO is thus encouraged when refining the QA4EO
- Expanding the scope, status, usage of QA4EO has significant impact on content, and raise a governance issue. This should be clarified to "facilitate the implementation of QA4EO".

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