Second JCOMM Marine Instrumentation Workshop for WMO Regional Association IV with focus on wave measurements from moored buoys

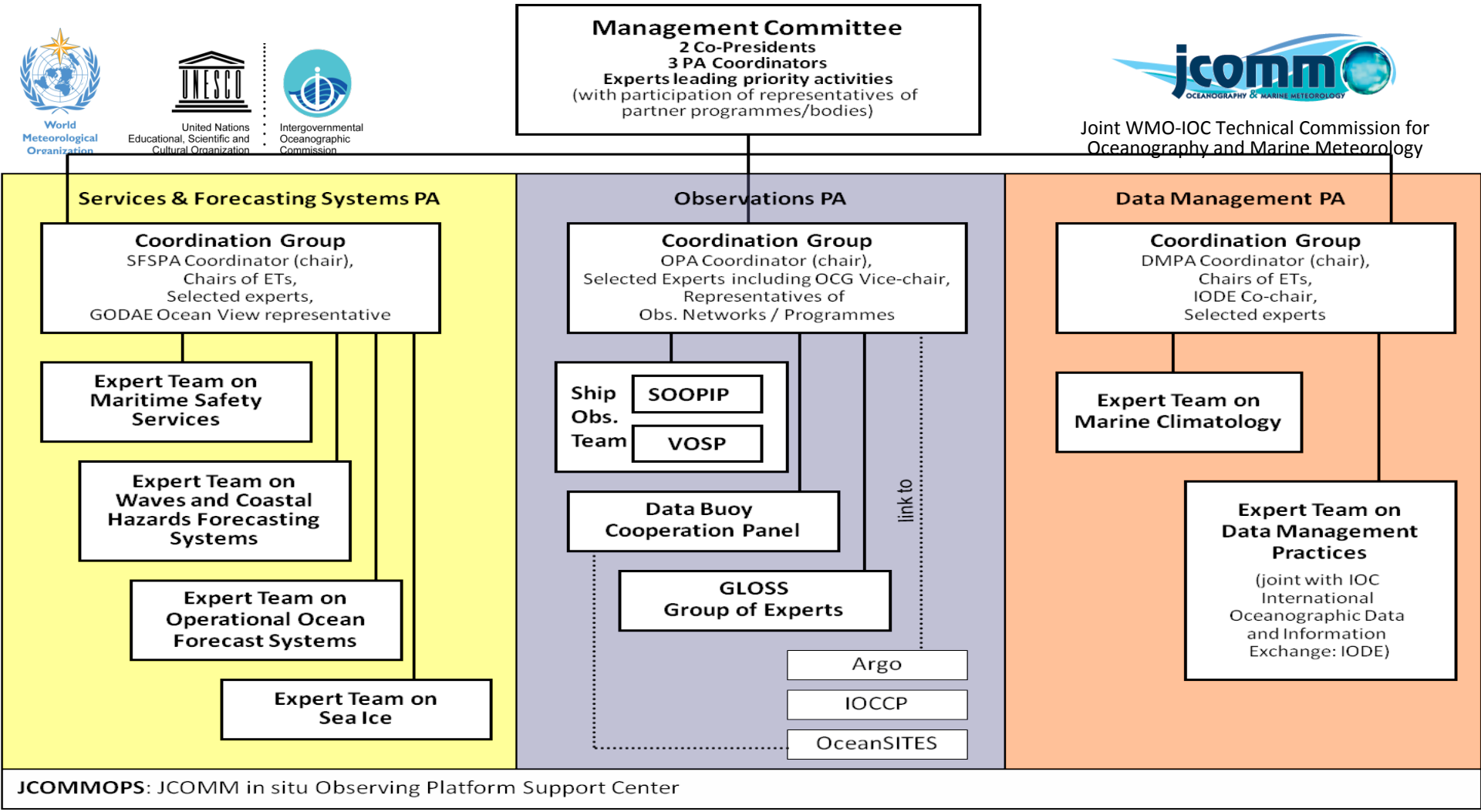
(Gulfport, Mississippi, USA, 29 Feb – 2 March 2016)

Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) contribution to the WMO Integrated Global Observing System (WIGOS)

Etienne Charpentier

(Chief, Observing Systems Division, WMO)

JCOMM Implementation through Programme Areas



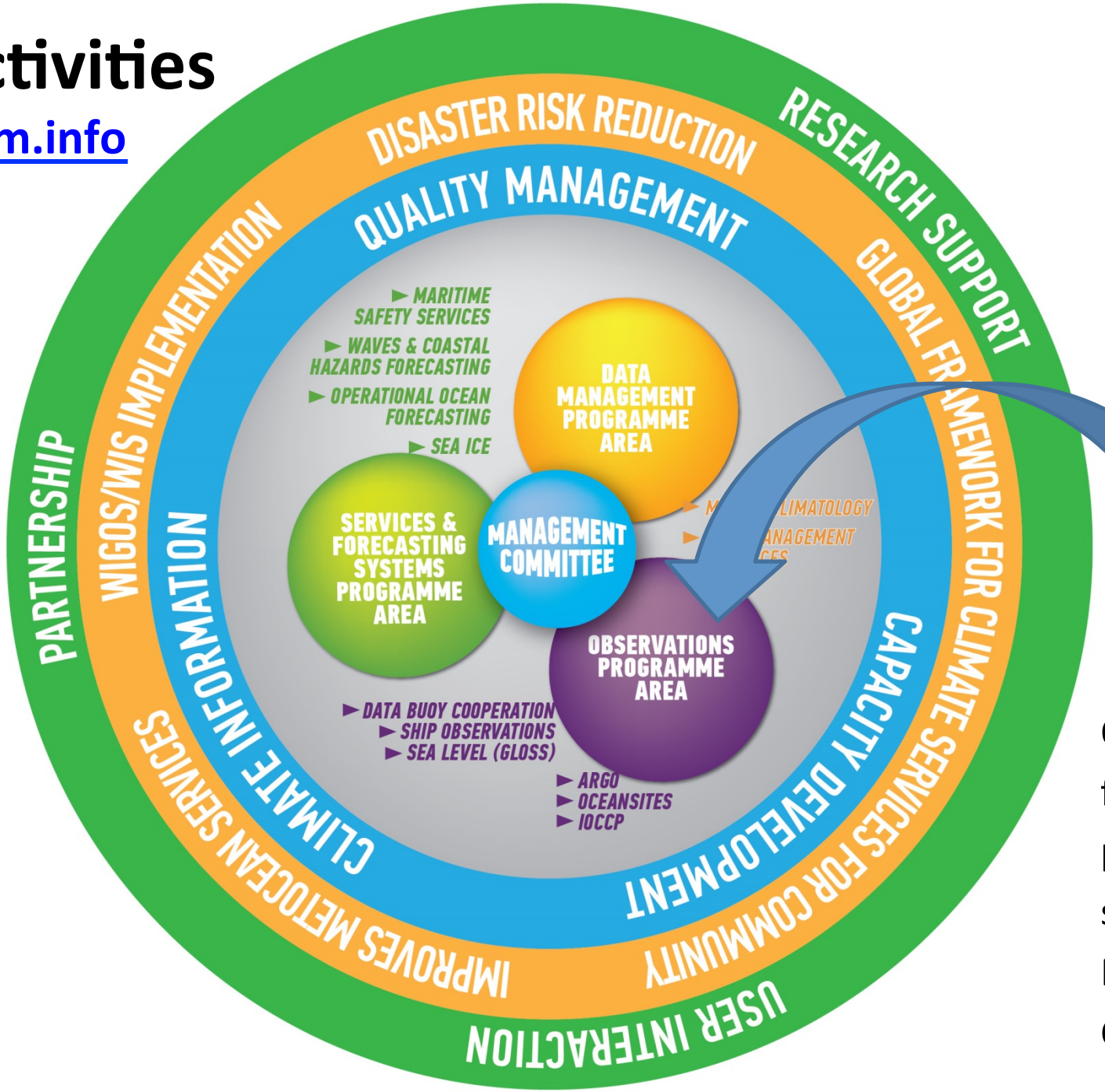
Updated June 2012 as per JCOMM-4 decision

WMO Strategic Priorities 2016-2019

1. **Disaster Risk Reduction**
2. **Global Framework for Climate Services**
3. **WMO Integrated Global Observing System**
4. **Aviation meteorological services.**
5. **Polar and high mountains regions.**
6. **Capacity Development**
7. **WMO Governance**

JCOMM activities

www.jcomm.info



Obs
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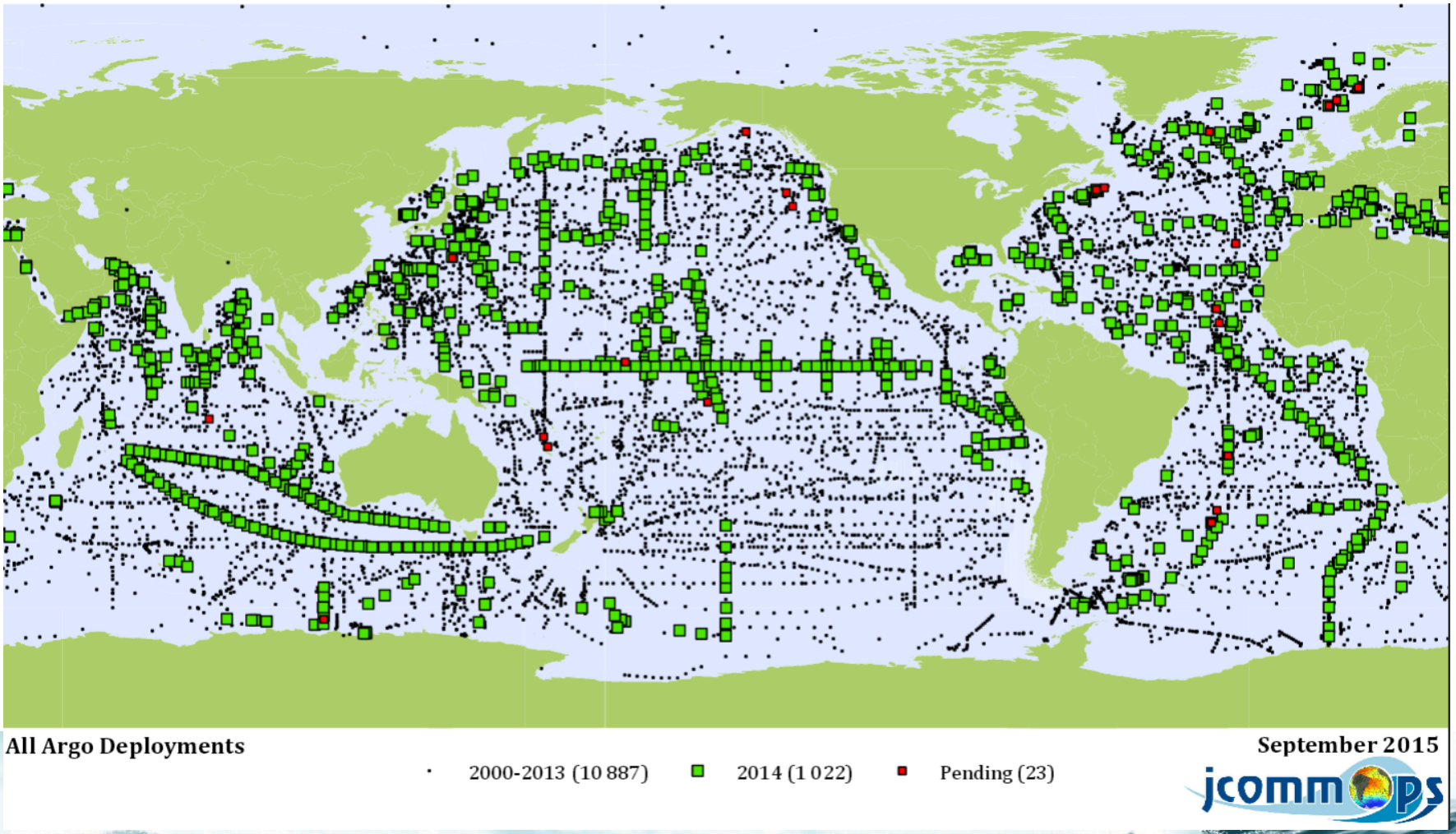
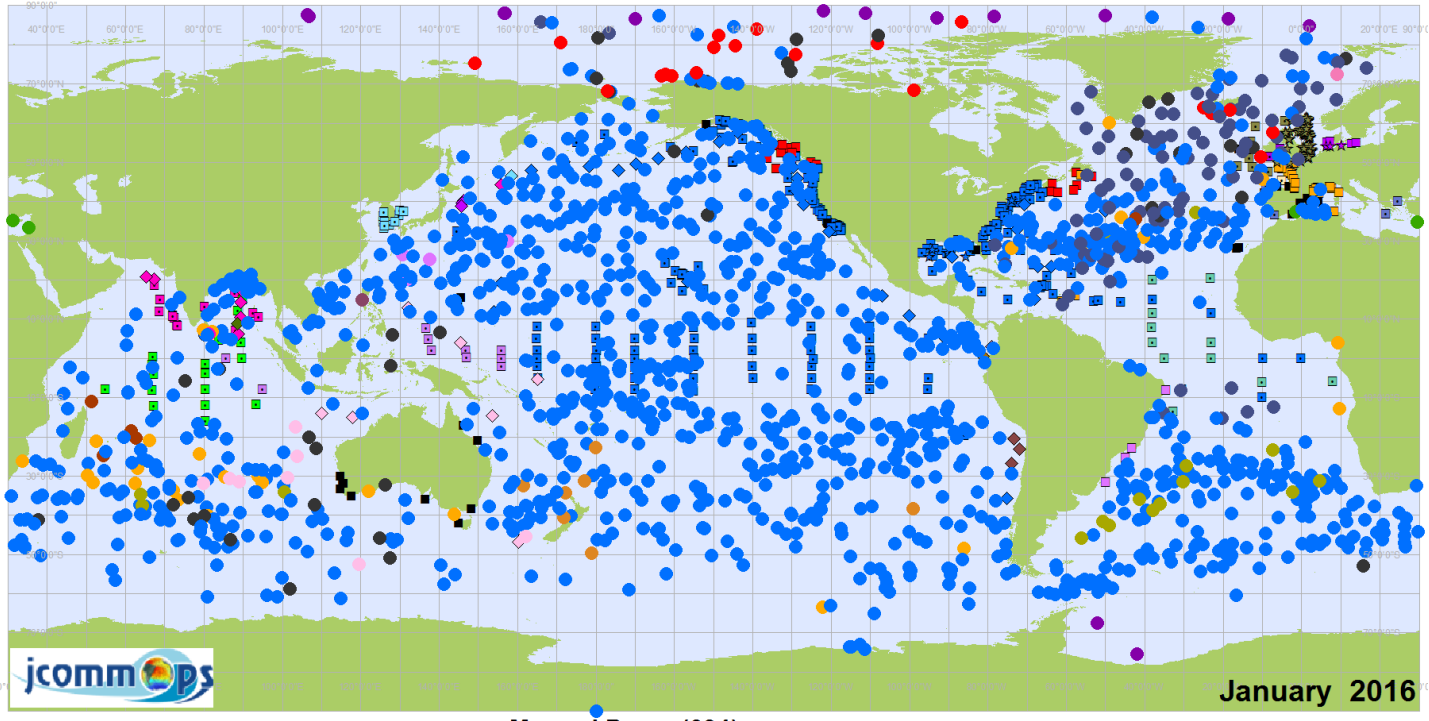
Argo (profling floats)

http://www.jcommops.org/argo



DBCP (data buoys)

http://www.jcommops.org/dbcp/



Drifting Buoys (1489)

- AUSTRALIA (8)
- HONG KONG (CHINA) (1)
- CANADA (20)
- EUROPE (90)
- FRANCE (28)
- GERMANY (14)
- INDIA (1)
- ITALY (4)
- JAPAN (5)
- NEW ZEALAND (7)
- NORWAY (1)
- UK (16)
- USA (1,247)
- USA/FRANCE (5)
- UNKNOWN (42)

Moored Buoys(394)

- BRAZIL (4)
- BRAZIL/FRANCE/US (11)
- CANADA (20)
- FRANCE (24)
- GERMANY (5)
- GREECE (2)
- INDIA (18)
- IRELAND (2)
- JAPAN (10)
- REPUBLIC OF KOREA (11)
- SPAIN (2)
- UK (11)
- UK/FRANCE (1)
- USA (225)
- USA/INDIA (17)
- UNKNOWN (31)

Fixed Platforms (104)

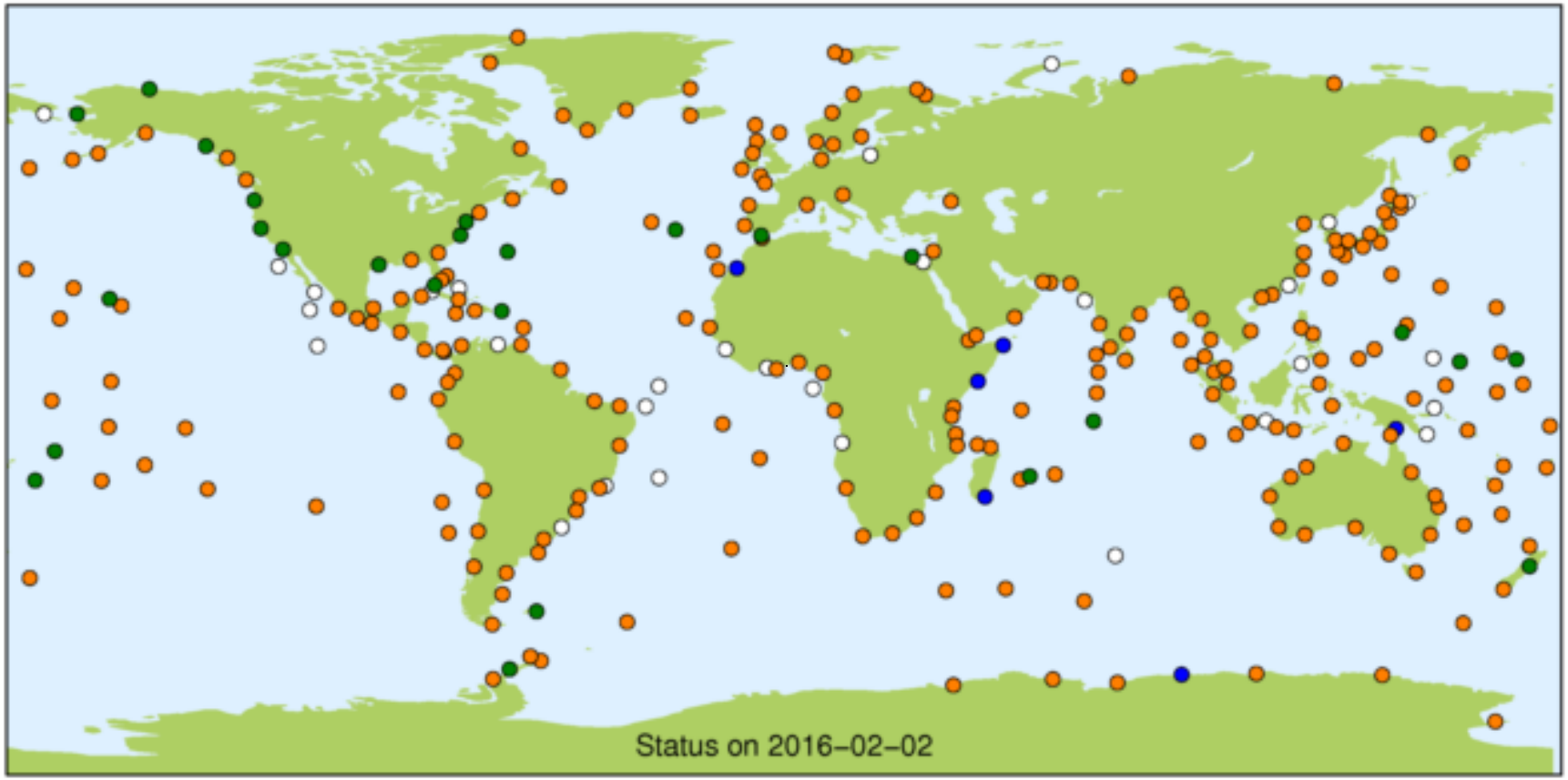
- GERMANY (3)
- UK (92)
- USA (9)

Tsunameter Buoys (55)

- AUSTRALIA (9)
- CHILE (3)
- COLOMBIA (1)
- ECUADOR (1)
- INDIA (7)
- JAPAN (3)
- RUSSIA (1)
- THAILAND (1)
- USA (29)

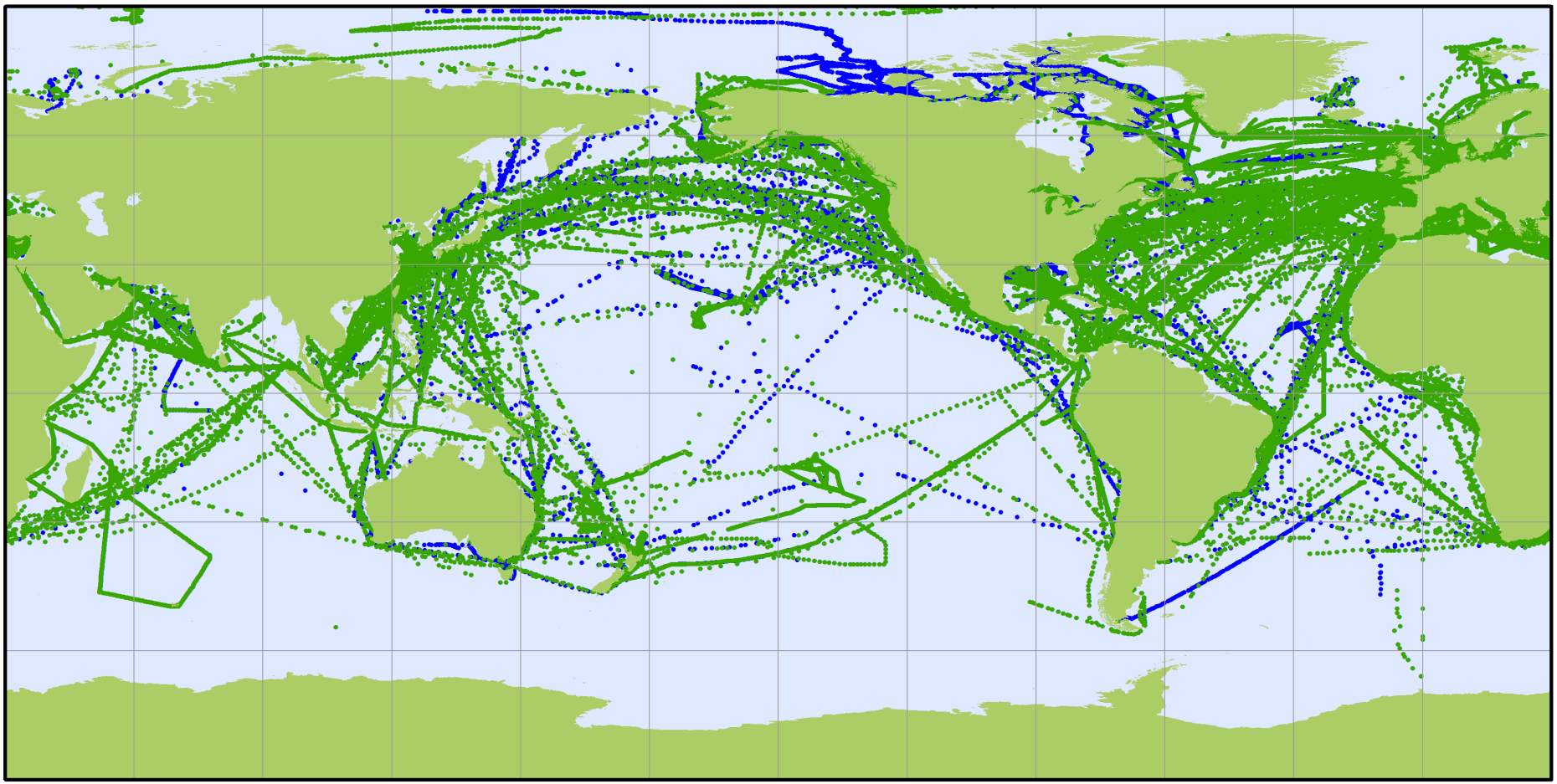
GLOSS (sea level -tide gauges)

http://www.gloss-sealevel.org/



Voluntary Observing Ships

http://www.jcommops.org/sot/

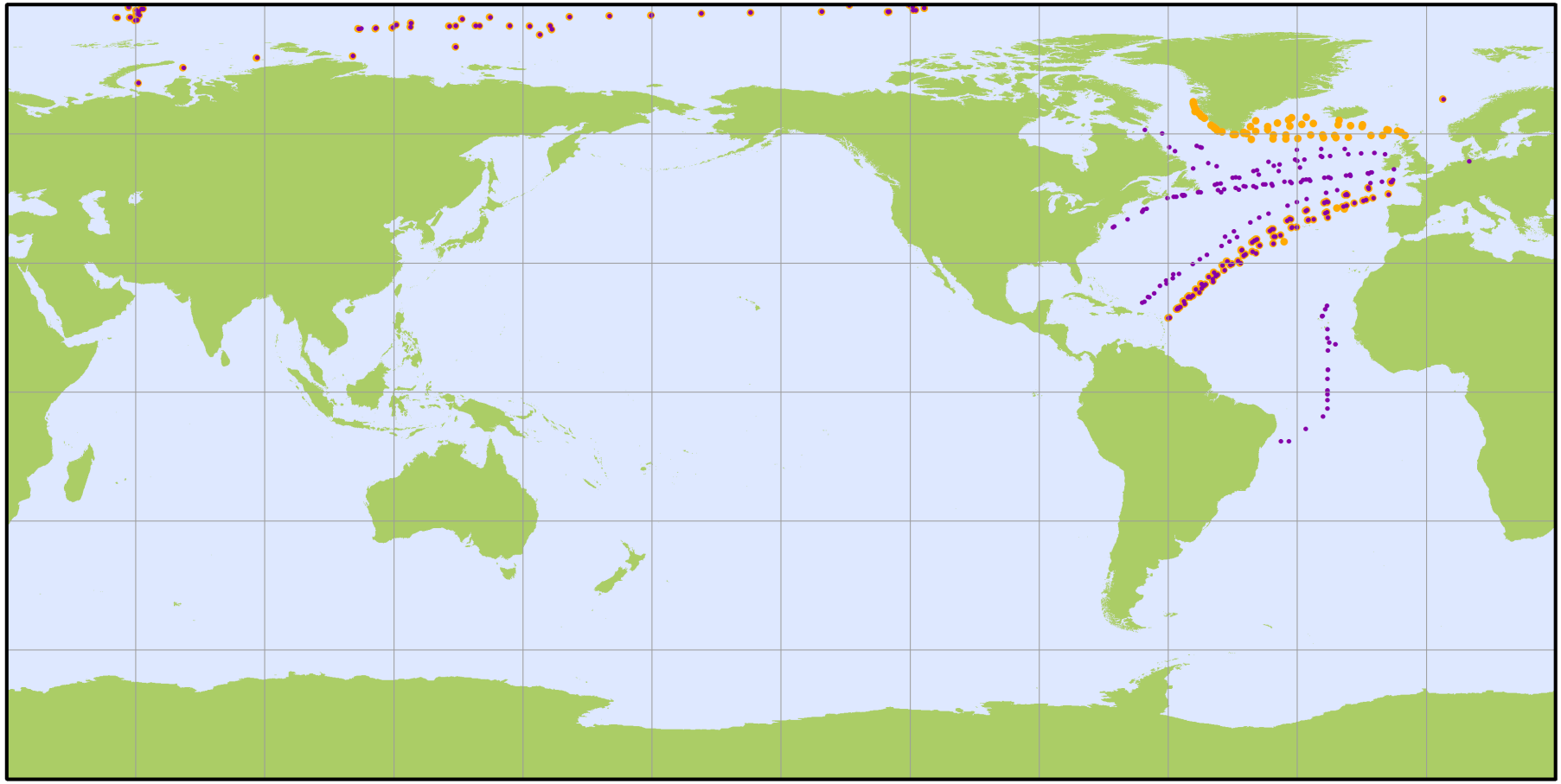


Ship Observations Team **VOS Panel by code type: Data availability in TDC and TAC** **September 2015**

• VOS in TDC (121554) • VOS in TAC (157572)

Aerological profiles

http://www.jcommops.org/sot/

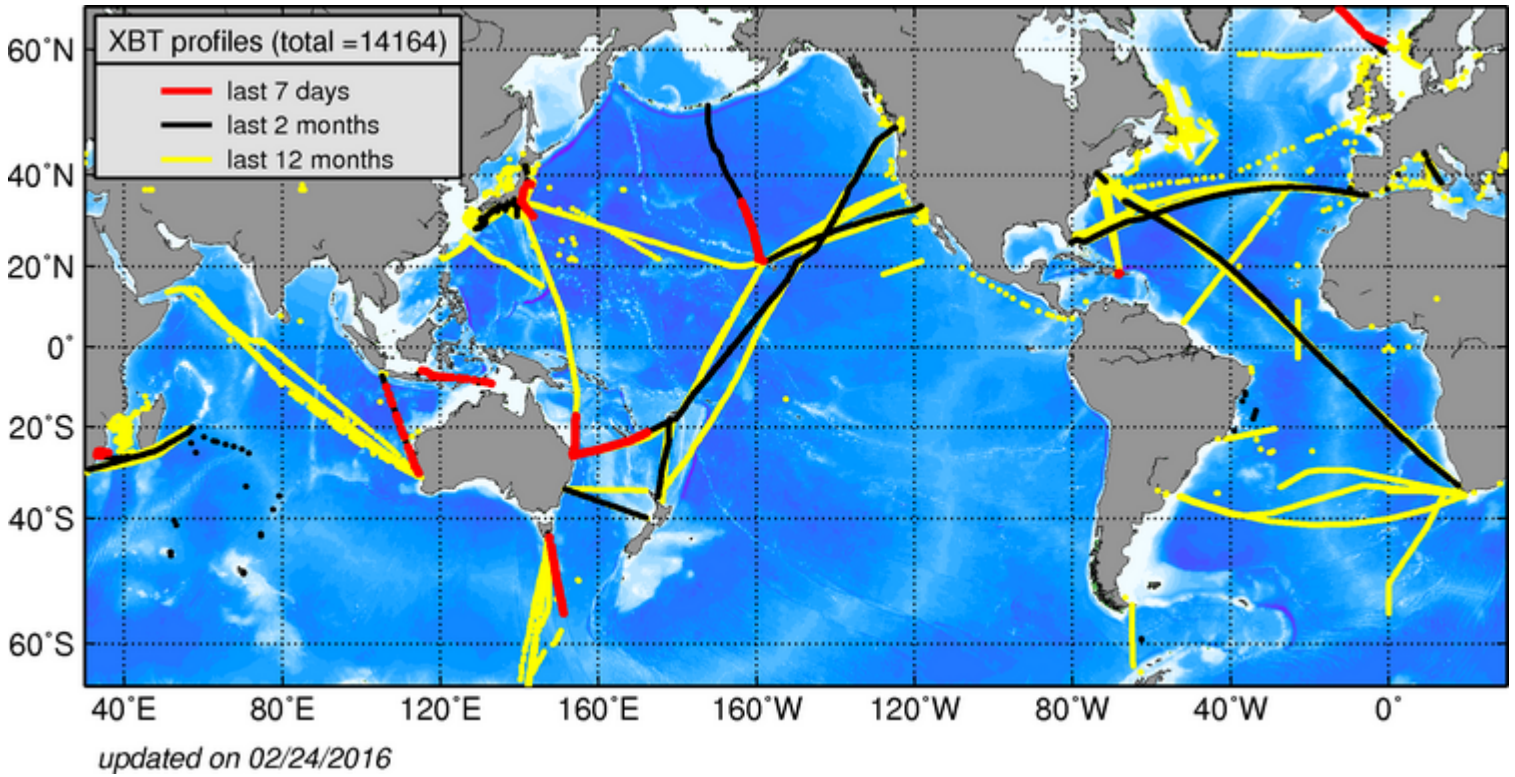


Ship Observations Team **ASAP launches: Positions and number of reports in TDC and TAC** **September 2015**

- ASAP in TDC (526)
- ASAP in TAC (211)

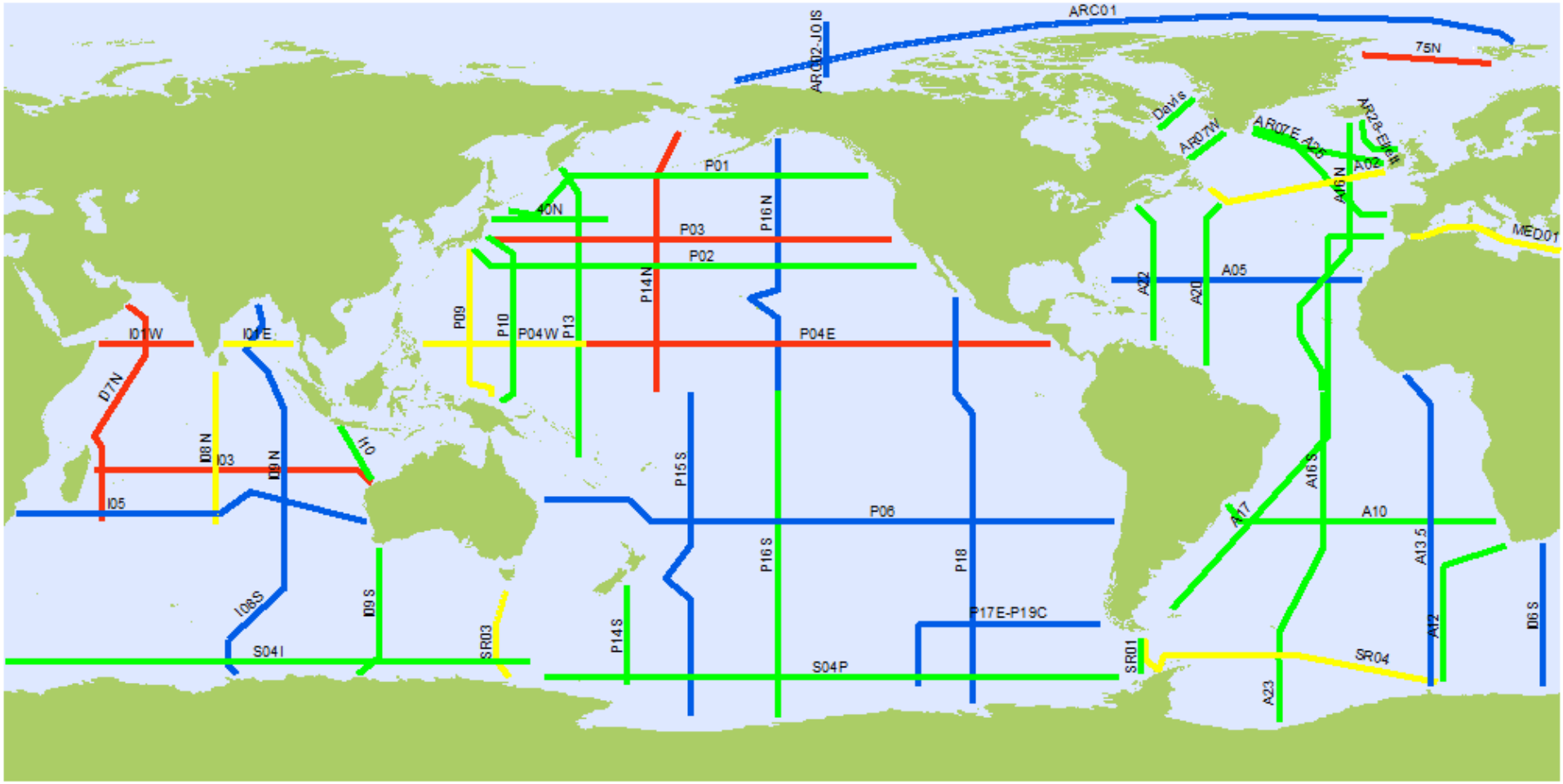
Ships of Opportunity (XBTs)

http://www.jcommops.org/sot/



Hydrographic surveys

http://www.go-ship.org/



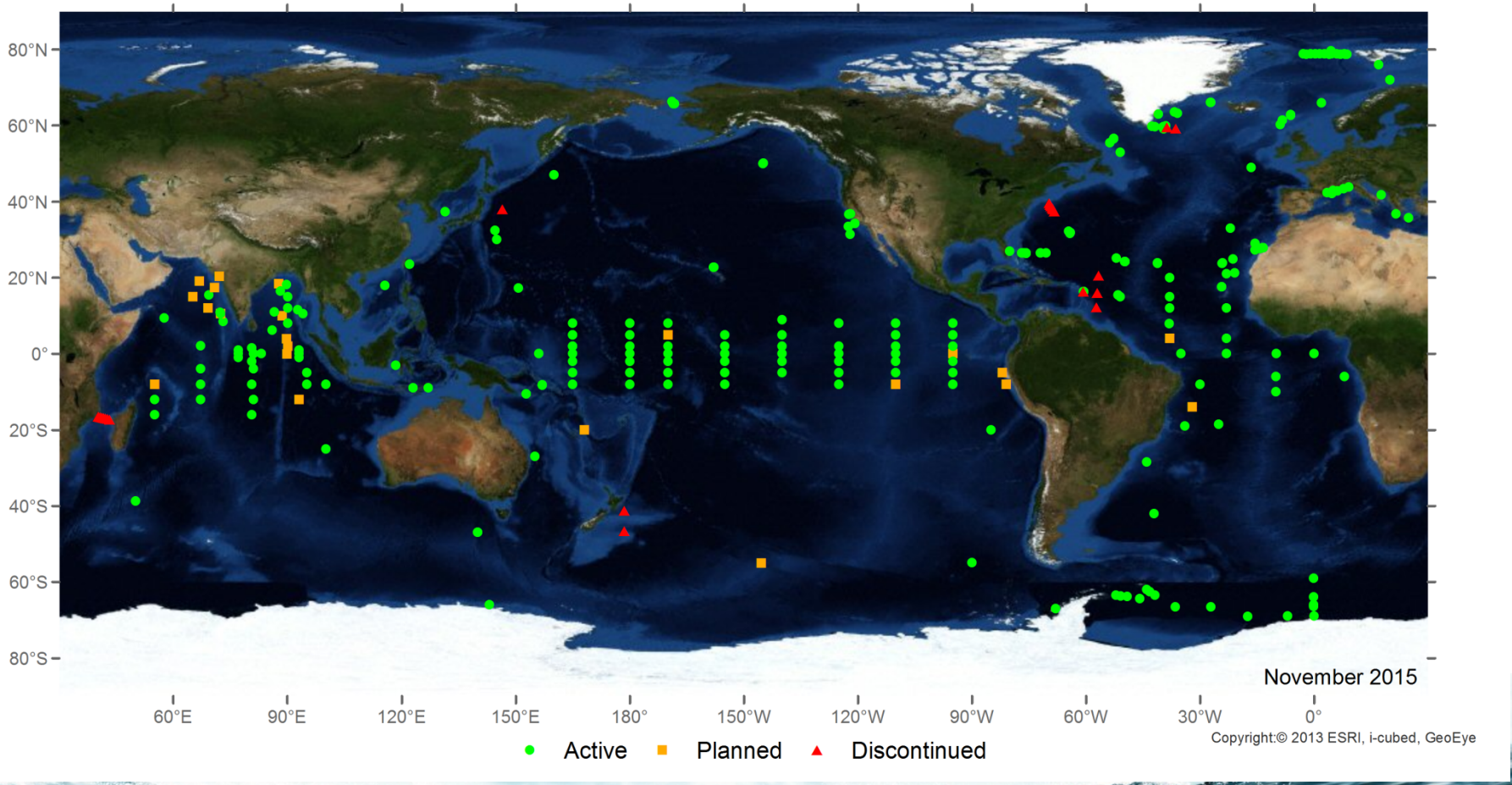
GO-SHIP 2012-2023 Survey (53 Lines) — **Status April 2015**

completed (25) — funded (13) — planned (8) — not planned yet (7)

Percentage of so far completed, funded or planned lines in the current survey: 87%

OceanSITES (deep ocean multidisciplinary time series stations)

http://www.oceansites.org/



What is WIGOS?

- An over-arching ***framework***
  - For the ***coordination and evolution*** of WMO observing systems
  - For contributions of WMO to co-sponsored observing systems
- An evolution from the WWW (weather) centric GOS to a ***multi-disciplinary framework*** supporting Weather, Water & Climate
- A WMO priority & a key contribution to the climate services (***GFCS***)
- A WMO contribution to ***GEOSS*** (with WMO Information System – WIS)
- Doing more & better with what we have now

⇒ For more efficient and effective service delivery

- WIGOS is <u>not</u>:

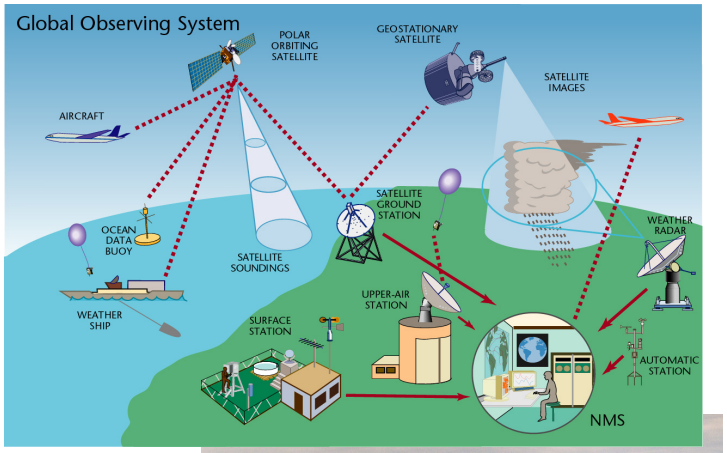
  Replacing or taking over existing observing systems, which will continue to be owned and operated by a diverse array of organizations and programmes, national as well as international

The WIGOS Framework

- The WIGOS framework is essentially about :
  - ***Documenting and implementing*** standard and recommended practices and procedures for making & sharing observations
  - ***Coordination & collaboration*** for efficiency and effectiveness
  - ***Integration and interoperability***
  - ***Timely delivering observations*** that meet user needs in a way they can use them
  - ***Empowering*** NMHSs and providing them with the necessary guidance

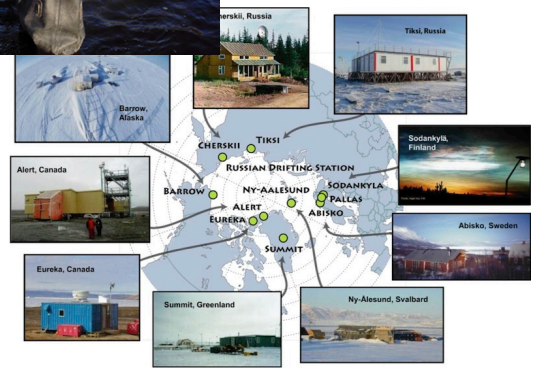
WIGOS Observing Systems

- Global Observing System (WWW/**GOS**)
- Observing component of Global Atmospheric Watch (**GAW**)
- WMO Hydrological Observing System (**WHOS**)
- Observing component of Global Cryosphere Watch (**GCW**)

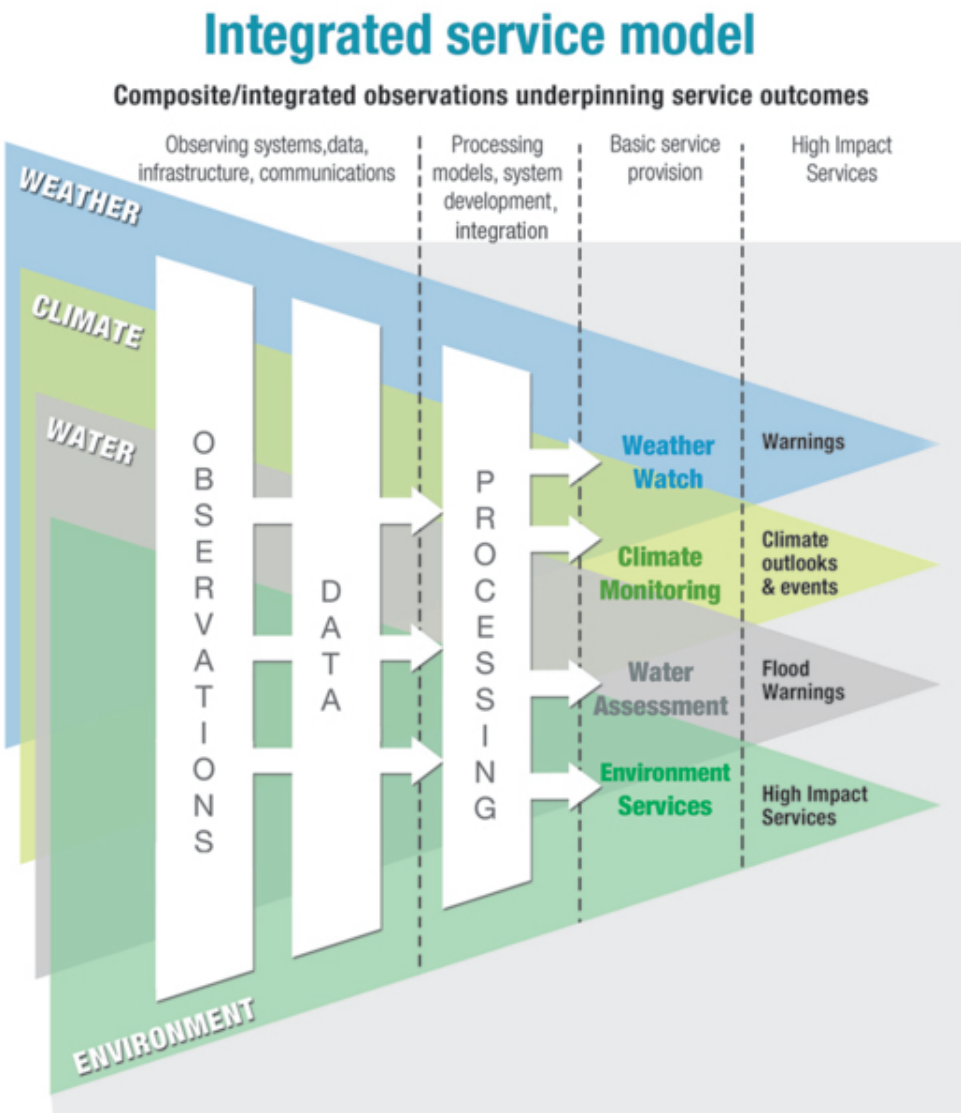


Co-sponsored Observing Systems

- WMO-IOC-UNEP-ICSU Global Climate Observing System (**GCOS**)
- IOC-WMO-UNEP-ICSU Global Ocean Observing System (**GOOS**)
- FAO-WMO-UNESCO-UNEP-ICSU Global Terrestrial Observing System (**GTOS**)



What do we mean by “integration” ?



- Composite systems
- 'Network of networks’
- Integration through:
  - Supporting diverse user needs
  - Systems designed for efficiency & effectiveness
  - NWP data assimilation
  - Partnership & collaboration
  - End-to-end service model
  - Data policy, access and exchange
  - Coordinated network operation & maintenance
  - Practices and procedures
- NOT one-size-fits-all

WIGOS Key Activity Areas

Management of WIGOS Implementation / operation

Collaboration with co-sponsors and partners

Data discovery, delivery & archival

To ensure supply of and access to WIGOS observations

To oversee, guide and coordinate WIGOS

To plan, implement and evolve WIGOS component systems

Design, planning and optimised evolution

Observing system operation & maintenance

Quality Management

To facilitate and support the operation of WIGOS

Communications and outreach

Operational Information Resource

Standardization, interoperability & compatibility

Capacity Development

The WIR web portal - www.wmo.int/wigos/wir

WIGOS Operational Information Resource

The WIGOS Operational Information Resource (WIR)

Note: *The WIR is currently under construction, and tools and some of the information meant to be delivered here may not be available at this point. These are added gradually, and the plan is to have WIR completed by Cg-17 (2015).*

The WMO Integrated Global Observing System (WIGOS) is an integrated, comprehensive, and coordinated system which is comprised of the present WMO global observing systems, in particular of the in situ and space-based components of the Global Observing System (GOS), the Global Atmosphere Watch (GAW), the Global Cryosphere Watch (GCW), and the WMO Hydrological Observing System (incl. WHYCOS). WIGOS also provides a framework for the contributions of WMO to the co-sponsored observing systems.

The WIGOS Operational Information Resource (WIR) is a network platform and tool designed to provide WIGOS stakeholders with all relevant information on the operational status and evolution of WIGOS and its component observing systems, the operational requirements of WIGOS, including standard and recommended practices and procedures used in the WIGOS framework, and their capabilities to meet observational user requirements of all WMO Application Areas.

The WIR provides information on the following WIGOS topics:

1. WIGOS concept, rationale and benefits
2. Management, and coordination mechanism
3. Design, planning and optimized evolution of WIGOS component observing systems
4. Observing System Operation and Maintenance, and Quality Management
5. Standardization, System Interoperability and Data Compatibility
6. Data Discovery, Delivery and Archival
7. Capacity Development, Communication and Outreach
8. WIGOS component observing systems

WIGOS Tools:

- SORT: "Standardization of Observations" Reference Tool
- OSCAR: Observing System Capability Analysis and Review tool
  - OSCAR/Requirements: Observational User Requirements
  - OSCAR/Space: Space-based capabilities
  - OSCAR/Surface: Surface-based capabilities

The functional requirements of the WIR are available here.

The diagram below summarises the key WIGOS Framework Activity Areas (**click on each activity below for more information**).

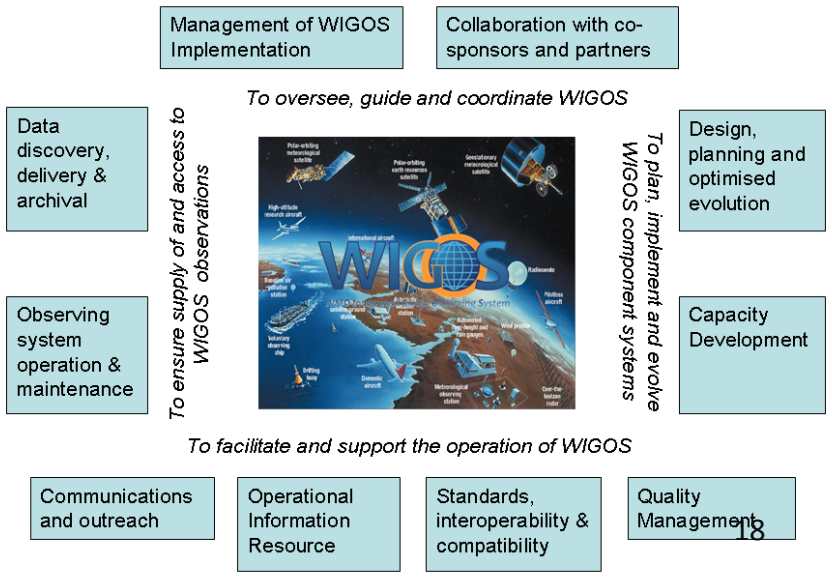
Related items

- Project Office
- Implementation
- RRR
- EGOS-IP
- GOS
- GAW
- GCW
- WHYCOS
- Co-sponsored

Tools:

- WIR
- SORT
- OSCAR
- OSCAR/Requirements
- OSCAR/Space
- OSCAR/Surface

WIGOS Framework: Key activity areas



WMO Executive Bodies decisions with regard to WIGOS (1/3)

Decisions of the seventeenth World Meteorological Congress (Cg-17, Geneva, 25 May – 12 June 2015):

1. Adopted WIGOS Technical Regulations and WIGOS Manual to come into force in July 2016
2. WIGOS a key priority as part of WMO Strategic Planning for the next financial period 2016 to 2019
3. Approved Recommendation 18 (CBS-Ext. (2014)) on the support of Members to the Implementation plan of the marine meteorological and oceanographic observing system in support of NWP (incl. barometer drifters & tropical moored buoy array)
4. CBS taking lead for developing Vision of WIGOS in 2040

WMO Executive Bodies decisions with regard to WIGOS (2/3)

Cg-17 decisions:

4. Adopted Resolution on pre-operational phase of WIGOS for 2016 to 2019 with aim that Members will benefit from a fully operational WIGOS from 2020 onward
5. Future WIGOS priorities:
   - **Develop WIGOS guidance**
   - **Further develop WIGOS Information Resource (WIR) and OSCAR**
   - **Develop & implement a WIGOS Data Quality Monitoring System**
   - **Develop concept and establishment of WIGOS Regional Centres (WRCs)**
   - **Undertake national implementation of WIGOS**

WMO Executive Bodies decisions with regard to WIGOS (3/3)

Decisions of the sixty-seventh Session of the WMO Executive Council (EC-67, Geneva, 15-17 June 2015):

- ICG-WIGOS re-established by the Executive Council (EC-67, June 2015)
- ICG-WIGOS is tasked to develop a complete Plan for the WIGOS Pre-Operational Phase (PWPP) for approval by EC-68 in June 2016

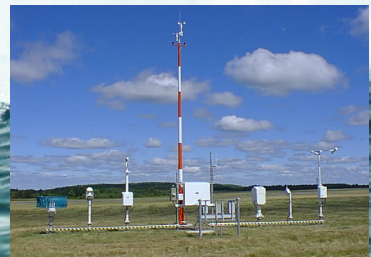
WIGOS Pre-Operational Phase
Priority 1/5

1. Develop WIGOS guidance material

- Develop new WIGOS Guide
- Complementing WIGOS Manual, e.g. on
  - ✓ Observing Network Design
  - ✓ WIGOS Identifiers
  - ✓ Collecting & submitting WIGOS metadata and using OSCAR

WIGOS Pre-Operational Phase
Priority 1/5

1. **Develop WIGOS guidance material - Observing Practices & Procedures**
   - ***Standards*** and ***recommendations*** for instruments and methods of observation
   - All aspects of observations and observing systems:
     - establishment & installation
     - management & operation
     - maintenance, inspection & supervision
     - delivery & sharing of observations
     - data and metadata management (pre-processing & processing, QC, monitoring, remedial actions, …)
   - Data Quality: 'fit-for-purpose' ideal
   - ***Documenting known quality is key***



WIGOS Pre-Operational Phase
Priority 2/5

2. **Further develop the WIGOS Information Resource (WIR) and the Observing Systems Capability Analysis and Review tool (OSCAR – oscar.wmo.int)**
   - OSCAR/Requirements : Technology free observational user requirements recorded quantitatively
   - OSCAR/Space: capabilities of all satellite sensors, whether historical, operational or planned
   - OSCAR/Surface: surface-based capabilities; developed by MeteoSwiss for WMO

WIGOS Pre-Operational Phase
Priority 2/5

2. WIGOS Information Resource (WIR) & OSCAR (oscar.wmo.int)

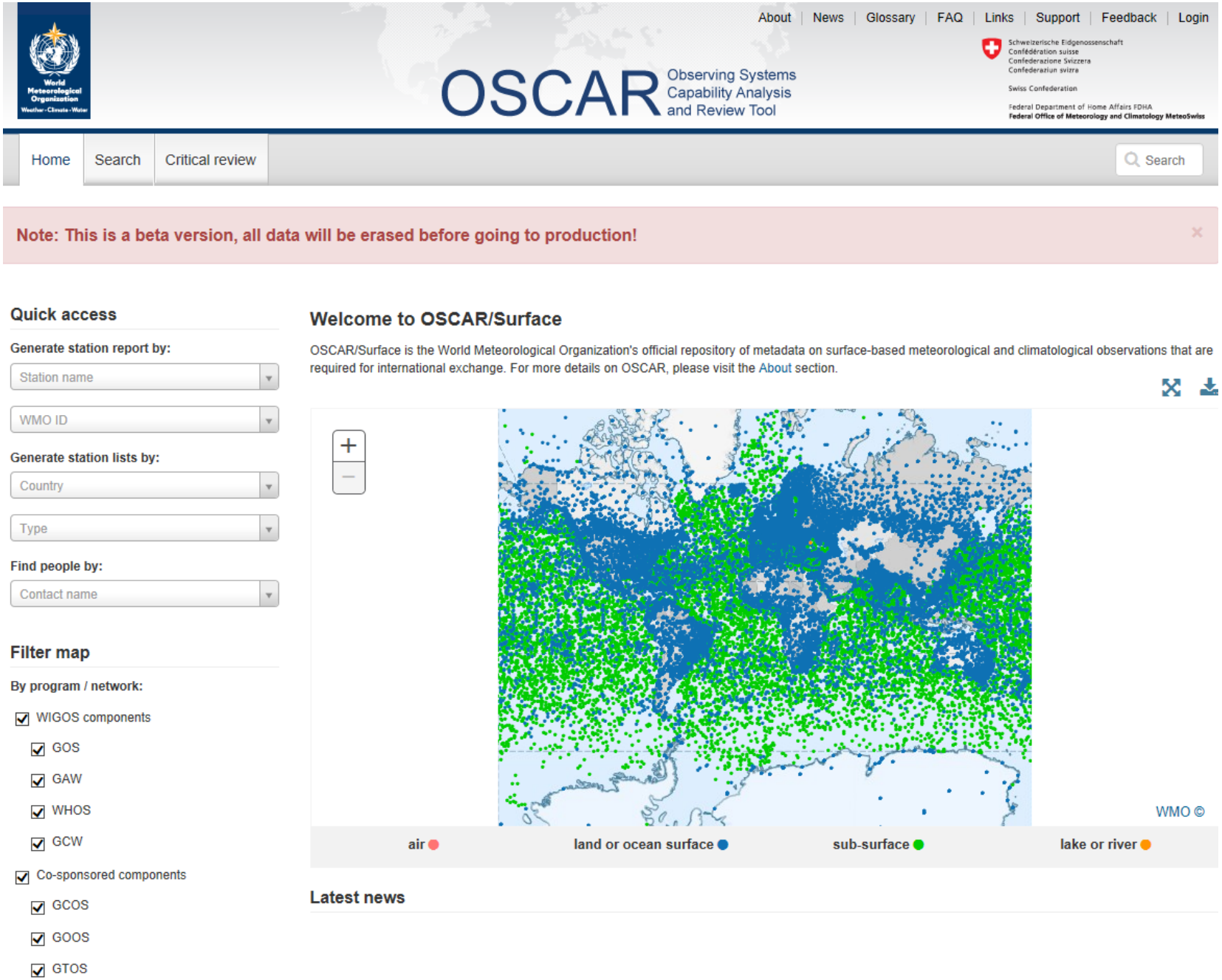
- OSCAR/Surface – oscar.wmo.int/surface
  - Meant to become the official repository of WIGOS Metadata as of early 2016
    - ✓ One-stop-shop for surface- and space-based observing instruments & platforms metadata
    - ✓ Allows user to understanding observational data
    - ✓ Allows to identify potential synergies
    - ✓ A tool for developing countries willing to use OSCAR as their primary WIGOS metadata database
  - An evolution/modernization of WMO No. 9, Volume A, Observing Stations and WMO Catalogue of Radiosondes
  - Includes marine observing systems metadata from JCOMMOPS

WIGOS Pre-Operational Phase
Priority 2/5

2. WIGOS Information Resource (WIR) & OSCAR (oscar.wmo.int)

- OSCAR/Surface – oscar.wmo.int/surface
  - A database for recording surface-based observing systems capabilities for the purpose of the WMO Rolling Review of Requirements
    - ✓ Objective gap analysis / critical review
    - ✓ A tool for planning evolution of the observing system
    - ✓ Monitoring evolution of capabilities, compare with plans, look at progress
  - **Operational as of 2 May 2016**
- Planned evolution of OSCAR
    - ✓ Add new types of stations in OSCAE/Surface (e.g. aircrafts, wind profilers)
    - ✓ Add gap analysis module
    - ✓ Enhancements of OSCAR/Space

OSCAR/Surface - oscar.wmo.int/surface



WIGOS Pre-Operational Phase Priority (3/5)

3. Develop & implement a WIGOS Data Quality Monitoring System

- Integrated approach but initial focus on GOS surface observing components based on pilots on
  - GOS Quality Monitoring (e.g. ECMWF, NCEP)
  - GOS Incident Management (e.g. RA-I)
- Strong role of
  - NWP monitoring centres
  - CBS Lead Centres
  - WIGOS Regional Centres
- JCOMMOPS to play a role for marine data

WIGOS Pre-Operational Phase
Priority 4/5

4. Develop concept and establishment of WIGOS Regional Centres (WRCs)

- Provide support & assistance to Members & Regions for their national & regional WIGOS implementation
- Provide link with Secretariat, regional offices, Regional Instrument Centres (RICs), Regional Training Centres (RTCs) regarding all WIGOS related activities in the Region
- Monitoring implementation of EGOS-IP
- Regional performance monitoring of WIGOS networks (data availability, timeliness, quality) and feedback
- Facilitate WIGOS data and metadata collection to WIS and OSCAR

WIGOS Pre-Operational Phase
Priority 5/5

5. Undertake national implementation of WIGOS

- Nominate National Focal Points
- Consideration of EGOS-IP actions
- Consideration of Observing Network Design principles
- Coordination with co-sponsors (other agencies than NMHSs)

What does WIGOS mean at the National level?

- ***Demonstrating national leadership*** in observations:
  - Best practices
  - Plan & design
  - Sustainability, maintenance & operation
  - Integration and interoperability
- ***Compliance with*** WMO TR (WMO-No. 49) - standard and recommended practices and procedures, and WIGOS Manual
- ***Culture change & change management;***
  - Supported by collaboration at Regional/Sub-regional level
- WIGOS benefits will ***only*** be delivered through commitment at a national level

National leadership through WIGOS

- **WIGOS and WIS** provide means & opportunities:
  - To enhance national observing networks for benefit of all users
  - To enhance sharing and accessibility of observations
  - To reinforce central role of NMHS through partnerships & a network of networks
  - To strengthen national mandate and authority
- ***Strong national*** coordination & cooperation will assist in building ***strong regional*** coordination & cooperation

Regional Marine Instrument Centres (RMICs)

- RMIC/RA-IV (USA) & RMIC/AP (China) established
- Morocco application for RMIC/RA-I pending submission of Statement of Compliance and Commitment
- 6 workshops organized since 2010
- Pilot Project on Seawater intercomparison completed (JCOMM TR No. 84) – 22 Laboratories from 17 countries participated
- RMIC/RA-IV Workshop, USA, 29 Feb. – 2 March 2016

International Forum of Users of Satellite Data Telecommunication System (Satcom)

- Cg-17 endorsed CBS Ext. (2014) Recommendation 9 establishing the Satcom Forum
- Satcom co-owned by CBS and JCOMM in WMO, and GOOS in IOC
- Limited funding provided by WMO
- Argos JTA to become a programme of Satcom
- Michael Prior Jones (UK) new Chair
- Meeting planned in Madrid, Spain, in conjunction with CIMO Technical Conference, and Meteorological Technology World Expo (Madrid, 27-29 September 2016)

JCOMM Capacity development in WIGOS

- JCOMM Capacity Building Strategy has included WIGOS implementation needs
- Capacity Building & Partnerships / PANGEA
  - Developed countries providing training on data use as well as ocean instruments deployed in the region
  - Developing countries contributing to the implementation of the ocean observing system on their region (e.g. ship time)
  - DBCP-WIO, NPOMS & PI series of workshop are excellent examples
- WMO-IOC Regional Marine Instrument Centres (RMICs) playing a key role in Capacity Development
  - Training workshops (2nd workshop for RA-IV planned in USA, Feb. 2016)
  - Liaison groups in the regions
  - Cost-effective calibration service
  - Leading intercomparison activities

Summary and conclusion

- The implementation of the global WIGOS framework (2012-2015) has made substantial progress
- The Pre-Operational Phase will focus on
  - ✓ Developing guidance material
  - ✓ Deployment and enhancement of OSCAR (WIGOS metadata)
  - ✓ Development of a WIGOS Data Quality Monitoring System
  - ✓ Regional and national activities:
    - Establishment of Regional WIGOS Centers
    - Regional/Sub-Regional Workshops and training events to support OSCAR/Surface and Regional priorities for WIGOS
    - Support for national WIGOS implementation efforts, in particular regarding national partnerships, data guidance, and network design and operation and maintenance
- JCOMM fully engaged in WIGOS implementation

Thank you for your attention

Questions ?