Status of the Global Ocean Observing System – April 2015

David Legler, Director
Climate Obs Division
NOAA Climate Program Office
OOPC – April 2015
Sendai, Japan
• The observing system has recovered its previous status, especially TAO array and drifting buoys.
• **Number count for many platforms is pretty good.**
• Spatial coverage (distribution of obs) could be improved.
The challenge: we’re still not good enough!

‘This familiar plot reminds us that ENSO is a problem worth solving. There are few climate signals whose prediction would give more benefit for more people than ENSO ... but we are not there yet. It remains an unsolved challenge with large potential payoff.’

(TPOS SC meeting)
Continuous satellite measurements of sea surface temperature, height, winds, ocean color, and sea ice.

Total in situ networks: 63%

- **Surface measurements from volunteer ships (VOS)**: 100%
  - 250 ships in VOSclim pilot project
- **Global drifting surface buoy array**: 100%
  - 1250 floats
  - 5° resolution array
- **Tide gauge network** (GLOSS committed): 39%
  - 300 real-time reporting gauges
- **XBT sub-surface temperature section network**: 39%
  - 37000 XBTs deployed
  - 3° resolution array: 3200 floats
- **Argo profiling float network**: 100%
  - 3° resolution array: 3200 floats
- **Repeat hydrography and carbon inventory**: 62%
  - Full ocean survey in 10 years

Representative Milestones:

- **Global time series network**: 51%
  - 87 combined sites
- **Global tropical moored buoy network**: 66%
  - 125 moorings planned

Milestones:

- Original goal for full implementation by 2010
- System % sustained, of initial goals

Yearly Progress:

- 2000: 30%
- 2001: 34%
- 2002: 40%
- 2003: 45%
- 2004: 48%
- 2005: 55%
- 2006: 56%
- 2007: 59%
- 2008: 60%
- 2009: 62%
- 2010: 62%
- 2011: 62%
- 2012: 62%
- 2013: 62%
- 2014: 63%
- Dec 2014: 63%
Databuoy network: coverage
Databuoy network: AOML view

STATUS OF GLOBAL DRIFTER ARRAY

October 13, 2014

All drifters have SST
- SST only: 613
- SLP: 737
- WIND: 0
- SAL: 37
- ARGOS: 1015
- Iridium: 372

# buoys = 1387

(M. Pazos and R. Lumpkin)
Drifters, 6-8 April ’15 – OSMC view
90day Forecast, SST Drifters

Drifter array forecast for June 28, 2015 (90d prediction)

% chance that 5°x5° bin is occupied

(R. Lumpkin, NOAA/AOML)
SLP Obs, Drifters, 26-28 Feb 2015
National Contributions to Argo

3555 Floats

Donor Programmes

- Gabon (1)
- Kenya (3)
- Nauru (1)
- Peru (3)
- South Africa (3)
- Spain (86)
- Argentina (4)
- Brazil (7)
- United Kingdom (137)
- United States (1462)
- Ecuador (3)
- Sri Lanka (1)

Map showing contributions from various countries.
Mooring Tprofiles, Mar15

Date: 28-Mar-2015 00:00:00 to 30-Mar-2015 23:59:59
Platforms: 115
ZTMP Observations: 86043
GO-SHIP Repeat-Survey Plan

2014: A25, AR07, P01, P16S, SR01 Completed
Limited GTS Status Info:

- GLOSS Tide Gauges
- SOOP XBT Lines
- Non-tropical OceanSites Moorings
GLOSS Status - 2010

- Category 1: Last data after 2005
- Category 2: Last data 1996–2005
- Category 3: Last data before 1996
- Category 4: No data
Repeat XBT Line Status 2012

XBT Network Status and Implementation (2011–2012)
OceanSITES

September 2014

- Green: Real-Time Data (148)
- Blue: Delayed-Mode Data (136)
- Orange: Planned (7)
- Red: Discontinued (10)
Recovery of TAO array
Monitoring: conclusion

• Current arrangements:
  – Do not give reliable status by platform, or by ECV
  – Probably do not represent best use of combined resources

• Further discussion and action needed
OGC mid-session imperatives

1. Develop better ways of routinely expressing the state of the observing network, including by platform type and by ECV

2. Horizon scan for platforms, sensors, technologies
   - will become part of the composite observing system
   - establish pilot activities to evaluate and transition to this arena

3. Participate in new initiatives to expand ocean observing capabilities
   - ITU/WMO/IOC initiative to use sub-sea comms cables for ocean observation and tsunami warning
   - IIOE-2 and its legacy
OCG mid-session imperatives

4. Encourage JCOMMOPS to continue its outreach to new platform groups, such as the glider community
   – More resources needed

5. Assure the growth and continuity of JCOMMOPS and its relationship with the OSMC
   – Agree responsibilities and priorities
   – Share resources

6. Adoption of consistent standards and practices for data management
   – Make full use of Keeley report

7. Promote the creation and timely updating of JCOMM best practice documentation
   – Framework in place
OCG mid-session imperatives

• 8. Strengthen links with the satellite community
  – *In situ* validation
  – ESA initiative to develop framework for *in situ* SST traceability
Definitions of SST:

- $\text{SST}_\text{fnd}$: sea surface foundation temperature
- $\text{SST}_\text{skin}$: sea surface skin temperature
- $\text{SST}_\text{subskin}$: sea surface subskin temperature
- $\text{SST}_\text{depth}$: sea water temperature at depth $z$, e.g., $\text{SST}_{2m}$
- $\text{SST}_\text{int}$: interface sea surface temperature

**Satellite SST**

**In situ SST**

**Depth**
- $10 \mu\text{m}$
- $1 \text{ mm}$
- $1 \text{ m}$
- $10 \text{ m}$

**SST - SST}_{10m} (K)**
- $0$
- $0.5$
- $1.0$
- $1.5$
- $2.0$
- $2.5$
- $3.0$

- Night-time, or strong winds
- Daytime, light winds
OCG mid-session imperatives

• 9. Help develop WMO dialogue with 3rd party organizations and acceptance of their data
  – JCOMM data are largely 3rd party
  – Operators need access to GTS/WIS for validation/feedback
WIGOS key operational components

Integrated Governance & Management

Collaboration & Coordination with Partners

ongoing activities to oversee, guide and coordinate the operation of WIGOS

ongoing activities to facilitate and support the operation of WIGOS

Communications & Outreach

Quality Management System

Standardization, Interoperability, Compatibility

WIGOS tools (DBs & Portal)
OCG mid-session imperatives

• 10. Engage with other ocean and cryosphere observation groups (e.g. GOOS, OOPC, POGO, SCOR, SCAR, SOOS, ...) to develop a consistent and seamless road map for ocean (including polar ocean/sea-ice) observations

• 11. Succession planning!
Conclusions/Challenges

• How to win the argument for more resources
  – How to prove that obs are vital
  – How to do better with shrinking resources
  – Work more closely with forecasters
    • Modellers and observers competing for same resources?
• Need to better measure and understand system status
  – Need for consistent metrics
• Need for a more holistic approach
  – ECV rather than platform based
  – Engage new platform and sensor groups
  – Much closer integration with satellite community