16th Observation Coordination Group (OCG-16)

7-10 April 2025, Brest, France

OceanSITES OCG-16 report

Prepared/submitted by OceanSITES co-chairs and Executive Committee

1. **Highlight the key network successes**

- EGU Science session on 'Climate variability and extremes through ocean, atmosphere and ice interactions: from model simulations to long time series observations' which will take place during the next EGU General Assembly 2025 with 18 orals presentations and 20 posters.
- Completing new deployments and recovering of new years of high frequency data at key SITES: STRATUS 24 years, KEO 21 years, WHOTS 20 years, 53N 28 years, K1 28 years, TS at Denmark Strait 28 years, PAPA (18 years, extending 30-year OWS that started 75 years ago), IO-TRITON and m-TRITON for capturing IOD features 24 years, GIFT 21 years.
- New capabilities: Station PAPA and KEO bubbles measurements combining wave and backscattering data from ADCP.
- New SITES and data sets: OOI (NSF) data now in the data workflow (incl. OceanOPS) of OceanSITES
- Progress on OBPS Mature endorsement
- New web in progress
- Synergies & Strategies: On-going relationship with METS and SMART cables, PCO_2 from OceanSITES mooring WHOTS and STRATUS (SOCONET), deployment of platforms during mooring cruises (e.g., Argo floats, surface drifters, gliders), ground truth for satellite measurements (cal/val)
- Test bed for cross-calibration for meteorological measurements (wavegliders and saildrone), data logger/telemetry systems.
- Synergies with modelling and reanalysis communities:
    - Co-organization of the EGU science session: 'Climate variability and extremes through ocean, atmosphere and ice interactions: from model simulations to long time series observations'
    - Attendance to the 6th WCRP International Conference on Reanalysis (ICR6), Japan 28 October-1 November 2024 and presentation of the work: 'Long-term Observations for Understanding Limitations of Reanalysis Fields Near the Ocean Surface' by J. Potemra, R. Weller, R. Lukas, A. Plueddemann, S. Bigorre, and E. Thompson.
    - Ocean-Predict UN Decade Program assimilation of OceanSITES mooring data
    - Stratus and WHOTS withhold surface meteorology from assimilation and provide independent time series to assess models and reanalyses; delayed mode exchange with ECMWF

- Selected publications
  - Kohlman, M. F. Cronin, R.P. Dziak, D. Mellinger, A.J. Sutton, M. Galbraith, M. Robert, J. Thomson, D. Zhang, and L. Thompson, 2024: "The 2019 marine heatwave at Ocean Station Papa: A multi-disciplinary assessment of ocean conditions and impacts on marine ecosystems", *J. Geophys. Res.*, 129(6), e2023JC020167, doi: 10.1029/2023JC020167.
  - Riihimaki, L.D., M.F. Cronin, R. Acharya, N. Anderson, J. Augustine, K.A. Balmes, P. Berk, R. Bozzano, A. Bucholz, K.J. Connell, C.J. Cox, A. Giorgio di Sarra, J. Edson, C.W. Fairall, J.T. Farrar, K. Grissom, M.T. Guerra*, V. Hormann, K.J. Joseph, C. Lanconelli, F. Melin, D. Meloni, M. Ottavian, S. Pensieri, K. Ramesh, D. Rutan, N. Samarinas, S.R. Smith, S. Swart, A. Tandon, E.J. Thompson, R. Venkatesan, R. Kumar Verma, V. Vitale, K.S. Watkins-Brandt, R.A. Weller, C.J. Zappa, and D. Zhang, 2024: Ocean surface radiation best practices. *Front. Mar. Sci.*, 11, 1359149, doi: 10.3389/fmars.2024.1359149.
  - Mrozowska, M. A., Jochum, M., Bastin, S., Hummels, R., Koldunov, A., Dengler, M., et al. (2024). Using NIW observations to assess mixed layer parameterizations: A case study in the tropical Atlantic. *Journal of Geophysical Research: Oceans*, 129, e2024JC020985. https://doi.org/10.1029/2024JC020985
  - González-Pola, C., Somavilla, R., Graña, R., Viloria, A., and Ibáñez-Tejero, L. A decade-long flow reversal in the intergyre region of the eastern north Atlantic, Progress in Oceanography, 231, 2025, doi: 10.1016/j.pocean.2024.103406

2. How has the network advanced across the OCG Network Attribute areas[1]

- Mission: OceanSITES as the global network of long-term, high-frequency, high-quality multidisciplinary deep reference stations at fixed locations in the ocean aims to provide a full view of the temporal behavior of the ocean system being key for understanding and responding/mitigating the effects of climate change.
- Mission-motivated OceanSITES core targets & indicators: Long time series products to support climate indicator framework (e.g., GCOS; G7 FSOI; UN Decade); number of "EOV-Years"; shortness of gaps; representativeness for areas (e.g., AMOC - local observation but global indicator); quality control and best practices
- Spatial scale: Global. Sites in all ocean basins; design is NOT a homogeneous distribution but aligned with phenomena to observe (e.g. boundary

[1] https://oceanexpert.org/downloadFile/45372

current, abyssal plains, air/sea interface, straits) and national interest. From the atmosphere to the ocean bottom.

- EOV: all physics EOV/ECV, all biogeochemistry EOV/ECV, Biology: passive acoustics, backscatter target strength, camera systems, plankton sampler
- Sustainability: Sustained observations is a qualification criteria for registering sites in OceanSITES
- Best Practice and FAIR Data (incl. metadata): They are in the mission/target of OceanSITES. Examples of OceanSITES DMT & data format Standards/Best Practices are: Data reference manual endorsed by GOOS, recommendation for plankton measurements, Surface Radiation OASIS, OBPS Mature endorsement
- CD & technology transfer: A lot on nations level but less on network level (incl. we do not have means at place to aggregate the information at the network level), this also include the participation of Early Career Ocean Professionals (ECOPs).
- Environmental Stewardship: moored observations are autonomous and thus without much impact to the environment except batteries, antifouling. Some waste is from the ground weight (but recoveries are needed in some EEZ areas). Carbon footprint shared between different activities shared on an oceanographic-cruise. OceanSITES acting as research aggregators lowering carbon footprint
- Capacity Building: OceanSITES investigators engage other potential operators, students, technical staff. Examples: Maintenance of Stratus site engages students and technical staff from Chile; maintenance of WHOTS site engages U. Hawaii students; WHOI staff work with Indian colleagues on Indian surface mooring programs.

3. **Future Plans[2] and Opportunities - at network and/or cross-network OCG level**
   - Improve OceanSITES service to community: Rehaul of oceansites.org, incl. metadata submission, maps, SITE highlighted cards including information about long time-series duration, history, … and serving data products and software, long time series for physics, biogeochemistry, biology
   - Progress on integration of other non-centralized (GDAC) data. After pilot exercise on integrating NSF Ocean Observation Initiative data, next steps will be taken for IMOS data
   - Proactive effort for interaction with modelling community interaction: merging of deep temperature long time-series.
   - Reference sites for machine learning / validation.

4. **Challenges and Concerns - at network and/or cross-network OCG level**
   - Cost of Service Level Agreement

[2] Future plans on implementation, instrumentation, data management, test, new sensors, plan for new EOV/ECV observations, capacity development, etc.

- Data & metadata access and exchange with OceanOPS: Transform from a GDAC-centric to a truly “distributed data archive” (federated data network)
- Motivate PIs to update metadata. We hope to improve the motivation and benefits for PIs in doing that in the new oceansites.org. Currently, the metadata in OceanOPS are not up to date for many OceanSITES, which prevents accurate reporting to GOOS)
- Seamless integration/dialogue with GOOS Regional Alliances (GRAs)
- Motivate participation of ECOPs
- Ship time and cost of shipping
- Some sites are at risk, such as Greece (due to funding issues), Italy (due to legal issues), and maybe other countries in the future even for political reasons?
- Non-functional and obsolete website

5. **Asks from OCG (Exec, networks, OceanOPS, and/or GOOS) and any priority topics that should be addressed at OCG-17**
   - Strategy for the way to pilot a cross-platform global reference network?
     - Adaptation of OceanOPS dashboard for climate time-series? OceanOPS dashboard is prepared for showing a present snapshot of what and where is now in the water, not for what has been there for a long time.

6. **Recent publications, articles, etc. (if you want to share)**
   https://scholar.google.com/citations?user=ECLfsRkAAAAJ&hl=en&authuser=1

Additional considerations:

- What requirements do you base your system design/completeness on - e.g. for the report card? Are you utilizing / are responsive to any requirements from e.g., GCOS, WMO RRR? If yes, what and how?
  - OASIS Air/Sea flux recommended practices
  - Anticipate contribution to G3W
  - Designed guided by EOV specifications for given applications
- What would you like to see in OceanOPS 2026-2030 strategic plan?
  - OceanOPS adapted for the strengths and particularities of the different networks
- Questions for other networks, networks specific questions for discussion at the session, and highlight cross OCG questions for discussion next day session
  - Strategy on intercalibration (across networks) - how to go about it?
  - General recommendations on uncertainty estimates
- What are your links to the Ocean Decade? (List programs etc. you are involved in)