

Key future improvements in observing system

AOPC, OOPC, TOPC



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The Atmospheric Observation Panel for Climate - AOPC



- **GSRN and GRUAN both operational to meet the needs for traceable long-term measurements for climate**
- **GBON operational (and maybe superseding many current networks)**
- **Concept adopted more broadly across WMO members**
- **Concept expansion to space based techniques with upcoming developments?**

- The original data are forever
- But data stewardship is very often piecemeal and data holdings often not interoperable
- Many data are in image or hardcopy format only
- Data management is often single institution / funding stream / PI deep
- Pressing need for improved data management

OOPC The Ocean Observations Physics and Climate panel

A panel of the Global Climate Observing System (GCOS), the Global Ocean Observing System (GOOS), and the World Climate Research Programme (WCRP)

Chairs: Sabrina Speich & Weidong Yu

GCOS Joint Panels Meeting

19 April 2021



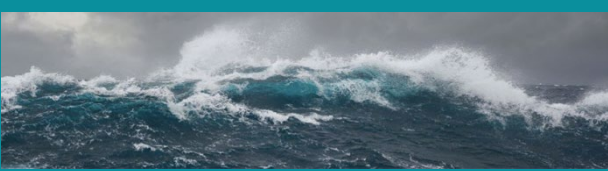
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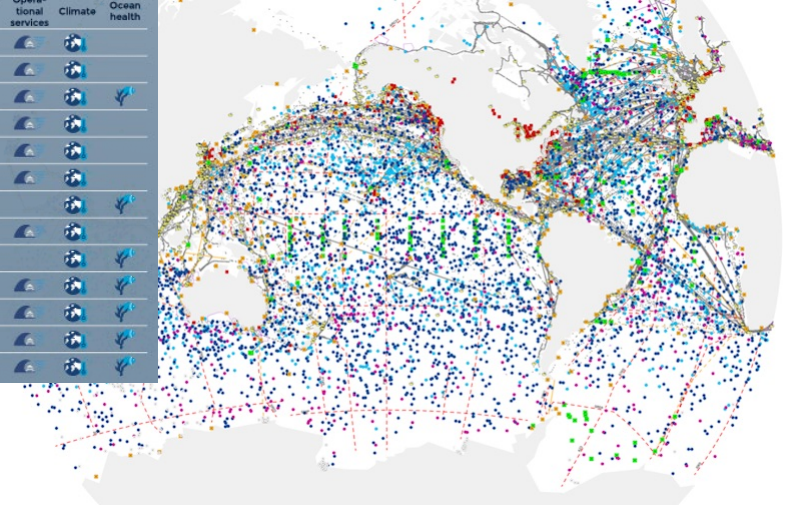
- Developing a fit-for-purpose SUSTAINED and TRULY GLOBAL OCEAN observing system able to respond and rapidly adapt to societal requirements and in particular those related with Climate Change (including Extremes & Adaptation)
- Focus on the Consider the entire value chain from collecting data to generating products and information for final users;
- Become more impactful in Science, and relevant for society (governments) and beneficial for society (i.e., Climate Services, local authorities,)
- Improving integration across Climate Subsystem to respond to societal requirements more consistently



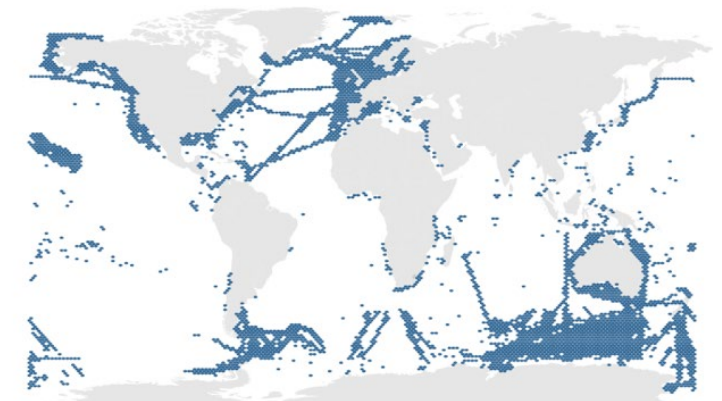
1. OceanOPS network status summary versus EOVs/ECVs

GOOS <i>in situ</i> networks ¹	Implementation Status ²	Data & metadata			Best practices ³	GOOS delivery areas ⁷		
		Real time ⁴	Archived high quality ⁵	Meta-data ⁶		Operational services	Climate	Ocean health
Ship based meteorological measurements - SOT/VOS	★★	★★	★★★	★★	★★	☁	🌊	🌿
Ship based aerological measurements - SOT/ASAP	★★	★★	★★	★★	★★	☁	🌊	🌿
Ship based oceanographic measurements - SOT/SOOP	★★	★★★	★★★	★★	★★	☁	🌊	🌿
Sea level gauges - GLOSS	★★★	★★	★★★	★★	★★	☁	🌊	🌿
Drifting and polar buoys - DBCP	★★★	★★	★★	★★	★★	☁	🌊	🌿
Moored buoys - DBCP	★★	★★★	★★	★★	★★	☁	🌊	🌿
Interdisciplinary moorings - OceanSITES	★★	★★	★★	★★	★★	☁	🌊	🌿
Profiling floats - Argo	★★	★★	★★★	★★★	★★	☁	🌊	🌿
Repeated transects - GO-SHIP	★★★	★★	★★★	★★★	★★★	☁	🌊	🌿
OceanGliders	★	★★	★★	★★	★★	☁	🌊	🌿
HF radars	Emerging	★★★	★★★	★★	★★★	☁	🌊	🌿
Biogeochemistry & Deep floats - Argo	★	★★	★★	★★★	★★	☁	🌊	🌿
Animal borne ocean sensors - AnIBOS	Emerging	★★	★★	★★	★★	☁	🌊	🌿

www.ocean-ops.org/reportcard2020



2. First biological “sustained” ocean observations assessment



Sustained obs cover only 7% of surface of the ocean; only 1/3 of those are freely and openly shared; Satterthwaite et al., in press, 2020

We have already a base structure on how to go Forward

- **OceanObs19 Conference (134 Articles in Frontiers) & Action plan**
- **Energy imbalance assessment (von Schuckmann et al. 2020)**
- **Air-sea fluxes OASIS proposal - funded SCOR working group**
- **Evaluations of parts of the observing system with design recommendations for the future (in terms of EOVs/ECVs against societal requirements)**
 - TPOS 2020 completion this year
 - TAOS Published this week
 - IndOOS-2 (published in BAMS Nov. 2020)
- **UN Ocean Decade : An opportunity for a step change in delivering a fit-for-purpose observing system (in particular for GCOS including Extremes and Adaptation)**

GCOS • WCRP



Areas for further work by GCOS

Initial Ideas



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- Improving Data Centres is very Important for TOPC
 - Establish/support existing data centres and support data acquisition?
 - Ensure a clear data policy: free, open and easily accessible
 - Include all kind of data for the same ECV (in-situ, satellite, UAV, citizen science)
 - Increase the speed of delivery of data and information (to make it more climate action oriented), in addition to having long-term consistent ECV time series
 - Work with existing Data Centres – no duplication
- Terrestrial observing networks
 - Require long-term sustainable support for operation,
 - particular challenges in developing countries, particularly resources and planning
 - Need stable, long-term, systematic, polar observing systems
 - Consider how long-term observations could be supported by infrastructures such as ICOS, eLTER, NEON, AmeriFlux, TERN, CERN etc.

- Integrating observations from individual ECVs for more data driven synthesis on issues such as
 - GHG Fluxes
 - Provide information on anthropogenic versus natural GHG fluxes (incl. the consideration of inter-annual variability and extremes)
 - AFOLU
 - Biosphere indicator
 - phenology of natural forests shows encouraging results
- Improve inputs into specific international policy and assessment processes such as:
 - UNFCCC/Paris Agreement, i.e. Global Stocktake, Adaptation & Mitigation
 - IPCC – how to link ECV observing system/networks to upcoming IPCC assessments
 - Consider overlaps with other Multilateral Environmental Agreements (MEA)
- Develop relationship with GBON and SOFF
 - May give a long-term solution to issues such as support for networks, data access and availability, data quality

Thank you



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