

## Blue Planet

### Breakout Session C1. Sustained Ocean Observations

Chaired by Nic Bax and Samantha Simmons, chairs of the GOOS Biology & Ecosystem Panel

Rapporteur: Patricia Miloslavich

Chair Nic Nax introduced the session pointing out the goals, why there is the need to focus on sustained observations, how GOOS fits into this space, and a rationale of why we will spend the session in biological observations. Essential Ocean Variables were considered within the Framework for Ocean Observation (FOO) as to be understandable at a general level and have scientific relevance, however, an essential variable could be one that is not essential in itself but that help reports in a higher level. Almost 40 people participated in this session.

The session was organized to discuss the topics requested by Blue Planet: (1) User needs and priorities, (2) Activities and outcomes, (3) What needs to be measured, and (4) Pathway to delivery. In addition, we included for the discussion an extra point (5) to complete the DPSIR\* model regarding “Response” or how success will be measured.

#### ***(1) Needs and priorities:***

These were identified as and/or defined by:

- Fisheries and food security
- GEO BON Essential Biodiversity Variables
- SDGs (Societal Developmental Goals)
- CBD, Aichi Targets (legally mandated)
- Supporting the biogeochemical models and working groups on ocean acidification
- Sea bed mining – ISA (International Seabed Authority): the advent of deep sea mining and the need to know what is there before it gets “wiped out”
- ABNJ – UN WG: new process on Areas Beyond National Jurisdiction
- EIA standards, also consultants, industry (cf. WAMSI blue print)
- International recabbling – smart cables: In 25 years all fiber optic cables underwater will have to be replaced. Think on the needs that may have and how to use this new infrastructure in a more efficient way, for example installation of cameras / sensors.

#### ***(2) Activities:***

##### ***Identified gaps***

- Mid-trophic levels in the open ocean, eg. higher trophic level in zooplankton communities: for example, look at new developments in terms of technology that make observations more easy and efficient and that connect better to fisheries (copepods, fish larvae, etc).
- Habitat mapping
- Satellite capabilities and data interpretation

- Non-uniformity of global ecosystem variable measurements – needs inter-comparability eg. between shipboard, buoys, etc.
- Data: Biologists need to step up to large data sets as satellite and genomics products expand dramatically. The biology community may not be aware of the power capability/ software, etc they will need to have to cope with the huge amounts of data that will be coming out

### ***How we achieve our goals?***

The discussion raised the point about the importance of being able to carry out observations autonomously. Since this is a global program, we should rely on what we can measure remotely in addition to what is measured in the field. In this sense, it was proposed that if an identified EOVS cannot be measured remotely, it gives the need and the driver for developing the technology to do it. It was also suggested that animal tracking and telemetry would help close the gaps with other areas like fisheries and bring together the community for the infrastructure, focused on a platform or a method.

- Need to exploit global biological products from global observations
- Process tools for prioritising and integrating biological information – include modelling community
- Emphasize need for food security especially in ocean – what can Blue Planet provide
- Challenge of adding to existing satellite capabilities: prepare to exploit the biological aspects/capabilities of new satellites
- BioArgo – to help interpret satellite products (e.g. ARGO and JASON linking). What is the key value of BioArgo and how to promote it
- Size spectra technology
- Hyperspectral habitat mapping for shallow water and mangroves
- Identify range of platforms with capacity for global biological observation – eg. autonomous systems, fishing vessels
- Expand to the GO-SHIP program to carry out biomass signal measurements through acoustics in deep scattering layer
- Compilation of deep sea biological data – INDEEP and DOOS

### ***(3) What needs to be measured:***

Agreement that biological Essential Ocean Variables, defined by SDGs (societal benefit) and with a high level of readiness need to be measured

Take advantage of existing platforms that have been measuring biological ocean variables:

- Assess statistical properties of existing data series
- Assess successful long-term series against FOO using the DPSIR framework
- Supporting existing programs to become global (GOOS networks)

**(4) Pathway to delivery:**

- Funding: Asean development bank and similar, GEF and LME program
- Build projects around the identified gaps
- Tackle the data question

**(5) Metrics of success: what to measure?**

- User uptake – eg. WOA II, CBD, management and policy
- Focusing role of Blue Planet and related initiatives
- Attract new sources of funding to ocean initiatives

**(\*) DPSIR model:** approach adopted by the European Environment Agency to identify the information needed to understand and manage human impacts on the environment which provides a high level model that can guide the process to identify Essential Ocean Variables (EOVs). The DPSIR framework considers the driving forces (D), the pressures (P), the states (S), the impacts (I), and the responses (R)