In the face of the Anthropocene's growing human population, sustainable management of marine resources depends on knowledge of ocean systems. The study of the many interrelationships in the ocean requires the integration of multidisciplinary approaches and different investigative tools, one of which is observation. The ocean observing community, therefore, has a responsibility to collaborate internationally to provide the scientific knowledge needed for wise global stewardship decisions.

1. Open access to data impacts science and operational oceanography, Argo as a successful example

Argo’s Open Data Policy has fostered the development of an observing network that is now essential both to research and operational oceanography.

2. Transfer of knowledge is essential for capacity building and integration

Training is key as it creates and generates a capacity to implement and transfer of standard methods to operational environments. Transfer of training is strongly linked to capacity building. Capacity building is essential for developing observations in areas where they do not exist and can facilitate the interoperability of data collected by different people through different means.

3. Improving effectiveness increases the data returns for societal applications, the Global Drifter Program as an example

Surface Velocity Plotters were devised to monitor sea-surface currents in the open ocean, with small buoys equipped with a holey sock drogue centered at 15 m depth. These buoys all carry temperature sensors, but adding further sensors enables them to generate greater data returns.

4. Move to a governance adapted to socio-ecological systems and based on scientific advice

The Anthropocene era provides a new framework for polycentric governance, well illustrated by COP21 in Paris. A new paradigm emerges: the “Policy driving policy” evolves to “science driving policy” & “policy driving science”, closing the loop.

5. Ensuring equity & fairness, reciprocity & transparency favor trustful relationships

The key ethical principles in research are integrity, honesty, accountability, professionalism and stewardship. Scientists have an ethical responsibility to share information in a global understanding of ecosystem functioning. Equanimity is an essential component of equitable stewardship, and equity and sustainability are linked (Steffen and Stafford Smith, 2013).

6. Animal ethics in ocean observation is essential, as implemented at the Ocean Tracking Network

Ethical issues facing OTN researchers include obligations to the animals and obligations to the broad group of stakeholders interested in the results from OTN studies and access to OTN data.

7. Compliance with laws avoids source of practical conflict

UNESCO defines zones of coastal jurisdiction, for which states have different rights and duties (1982).

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- The terrestrial sea: territorial sovereignty of the coastal state to 12 nautical miles including a right of innocent passage for ships of all states.
- The exclusive economic zone (EEZ): the coastal state may claim exclusive rights for the exploration and exploitation of marine resources over 200 miles.
- The continental shelf: submarine seabed and its subsoil beyond the limits of the territorial sea, within 200 miles up to 350 miles, with sovereign rights on natural resources.