



# Carbon Cycle (Biogeochemistry)

**The Deep Ocean Observing Strategy (DOOS) is being developed under the auspices of the Global Ocean Observing System (GOOS), and will embrace observations below 200 m.**

As a GOOS Project, DOOS will be aligned with the Framework for Ocean Observing (Framework). In 2012 the GOOS adopted the Framework as a guide for GOOS activities and alignment. The purpose of the Framework is to assist in the development and delivery of an integrated ocean observing system fit for many purposes.

The Framework describes a clearly defined structure that allows ocean observing providers and users to plug-in at various points within the system. It traces a path from Inputs (requirements or EOVs) to Processes (observations), to Outputs (data and products). To maintain an ocean observing system that is fit-for-purpose, the outputs must properly address the issues that drove the original requirements. This creates a constant feedback loop such that requirements are always science driven and informed by societal needs; and that EOVs are part of the system that responds iteratively to this evolving set of science and societal needs.

A focus on measuring EOVs provides a way for all stakeholders to speak a common language fostering collaboration in this highly voluntary system. EOVs are identified based on how feasible they are to observe and their level of scientific or societal impact. Targeting investments based on EOVs, in conjunction with the evaluation and encouragement of improved readiness levels for sustained observations, ensures a path for research and innovation to shape the evolution of GOOS.

## Carbon Cycle: Biogeochemistry EOVs

Within the GOOS Biogeochemistry (BGC) community EOVs are determined by the impact of their measurement and the feasibility of the technology required to measure these variables. The EOVs for biogeochemistry BGC within GOOS are variables essential to answer questions related to:

- The role of ocean biogeochemistry in climate
- Human impact on ocean biogeochemistry
- Ocean ecosystem health

Based on an analysis of impact and feasibility based on the 3 questions listed above as guidelines, the GOOS BGC panel compiled a list of 9 EOVs. (Of these, 7 are listed as essential climate variables in the 2016 GCOS Implementation Plan.



## GOOS Biogeochemistry EOVs

GOOS BGC EOVs of physical ocean environment include:

- Dissolved Oxygen
- Inorganic Macronutrients
- Carbonate System
- Transient Tracers
- Suspended Particulates
- Nitrous Oxide
- Stable Carbon Isotopes
- Dissolved Organic Carbon

## DOOS Biogeochemistry EOVs

Preliminary discussions related to BGC EOVs are focused on the two following focal points:

- Synergies and discrepancies between the BGC EOVs defined by DOOS and the GOOS BGC panel
- Gaps in the DOOS BGC EOVs as discussed to date

Discussions on GOOS and DOOS EOV discrepancies will be focused on:

- Dissolved and particulate organic matter/suspended particulates are presented as one EOV by DOOS while they are considered separate EOVs by the GOOS BGC panel
- DOOS suggests transient tracers (e.g., CFC, SF<sub>6</sub>, <sup>3</sup>He, <sup>14</sup>C) are listed as physical EOVs in GOOS
- N<sub>2</sub>O and Ocean Color, being defined as GOOS BGC EOVs are not considered by DOOS

## Next Steps

As DOOS progresses there is an agreement that discrepancies between DOOS and GOOS EOVs should be reconciled where possible.

<http://deepoceanobserving.org/observations/carbon-cycle-biogeochemistry/>