ECV IN BRIEF

Domain: Ocean
Subdomain: Biogeochemistry
Scientific Area: Biosphere
Products: Interior Ocean Oxygen Concentration

Oxygen

Oxygen (O2) is essential for nearly all multicellular life. Subsurface oxygen concentrations reflect a balance between supply through circulation and ventilation and consumption by respiratory processes. Changes in either of these processes is susceptible to lead to changes in O2 distribution. A global ocean O2 observing network will act as a sensitive early warning system for trends that climate change is causing. Ocean deoxygenation (decline in O2 concentration) is under way in part because of ocean warming and increased stratification, but also because of increased nutrient loads in the coastal ocean. Deoxygenation has been largely under the radar to most people including policy advisers and decision makers. Yet it is deoxygenation that will have profound implications not just for ecosystems but also for communities and economies that depend on a healthy ocean.

ECV Product[1]

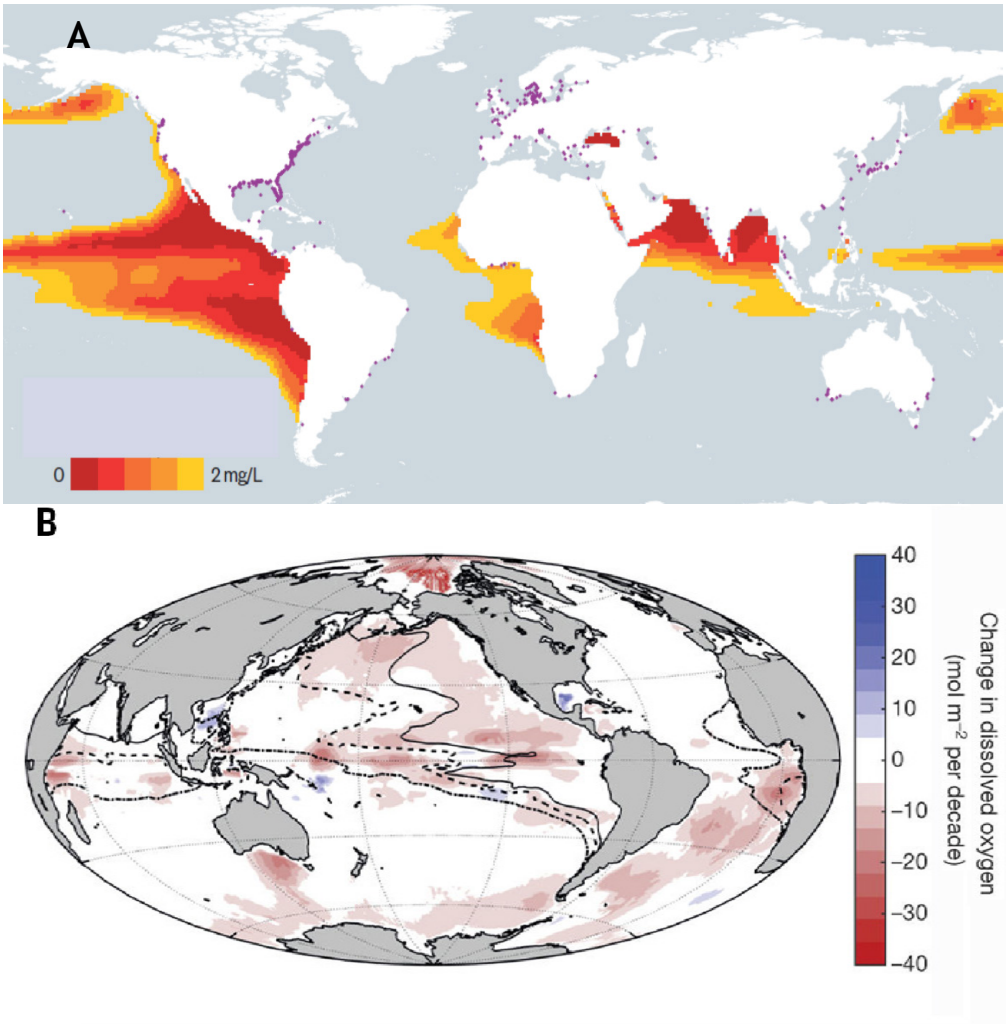
PRODUCT	DEFINITION	REQUIREMENTS				
		FREQ.	RES.	REQUIRED MEASUREMENT UNCERTAINTY	STABILITY	STANDARDS/ REFERENCES
INTERIOR OCEAN OXYGEN CONCENTRATION	Concentration of dissolved oxygen in the water column [µmol kg^{-1}]	Weekly to Decadal	3-20° degrees	0.5 **µmol** kg^{-1}– 2 µmol kg^{-1}	Not specified	See EOV Specification Sheets: www.goosocean.org/eov

[1] Current Products and Requirements as in the Implementation Plan 2016 (GCOS-200). GCOS is reviewing and will update the requirements until 2022. More information on: gcos.wmo.int and climatedata.wmo.int.

Data Sources[2]

- CLIVAR and Carbon Hydrographic Data Office (CCHDO): http://cchdo.ucsd.edu/
- Biogeochemical Argo Global Data Assembly Centres: http://biogeochemical-argo.org/data-access.php
- OceanSITES Global Data Assembly Centres: http://www.oceansites.org/data/index.html
- Global Ocean Data Analysis Project (GLODAPv2): http://glodap.info/

Oxygen concentrations in the ocean



(A) Global map showing coastal sites (purple dots) and open ocean sites (red to yellow, at 300 m of depth) where O2 levels are below 2 mg L-1 (Adapted from Breitburg et al., 2018)

(B) Change in oxygen content of the global ocean in mol O2 m–2 decade–1.

Reference: Breitburg, D., et al.(2018): "Declining oxygen in the global ocean and coastal waters." Science, Vol. 359, Issue 6371, doi:10.1126/science.aam7240

[2] This list provides sources for openly accessible data sets with worldwide coverage for which metadata is available. It is curated by the respective GCOS ECV Steward(s). The list does not claim to be complete. Anyone with a suitable dataset who would like it to be added to this list should contact GCOS.