
ICOS France Ocean: long term observations of the carbon system in key regions of the ocean

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Résumé

The main objective of the French ICOS Ocean is to better quantify the air-sea CO₂ flux, its seasonal and decadal variability as well as its long term trend. When water column measurements are made, the anthropogenic penetration of CO₂ can be assessed. At coastal stations, the biogeochemical observations allow the study of the response to anthropogenic effects and ocean acidification.

The measurements of the carbon system are performed on different platforms (buoys, research ships, merchant ships, ferry) and the regions sampled correspond to key regions of the world ocean.

The North Atlantic subpolar gyre, sampled during Suratlant cruises, is a major carbon sink to the atmosphere, mostly because of the strong seasonal cooling in this regions associated with the thermohaline circulation.

The tropical Atlantic is a strong source of CO₂ to the atmosphere characterized by strong ocean dynamics and river discharge. The evolution of the source of CO₂ under increasing atmospheric CO₂ remains unknown.

The Southern Ocean (south of 40oS) constitutes the most important ocean sink for atmospheric CO₂ accounting for about half the contemporary global ocean carbon uptake, thus slowing the rapid accumulation of CO₂ in the atmosphere.

The Subtropical Indian Ocean (20oS-40oS), investigated during OISO cruises, is an annual carbon sink mainly driven by thermal processes.

The western European shelf concentrates several key temperate coastal ecosystems (homogeneous, stratified, estuarine plumes, bays, thermal front). Their role as sources or sinks of CO₂ has yet to be accurately estimated in global carbon budgets.

Carbon data from the DYFAMED station and the MOOSE cruises will be exploited to monitor the ocean acidification in the Mediterranean Sea.

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