# Laboratoire d?Océanographie et du Climat : Expérimentation et Approches Numériques

**Laboratoire d'Océanographie et du Climat : Expérimentation et Approches Numériques** studies ocean in a wide range of spatial scales and the role of ocean on climate variability. LOCEAN recently initiated studies on climatic variability and society relationships interacting with other communities (agronomy, economy, health).

## Organisation

LOCEAN is a joint research laboratory of Université Pierre et Marie Curie, Muséum National d?Histoire Naturelle, Centre National de la Recherche Scientifique and Institut de Recherche pour le Développement. It houses roughly 150 personel, two thirds of which being either researchers, university teachers, Ph.D. students or post-doctoral fellows.

## Research themes

The primary focuses of the research at LOCEAN are the physical and bio-chemical study of the ocean and of climatic variability. Studies in the ocean cover a vast range of scales from vertical mixing, internal waves to basin-scale or planetary-scale motions. They aim to improve our understanding on ocean dynamics and their impact on major chemical reservoirs. The bio-geochemical cycles are investigated in particular for carbon, both inorganic and organic. Climate studies include in particular the role of the ocean on climate variability on the times scales from the intra-seasonal to the century or millenial, both for past, present and future climates. Recently, the laboratory got involved in studies of the relation between climate variability and the society interacting for that with other scientific communities (agronomy, economy, health).

## Main international projects

- ***European projects :***

  - **DAMOCLES** : observation, understanding and quantification of climate change in the Arctic to contribute to decision making related to global warming.- **CLARIS-LPB** : forecasting the

impacts of climate change in the La Plata river basin of southern America and definition of adatation strategies (agriculture, rural development, water management?)

- **MyOcean** : development and implementation of a unique system for observing, modeling and forecasting the world ocean and regional european seas.
- **DRAKE *:***
  Study of the transports across the Drake straight
- **SMOS :** ESA satellite mission devoted to surface salinity and soil humidity measurements

# Collaborations

Within SMOS, LOCEAN collaborates with the companies ACRI-ST and CLS (Collecte Localisaiton Satellites). LOCEAN maintains numerous collaborations with Brazil (PIRATA moored array observing system, climate impacts on health, paleo-climatological observations, studies of the anthropogenic carbon in the tropical Atlantic), with Argentina (CLARIS-LPB, climate impacts on hydrology, agriculture and water uses in the La Plata basin of South America), Peru (studies of coastal upwellings and their inter-annual variability both physical and bio-geochemical), Senegal (statistical methods applied to environmental data, studies of the variability of the inter-tropical Convergence zone and air-sea coupling in the tropical Atlantic) and India (intra-seasonal variability of the Indian Ocean and the coupling with monsoon regimes and variability of the tropical atmosphere).

# Tools / instrumental developments

- Oceanographic instruments that are part of a multi-laboratory instrumental array to be used in oceanographic cruises, in particular for the study of ocean dynamics and air-sea coupling.
- Instrumental development, in particular for instrumented drifters, in-situ measurement of sea ice thickness or chemical analysis of sea water.
- Numerical modeling tools for the dynamical and biogeochemical ocean and sea ice. This is coordinated in the observatory ES-OPA of INSU with numerical model development OPA and data assimilation NEMO.
- Chemical analysis equipment : service SNAPOCO2 for the analysis of inorganic carbon in sea water, instrumentation for organic carbon studies in sea water, analytical platform for the analysis of 18O/13C in sea water and solid material
- Tools for theoretical, conceptual and statistical modelling of data (analysis of in situ, satellite or model data)
- Coordination and participation to the INSU observatory OISO/CARAUS of the study of inorganic carbon in the Southern ocean, and participation to the INSU observatory SSS of sea surface salinity.

# Management team

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