

CIRENE Project (France)

Contribution to "Overview of existing and planned observations" (SOCIO meeting)

1. Scientific rationale

The aims of the CIRENE project contribute to :

- a- Describe and understand the role of the ocean in Indian climate variability at seasonal and interannual time scales (e.g. variability of the monsoons, Dipole Mode)
- b- Determine the relationship between the Indian basin variability and other climate modes (such as ENSO) through a better description of the Indian Ocean (e.g. role of ocean-atmosphere coupling on the boreal winter Intraseasonal Oscillations leading to Westerly Wind Bursts in the western Pacific; importance of Indian oceanic conditions in the response to the external forcing related to ENSO)
- c- Improve the large scale description of ocean models by evaluation of these models to observations and by using ocean data assimilation (applications to research and operational oceanography objectives)
- d- Prepare improved ocean initial states for seasonal to interannual climate prediction (monsoons, precipitations in Africa, ENSO onset and global teleconnections)

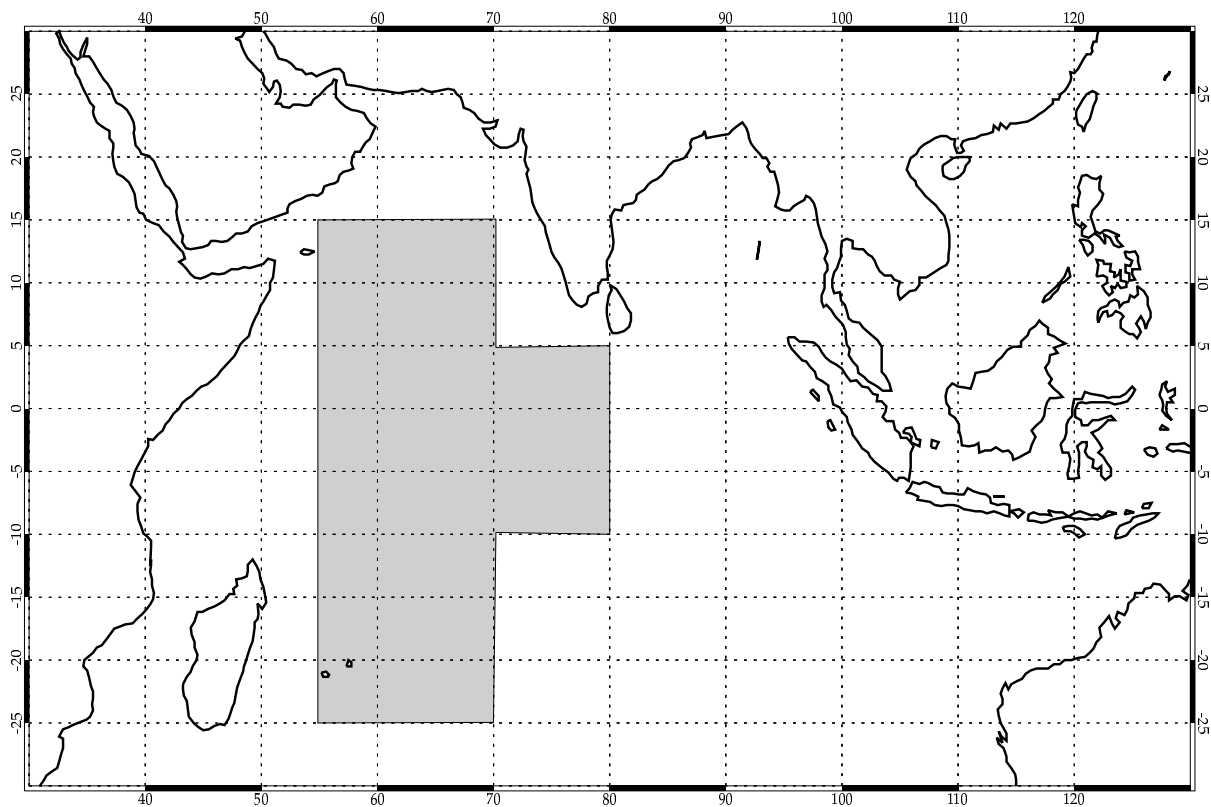
While a first effort is actually put on measuring the eastern equatorial Indian Ocean (e.g. deployment of TRITON buoys by JAMSTEC, see the contribution by Dr Takeuchi), the CIRENE Project aims at deploying PROVOR floats in the western Indian Ocean. It is integrated into the french contribution to the ARGO Programme. The strategy of deployment will be defined during the year 2001 based on ocean simulations and data assimilation (twin experiments) expecting a deployment in 2002. A general scheme of deployment has already been discussed and is summarized in the map below. Basically, the deployment should follow a north-south direction from the Arabian Sea to La Reunion. The meridian of deployment should be located between 55°E and 70°E. Such a deployment should allow the study of the thermohaline structure on seasonal to interannual time scales as a function of latitude, as well as the description of the thermocline and its waters masses.

Between 5°N and 10°S, PROVOR floats should be deployed at different longitudes allowing a better zonal coverage of the Indian Ocean thermohaline variability in order to address the equatorial variability (e.g. impact of the Wyrki Jets, Dipole Mode, ENSO impact), the SST/thermocline decoupling below the wind convergenc zone, and the role of the ocean into boreal winter Intraseasonal Oscillation characteristics.

The general scheme of deployment has suggested :

- northern region (15°N-5°N) : 3 to 5 floats
- southern region (15°S-25°S) : 3 to 5 floats
- equatorial region (5°N-10°S) : 5 to 7 floats per longitude aiming at deploying floats at three different longitudes (e.g. 60°E, 70°E, 80°E).

Funding for 25 floats have been requested at the French PNEDC aiming a first deployment in late 2002 completed next year according to float divergence or loss.



General scheme of PROVOR deployment

The T/S measurements collected by the PROVOR floats will allow us to address in particular the following scientific objectives:

- role of salinity in Indian climate variability
- variability of Wyrтки Jets onto the ocean thermohaline structure and mass/heat transports
- Indian basin interannual variability (biannual, Dipole, ENSO impact)
- SST/Thermocline decoupling in the ITCZ region
- role of the ocean in boreal winter Intraseasonal Oscillations

This observational project is completed by the use of ocean (OPA OGCM) and ocean-atmosphere coupled models as well as by the use of the 4D-Var assimilation method developed at LODYC in the ECUME group. Integrating the CIRENE data with the international efforts (e.g. japanese TRITON moorings in the Eastern Indian Ocean, australian PALACE deployments in the eastern and south-eastern Indian Ocean, XBT lines) together with satellite data (such as sea-level from TOPEX/POSEIDON, Jason) will allow to reach a data coverage potentially sufficient to constrain ocean models by data assimilation using a method such as 4D-Var.

2. Summary of observational plan

(1) PROVOR floats

About 25 PROVOR floats would be launched in two phases (in late 2002 and in 2003) along a north-south transect from the Arabian Sea to the Reunion island.

Period of deployment: second semester of 2002

Location (to be defined): from the Arabian Sea to the Reunion island with a focus on the equatorial region and the ITCZ region

Measurements: Temperature and salinity over 2000m

(2) Hydrographic observations

Simultaneously with the deployment of the PROVOR floats, we aim at collecting hydrographic measurements. Ship time for an oceanographic campaign in late 2002 will be soon requested.

(3) Thermosalinograph lines

The feasibility of developing new thermosalinograph lines (VOS Programme) is under evaluation.