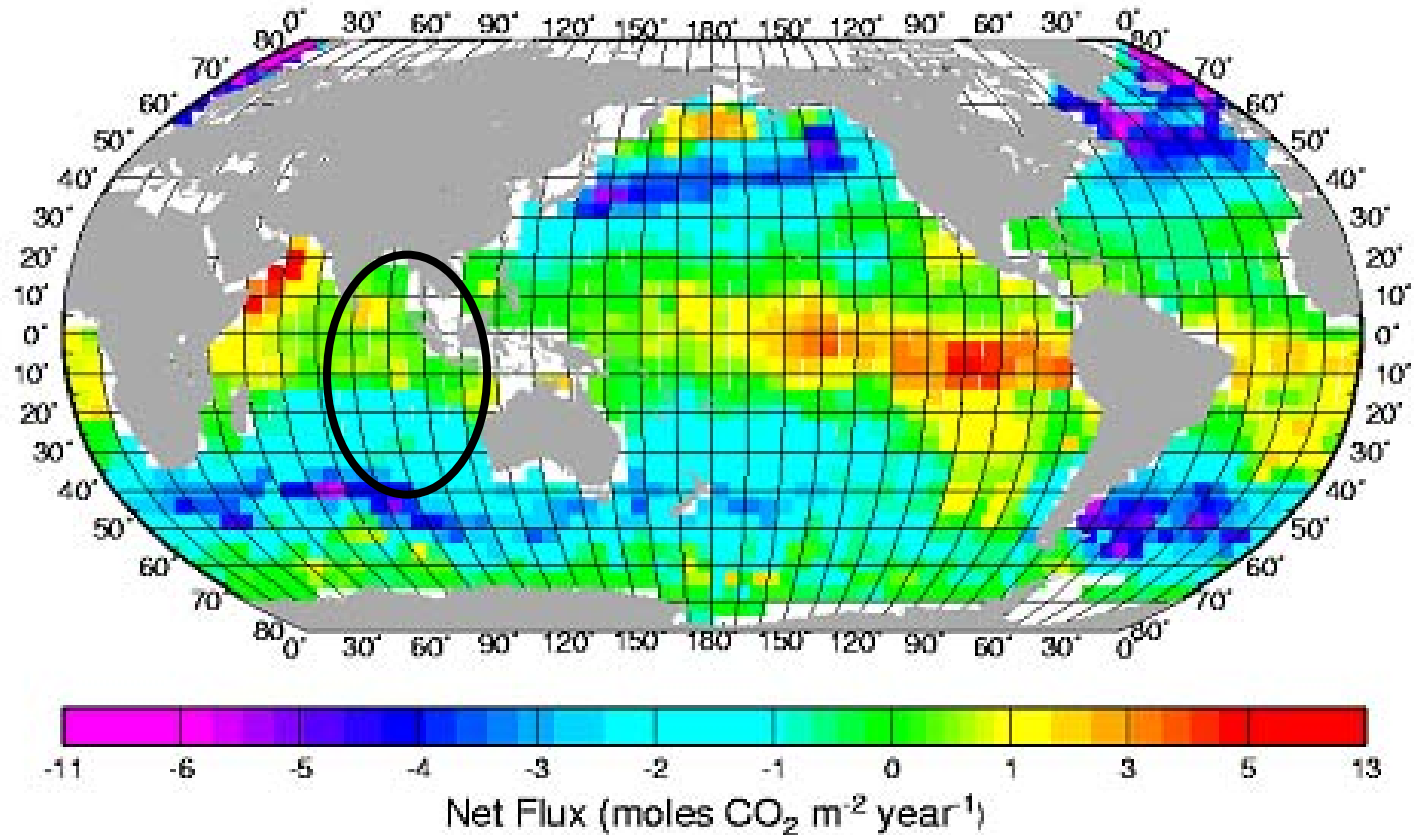


**Planned Time-series observations in the
Northern Indian Ocean
by
National Institute of Oceanography
India**

**V.V.S.S. Sarma, M.D.Kumar, V.V. Sarma, Y. Sadharam, N.P.C. Reddy
National Institute of Oceanography, Goa/Vizag**

Annual mean net CO₂ fluxes [mol m⁻² y⁻¹]



Takahashi et al., 2002

Ongoing time-series projects in the east coast of India (western Bay of Bengal)

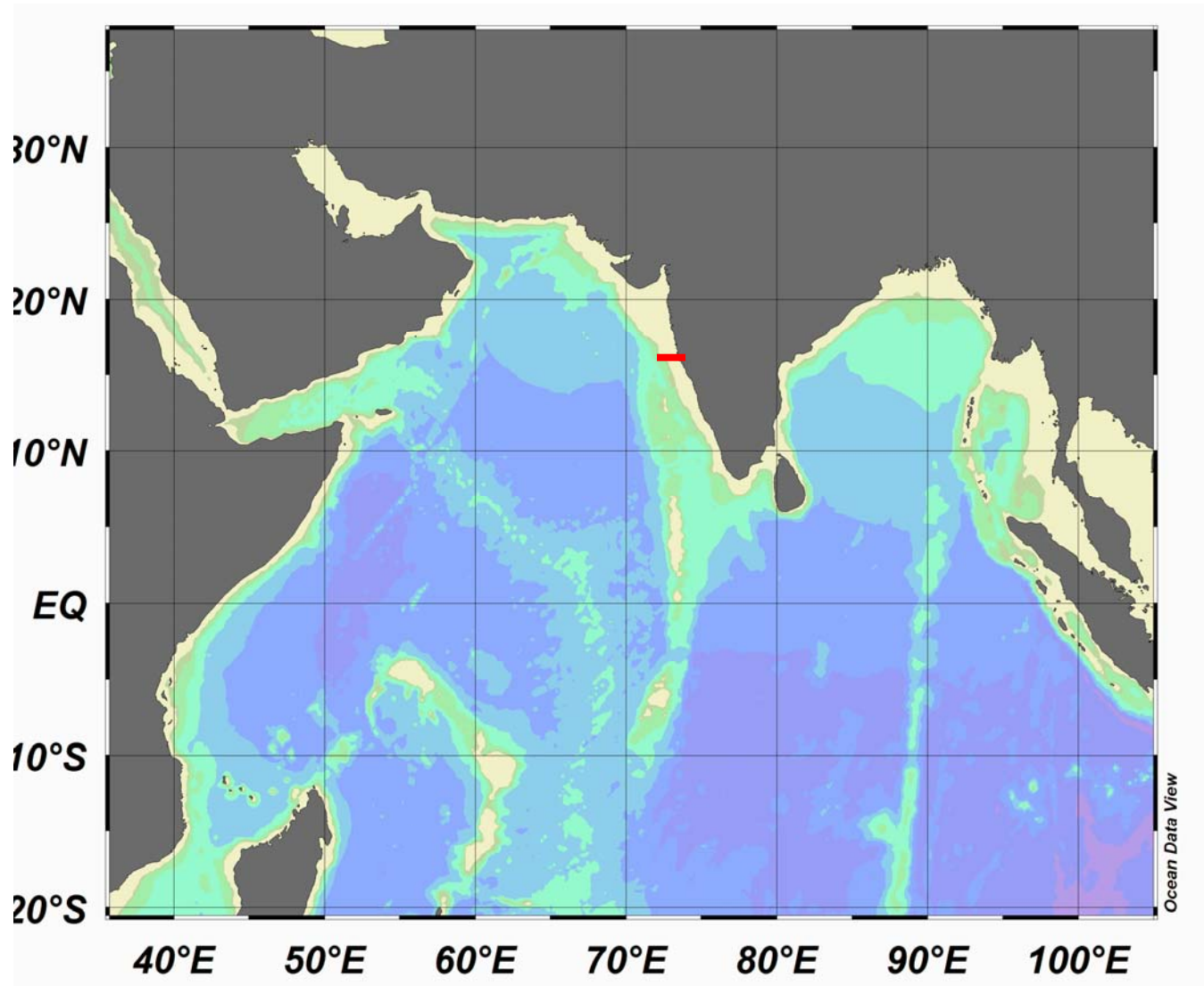
- *Biogeochemical Response of coastal waters off Visakhapatnam To extreme climatic events and human interference – Surface Ocean Lower Atmosphere Study (SOLAS) since 2006*
Sampling at Monthly Scale
- *Bay of Bengal Carbon Flux Study (BOBFLUX) – Council of Scientific and Industrial Research (CSIR) Since 2008*
Sampling at diurnal to seasonal Scale
- *Variability of Ecosystem and Biogeochemistry in Godavari Estuarine System (VEBGES) – Supra Institutional Project (SIP) Of Council of Scientific and Industrial Research (CSIR) since 2007.*
Sampling at daily Scale
- *Coastal Ocean Monitoring and Prediction system (COMPAS)- Ministry of Earth Science since 2008*
Sampling at seasonal Scale

Ongoing time-series projects in the west coast of India (eastern Arabian Sea)

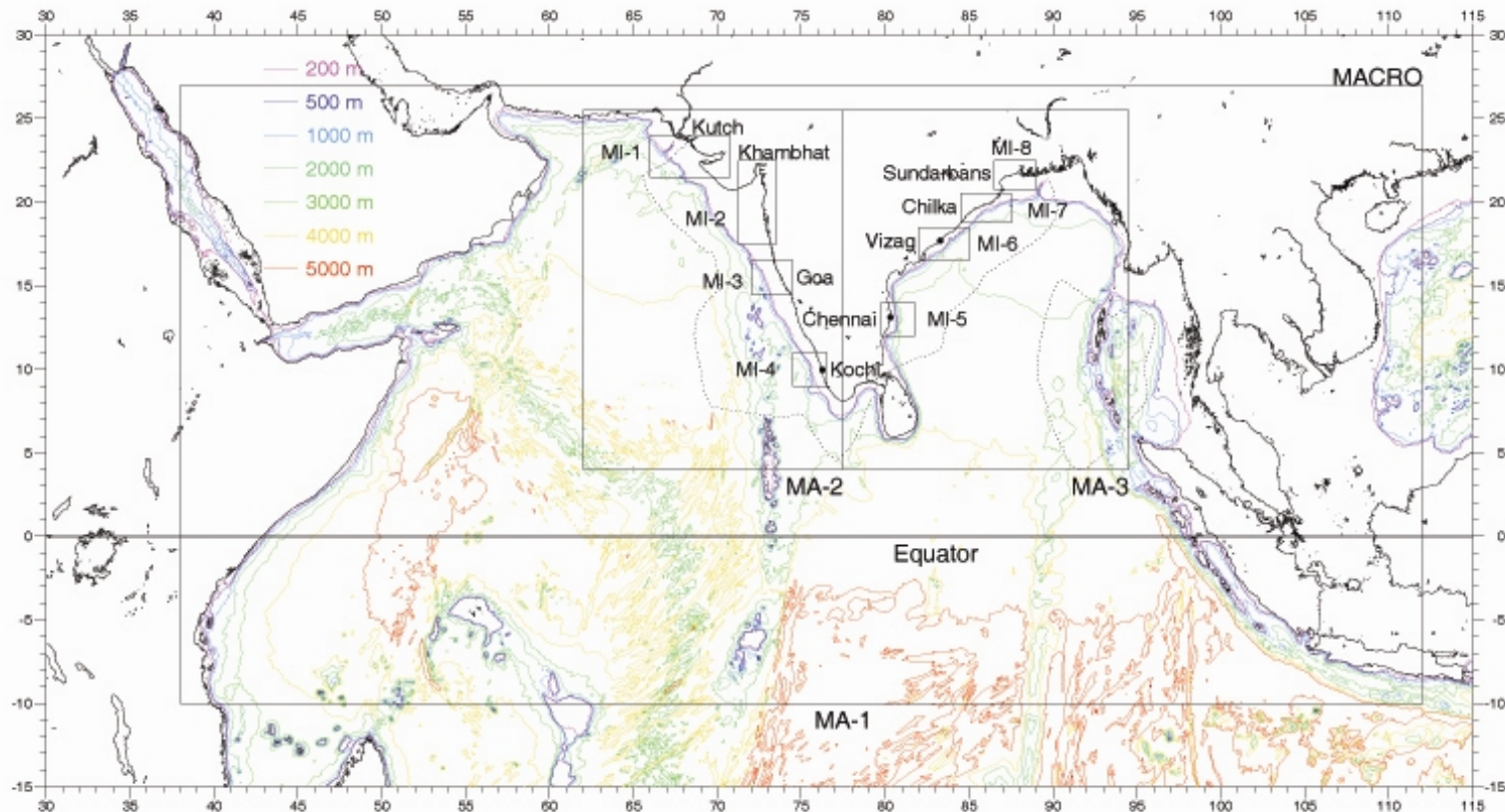
- *Impact of anthropogenic perturbations on oceanographic – atmospheric processes in and around India in the context of Global Change (CSIR Network Project No. CMM 009) Since 2002*

Sampling at Monthly Scale

Arabian Sea time-series stations



Identified time-series stations along the Indian coast



Bay of Bengal time-series stations

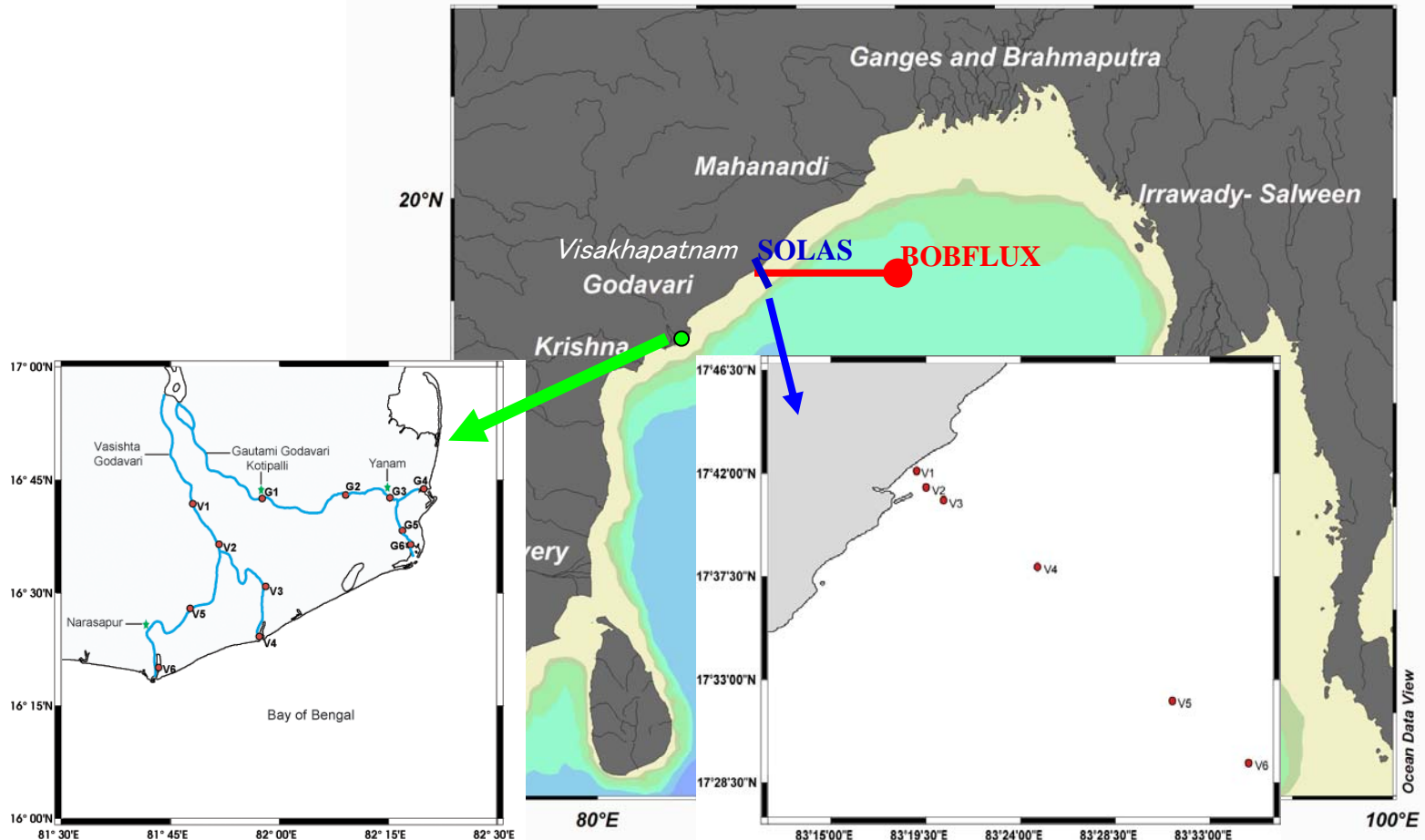


Figure1. Sampling locations in Gautami (G1 - G6) and Vasishta (V1 - V6) estuarine systems

(G1,G3 stations for pilot experiment)

Variability of Ecosystem and Biogeochemistry in Godavari Estuarine System (VEBGES)

Objectives: Understand influence of river influx (lithogenic, terrogenic material) on ecosystem structure in the rivers in diurnal to inter-annual time scales.

Physical variables such as temperature, salinity, currents, tidal variations, surface meteorological parameters, and biogeochemical parameters such as dissolved oxygen, nutrients, bulk chlorophyll-a, size fractionated chlorophyll, phytoplankton speciation, phytoplankton pigments, primary production (gross and net community production), Community respiration, new production, dissolved organic carbon, dissolved inorganic carbon species, (total alkalinity, pH, partial pressure of carbon dioxide, and total inorganic carbon), organic carbon (both dissolved and particulate) and isotopic ratios of dissolved and particulate organic/inorganic carbon and nitrogen, suspended matter, grain size analysis, rates of phytoplankton growth, zooplankton grazing and bacterial respiration.

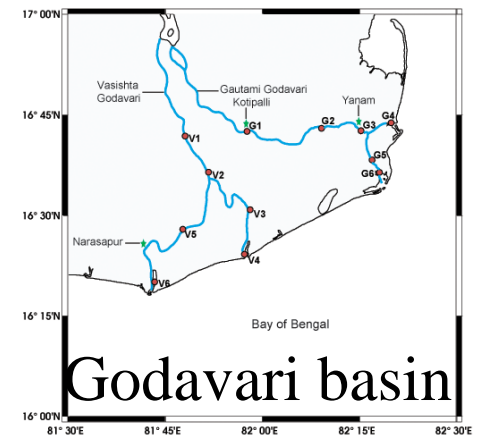


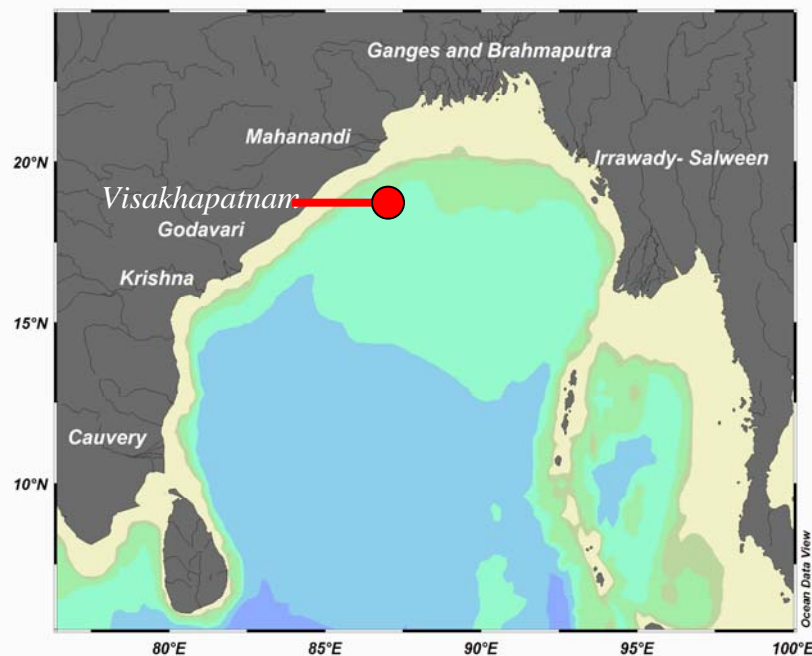
Figure 1. Sampling locations in Gautami (G1 - G6) and Vasistha (V1 - V6) estuarine systems (G1, G3 stations for pilot experiment)

Bay of Bengal Carbon Flux Studies (BOBFLUX)

Period: 2008-2012

Funding: CSIR

The main objective of this proposal is to understand quantitative biogeochemical cycling of carbon and nitrogen in the Bay of Bengal by addressing the following specific questions:



1. What is the short-term to inter-annual variability in Biogeochemical processes in the Bay of Bengal?
2. How river inputs influence the carbon biogeochemistry in the Bay of Bengal?
3. What is the influence of cyclones on nutrient injections, primary production and air-sea exchange of trace gases?
4. What is the seasonal to inter-annual variability in export production?
5. What is the relationship between primary and export production?
6. What is the influence of river runoff on bacterial growth rates and respiration?
7. What are the seasonal variations in transfer velocities of trace gases?
8. What are the temporal and spatial variations in the air-sea exchange of trace gases?

Biogeochemical Response of coastal waters off Visakhapatnam To extreme climatic events and interference – SOLAS project

- ➔ To study the biogeochemical processes and their physical interactions in the coastal waters off Visakhapatnam under normal and extreme climatic events
- ➔ To detect the occurrence of hypoxia conditions (if any) due the agricultural, industrial and anthropogenic inputs in these coastal waters
- ➔ To quantify the net exchange of CO₂ across the air-sea interface by studying the carbon system in the coastal waters.
- ➔ To study the impact of coastal hazards (cyclones, storm surges tsunamis) on biogeochemical processes in Visakhapatnam Coastal waters.

Future plans:

Time-series measurements of triple oxygen isotopes and O₂/Ar Ratios in the surface ocean

Time-series measurements of inorganic carbon parameters

Measurements of ¹³C, ¹⁵N of dissolved and particulate (both organic & Inorganic)

Sinking fluxes collection using sediment traps

High resolution sampling using Remote access Samplers

Continuous measurements of Primary production by FRRF.