CoLaB: "Coastal Lab in a Box"

Objectives

1. **An affordable and portable package of instruments and methods for standardised coastal oceanographic studies**

Water sampling - Hydrographic, Biogeochemical and Biological observations

- Maximal applicability: wetlands to open shelf (0-200+ m)
- Minimal infrastructure: research vessel, laboratory etc
- Complementary to moored observing systems
- Easily taught

2. **Best practices and training manuals for standardised methods**

3. **Secure instrument package and team for training**

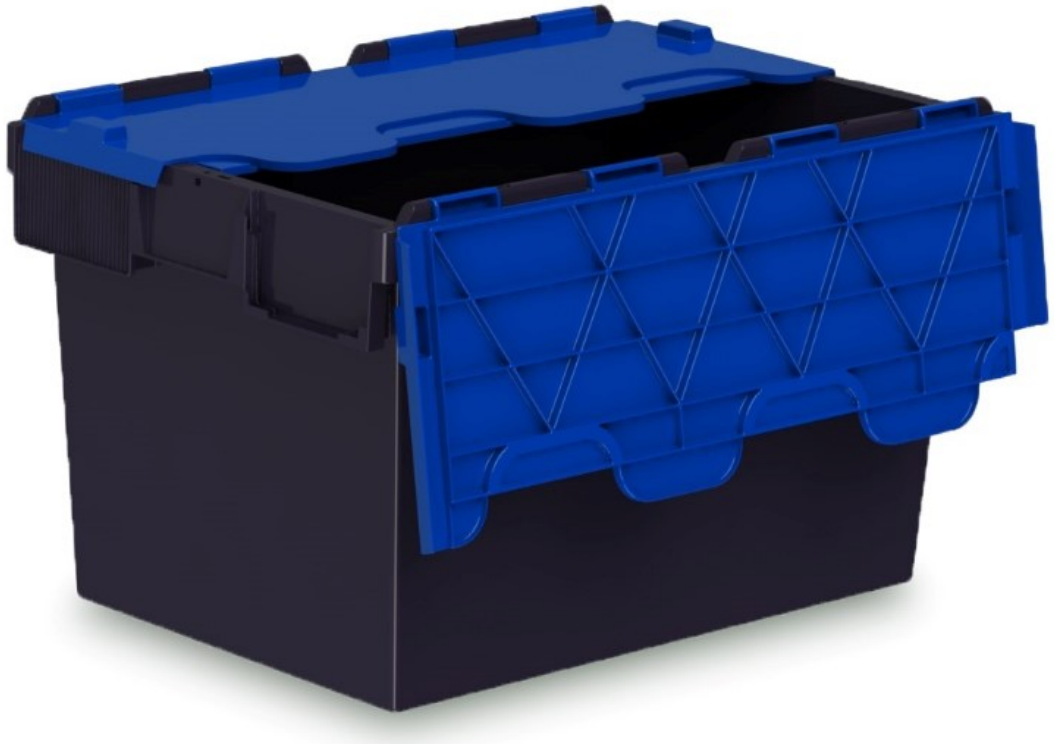
Greg Cowie: School of GeoSciences, University of Edinburgh (glcowie@ed.ac.uk)

Sponsored by IMBeR, SCOR and the National Science Foundation

Outline

- Portability
- Vessels
- Simple hydrographic methods and instrumentation
- Water sampling and issues
- Biogeochemical analyses and associated issues
- Some examples

Portability

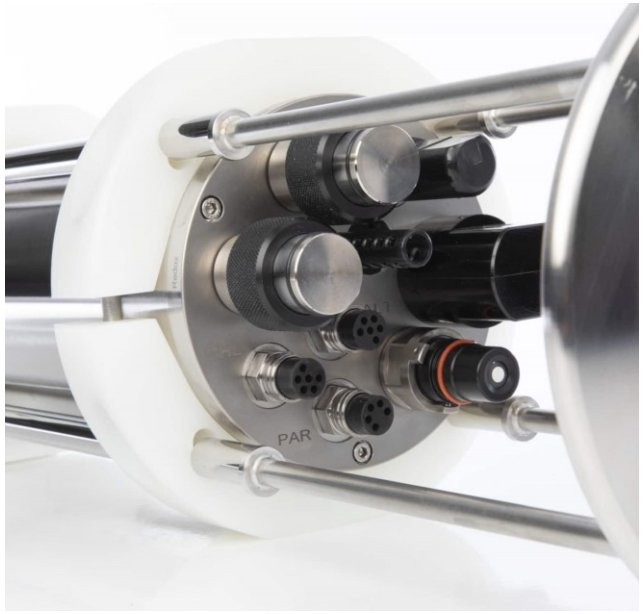


Vessels

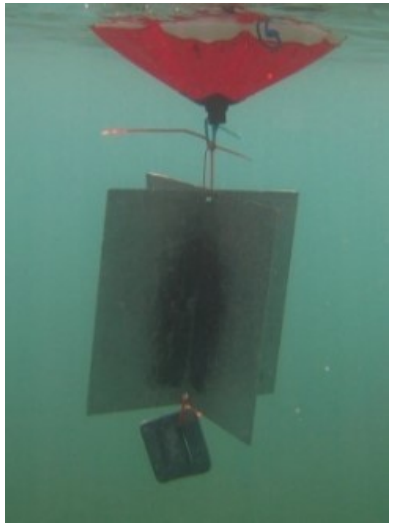
- Kayaks
- Outboards (dive boats/RIBs)
- Small research vessels (inland waters)
- Ocean-going vessels (shelf studies) - fishing boats to full research vessels

Basic hydrographic instrumentation

CTD



Currents



Water sampling and associated issues

Old-School
Niskins and messengers

CTD-Rosette sampler

Line hauler

Winch and wire/rope

Biogeochemical analyses

Multiparameter sondes

Some lab-based methods

- Nutrients
- Chlorophyll
- Dissolved oxygen
- Alkalinity
- pH
- SPM
- Sulfide
- CDOM and FDOM
- (POC, PN, metals, DOC, TDN)

Simple analytical instrumentation

- Balance
- UV-vis spectrophotometer
- Fluorometer

Other equipment

- Labware (plastic)
- Pump and manifold for filtration
- Water bath/circulator

Purified water

Lab requirements

- Bench space
- Sink and water
- Power
- Reagents
- Refrigeration/freezer
- (Drying oven)
- (Fume hood)

Sample throughput?

30 – 40 samples per day for full suite of analytes

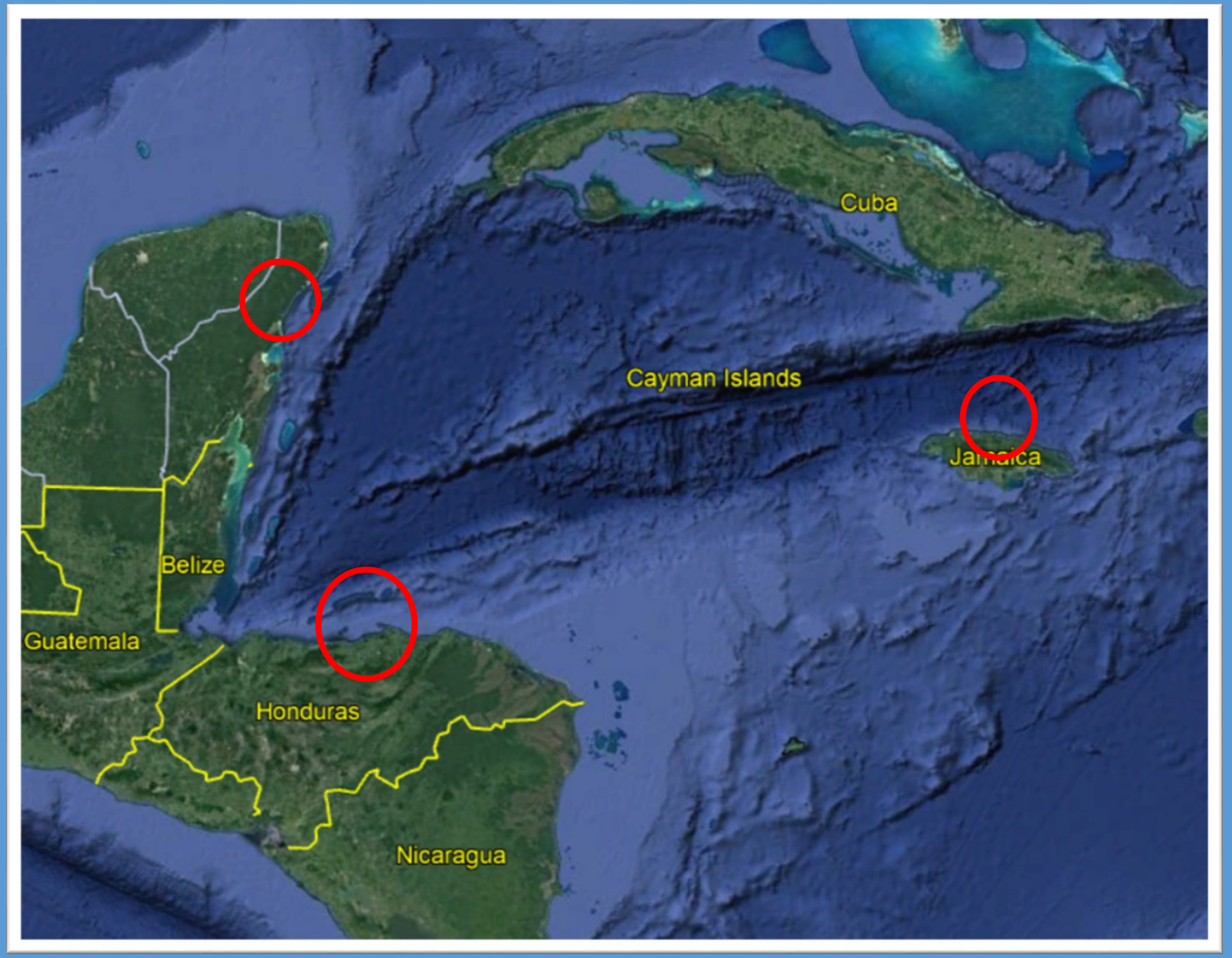
3-4 analysts

Examples of applications:

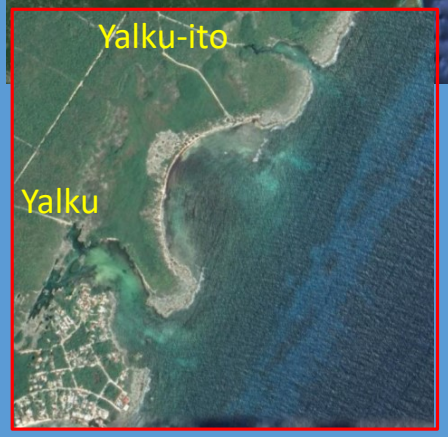
A. Caribbean studies

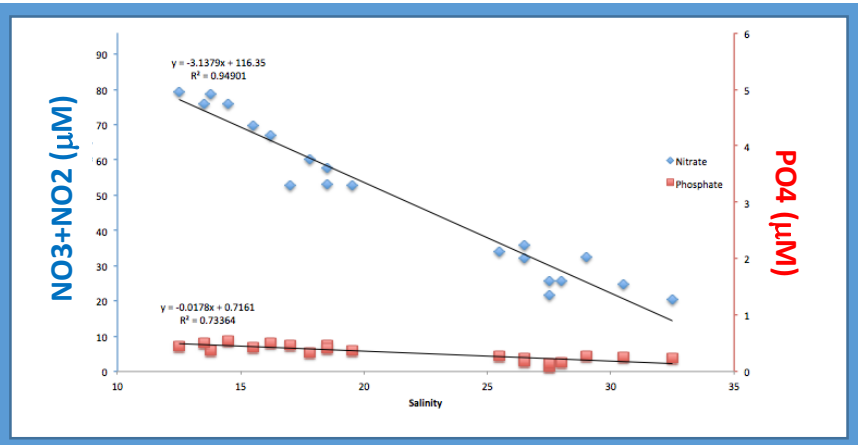
University of Edinburgh fieldtrips and dissertation projects

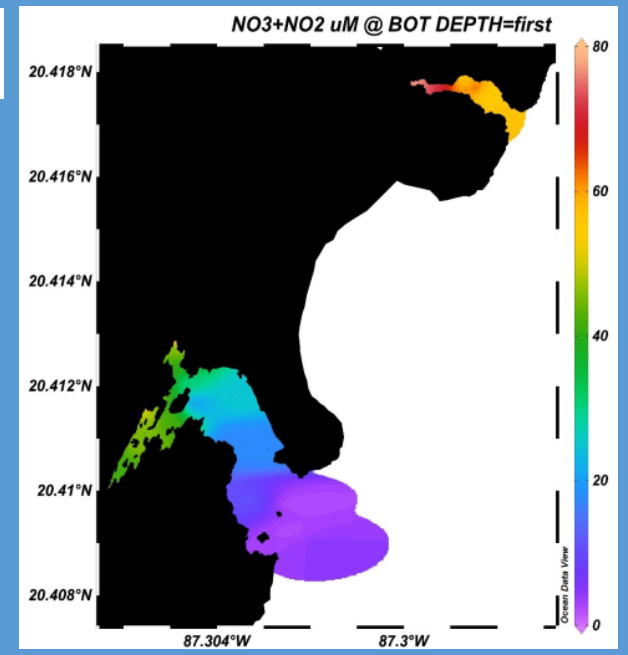
- Mexico, Honduras and Jamaica
- Kayaks to small dive boats
- Manual sampling and deployments

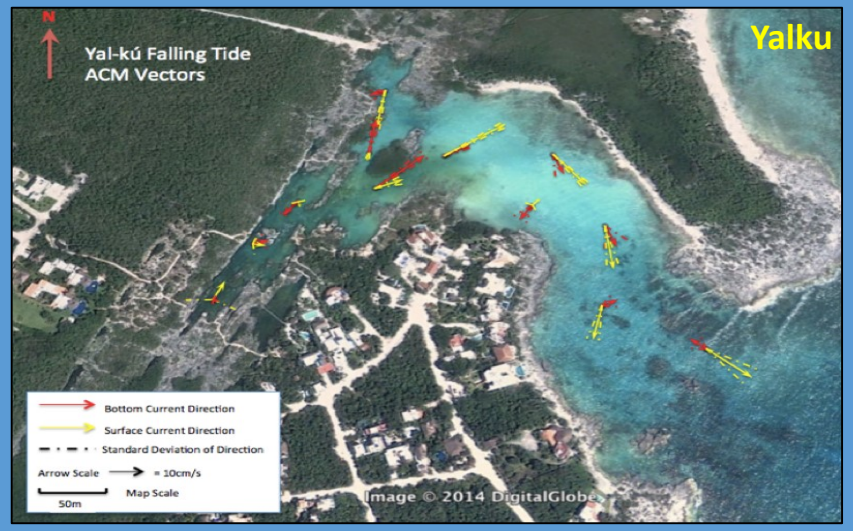


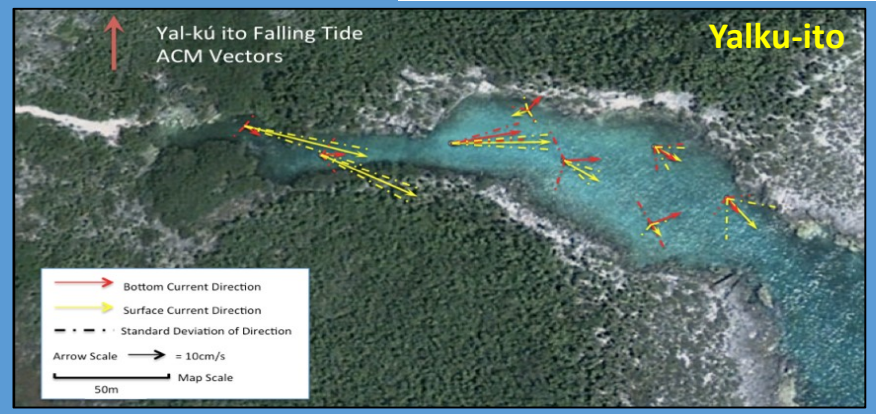
Mexico: Contaminated groundwaters and reef health

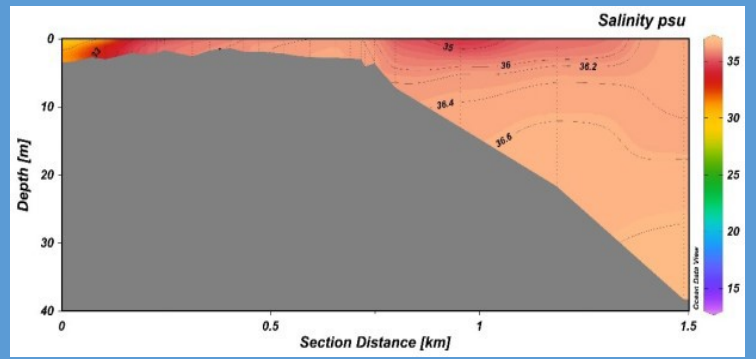


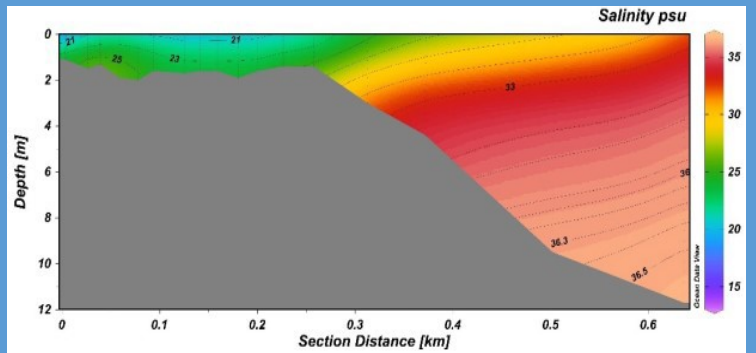




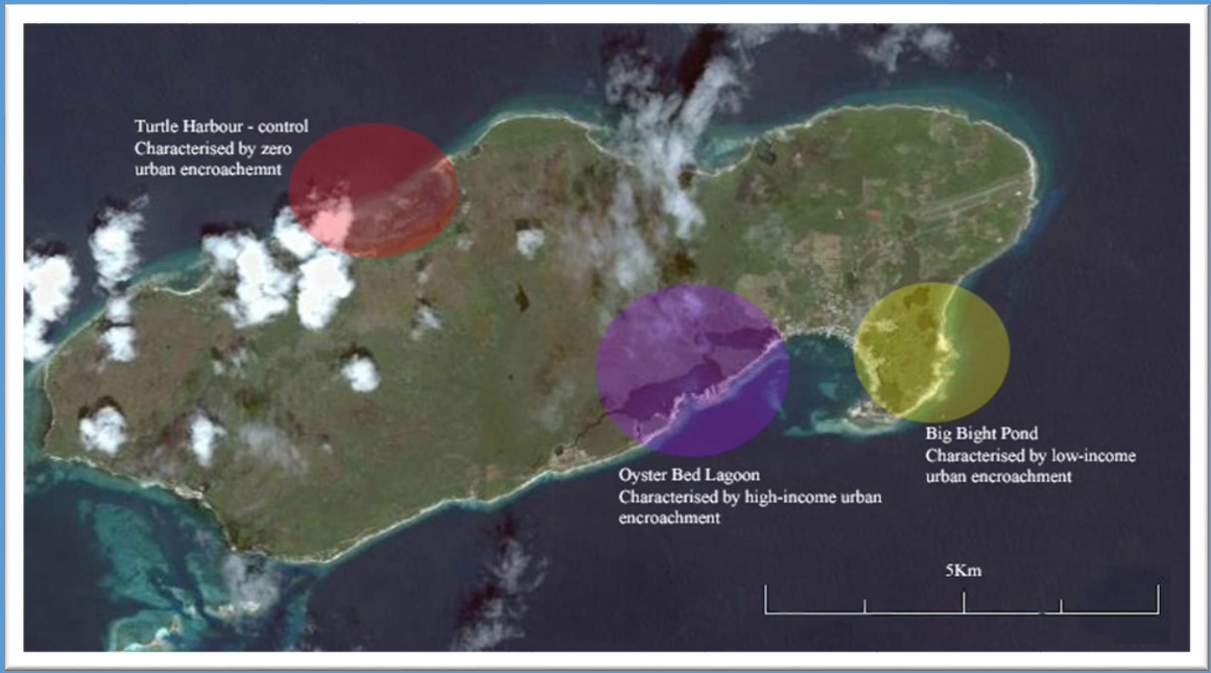




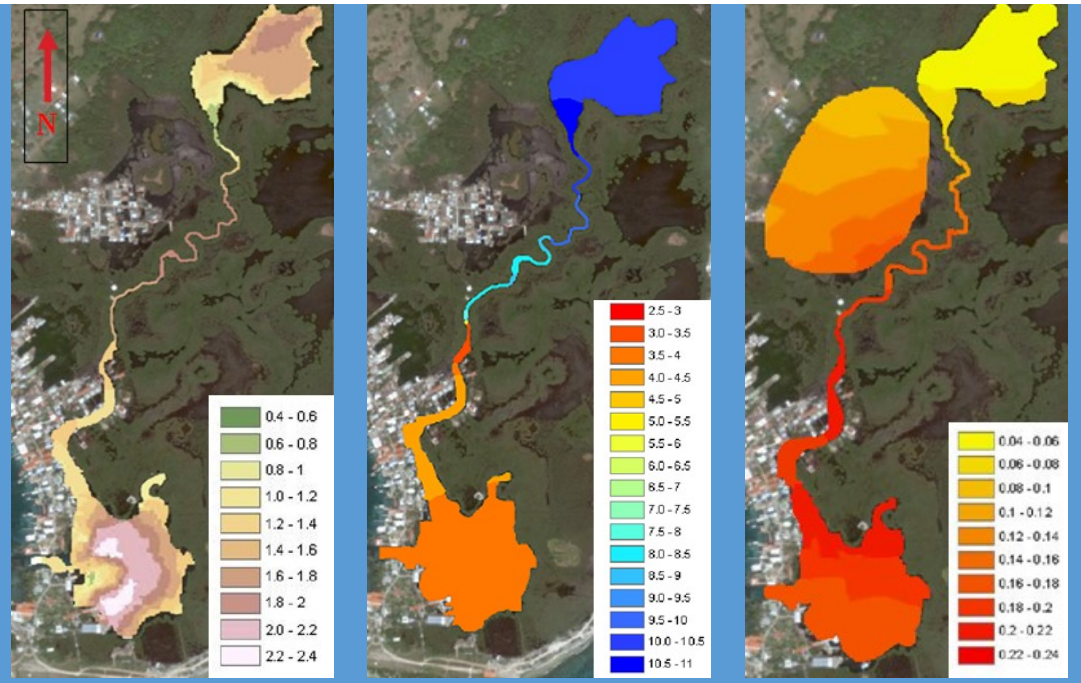




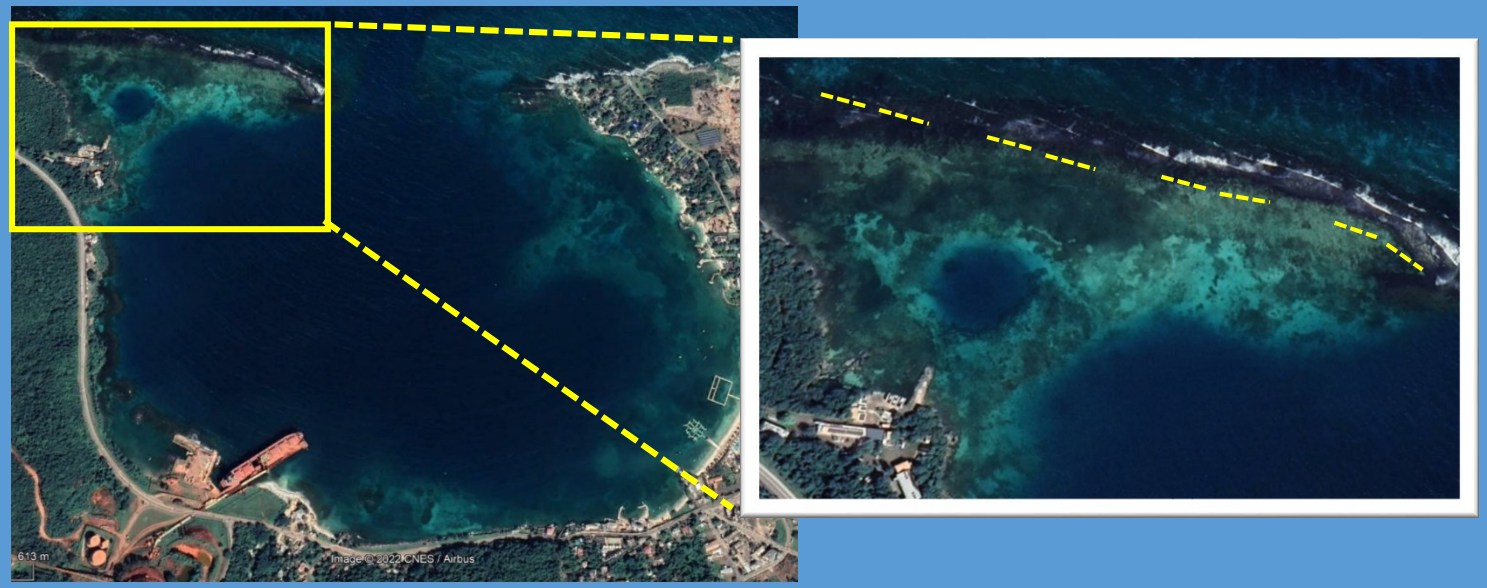
Honduras: Human impacts on mangroves and offshore reef health

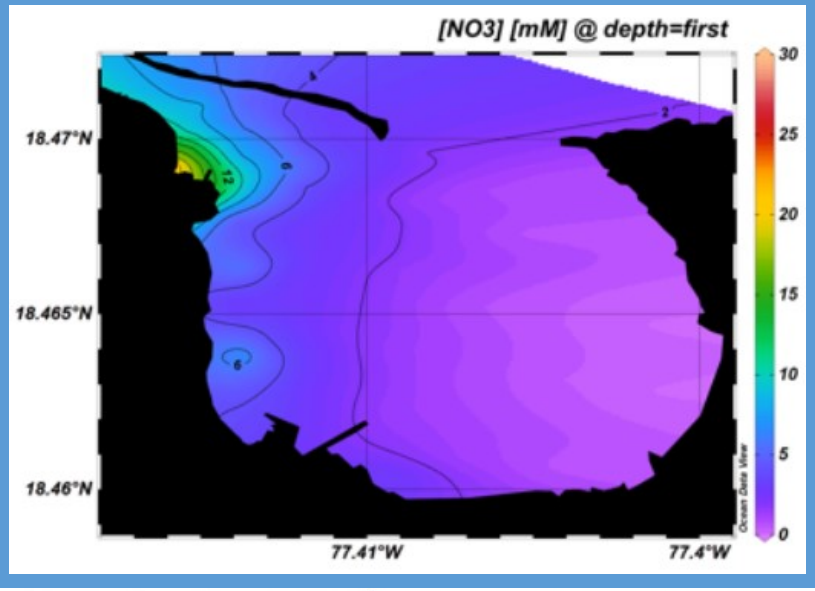


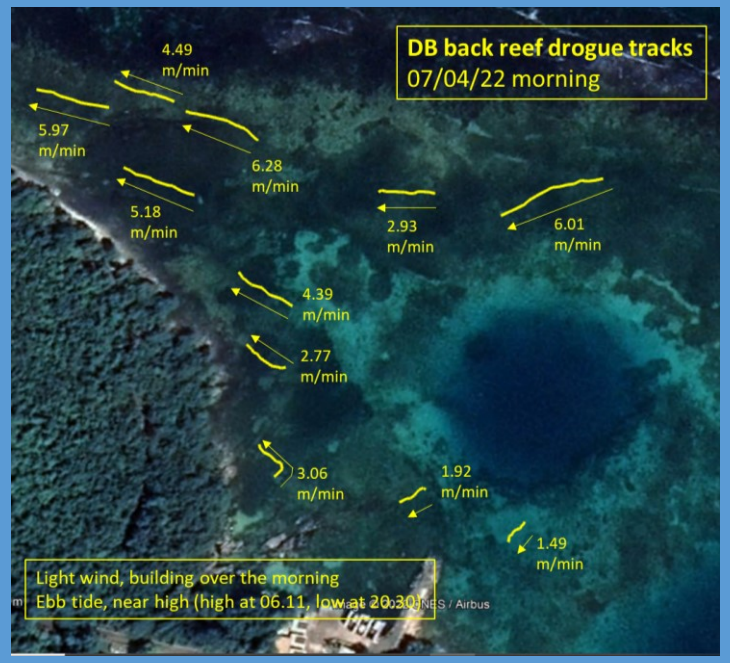
Bathymetry (m) SPM (mg/l) Ammonium (µM)

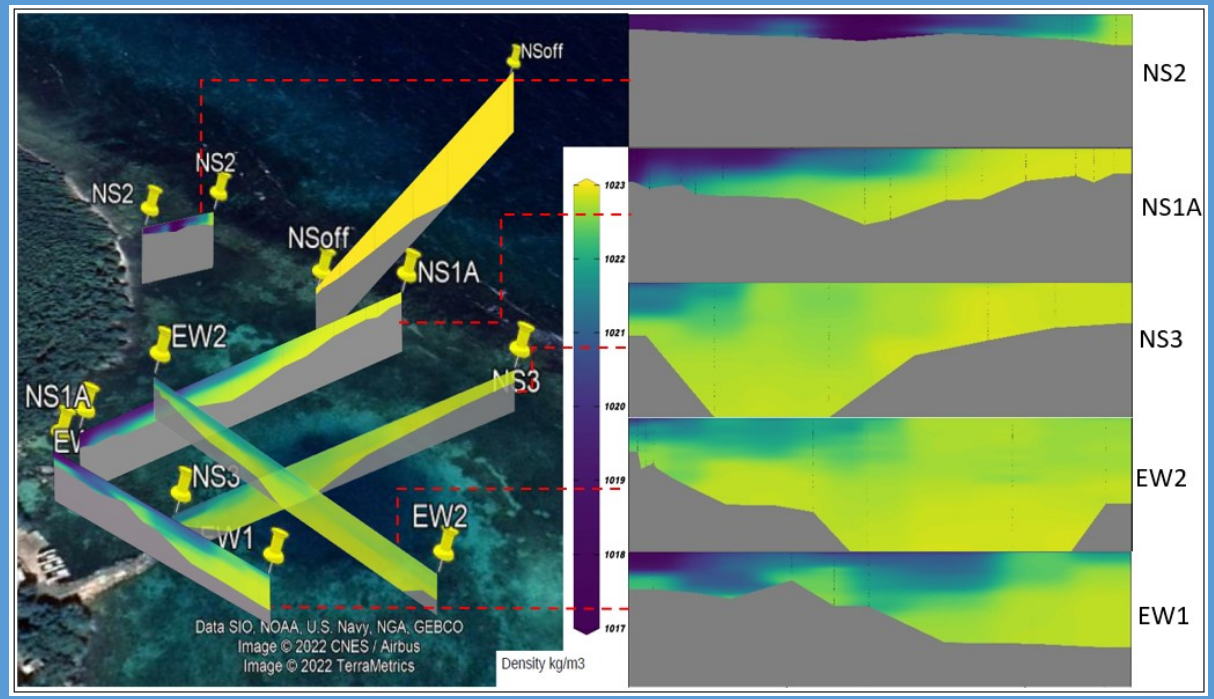


Jamaica: Groundwater nutrient contamination and reef health

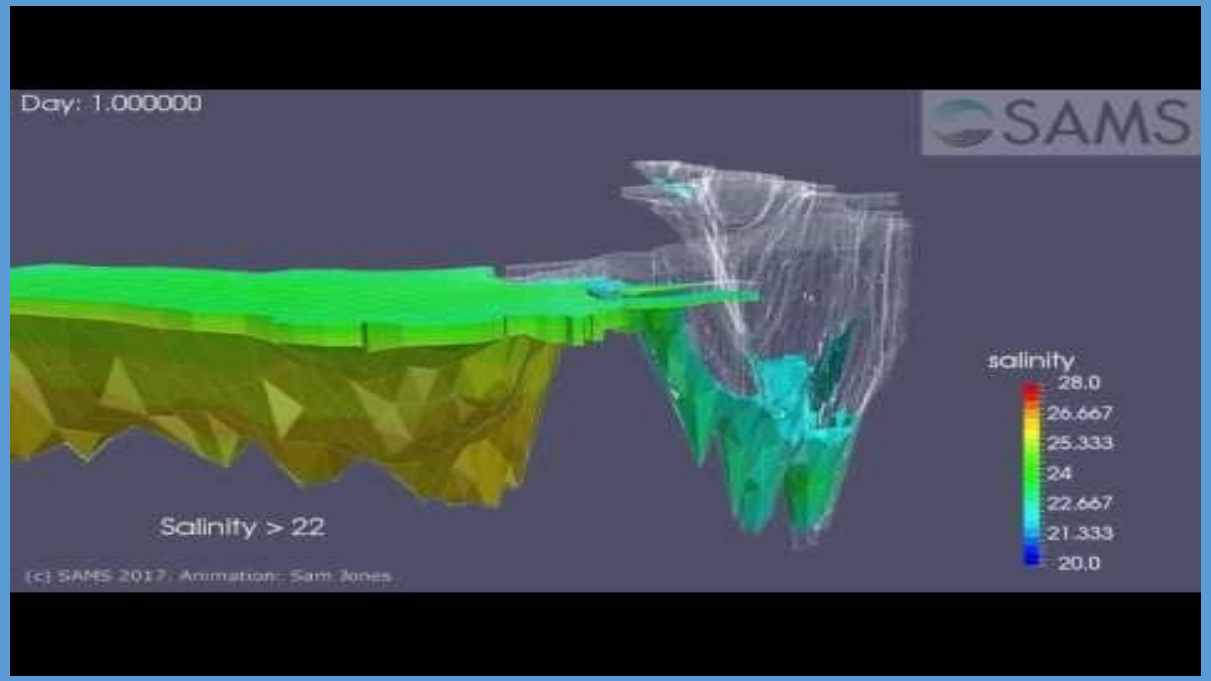


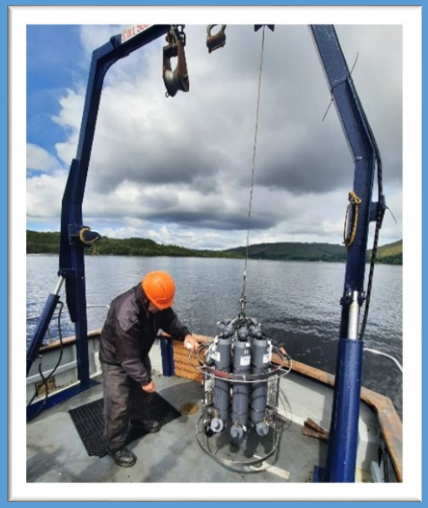


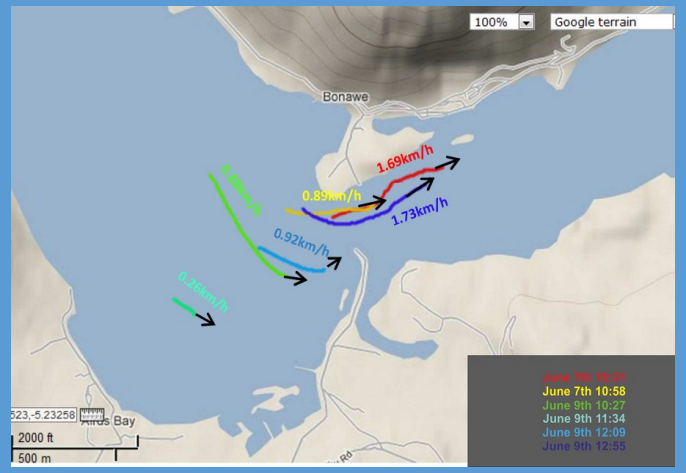


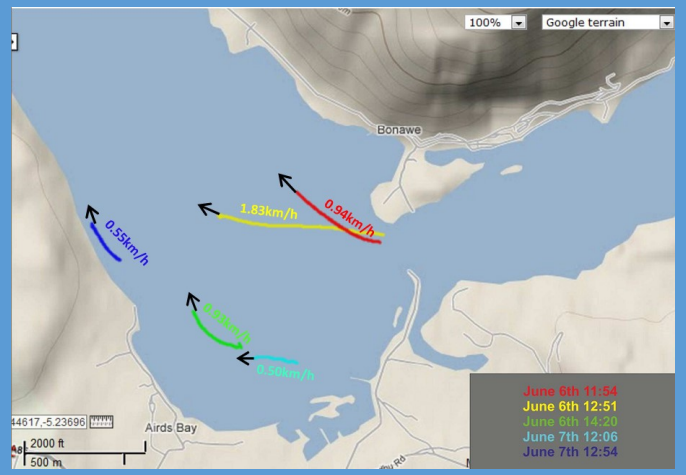


B. Scotland: Biogeochemical and physical process studies in a temperate fjord



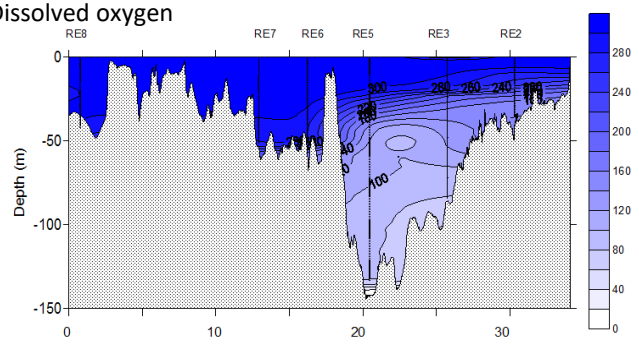




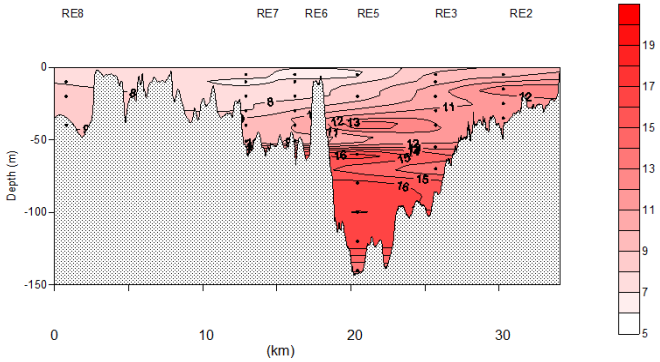


Loch Etive, March 2012

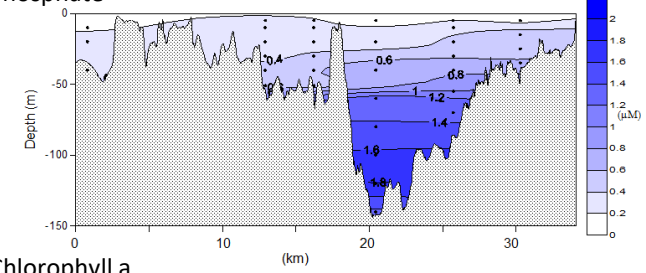
Dissolved oxygen



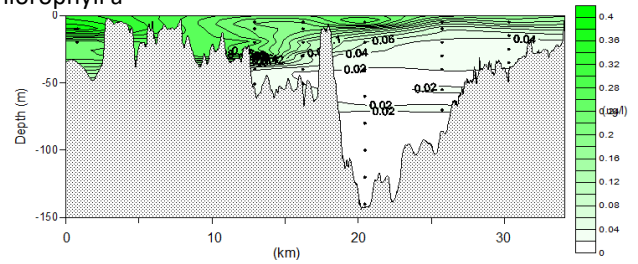
Nitrate



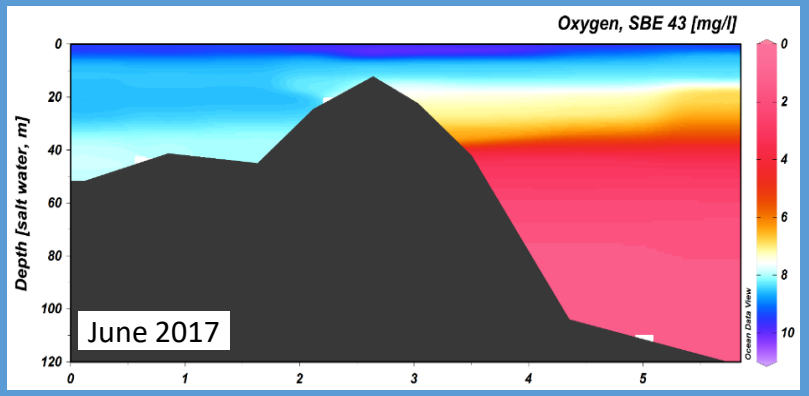
Phosphate

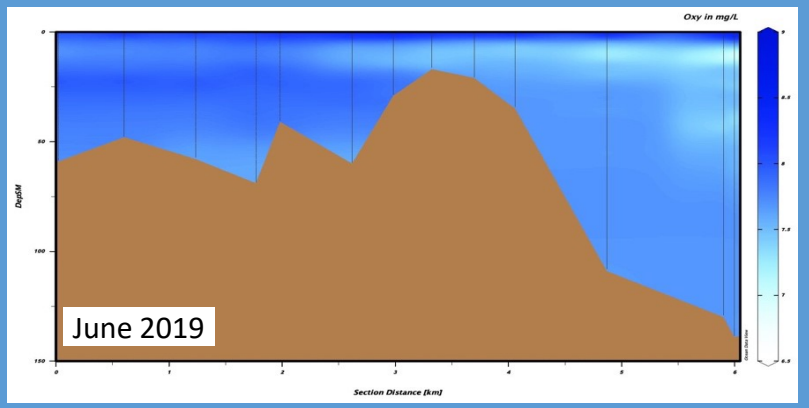


Chlorophyll a

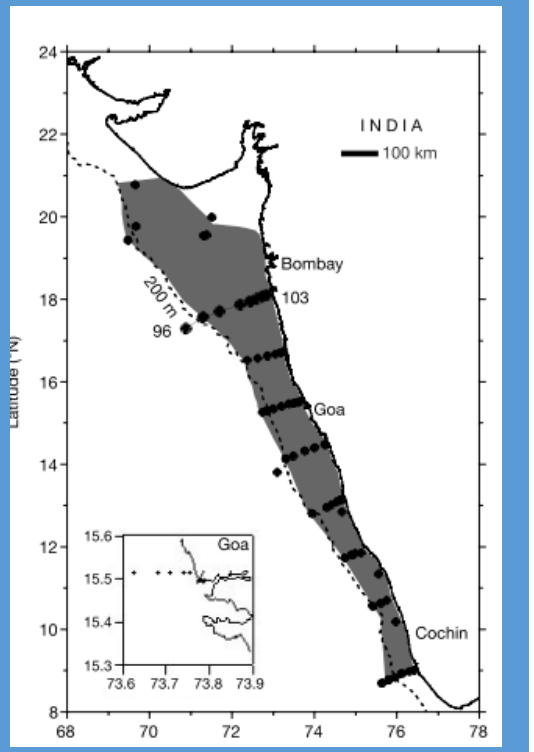


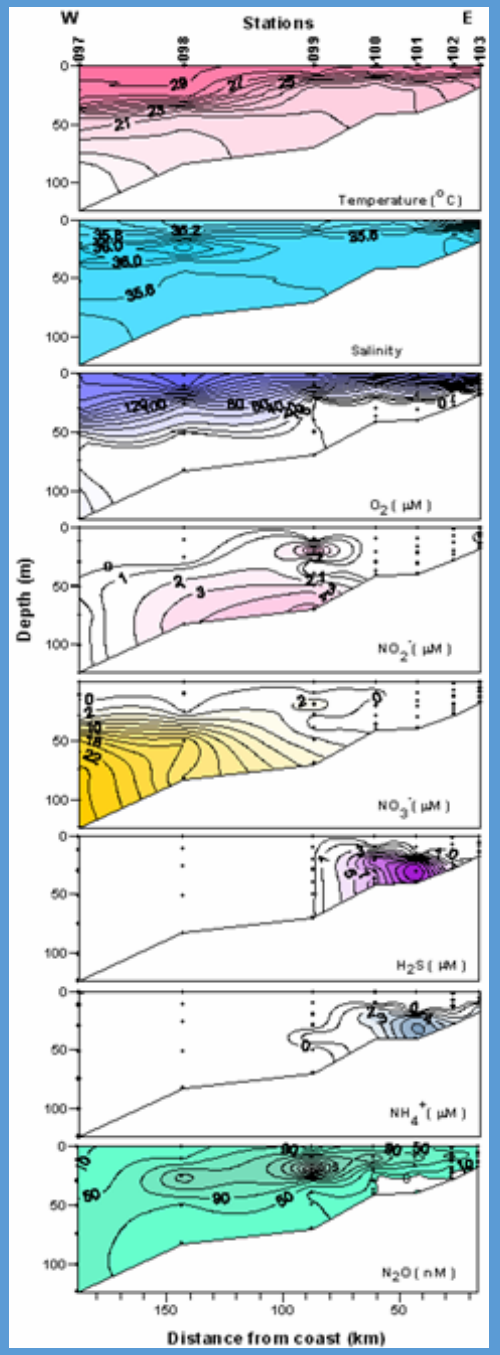
Dissolved oxygen

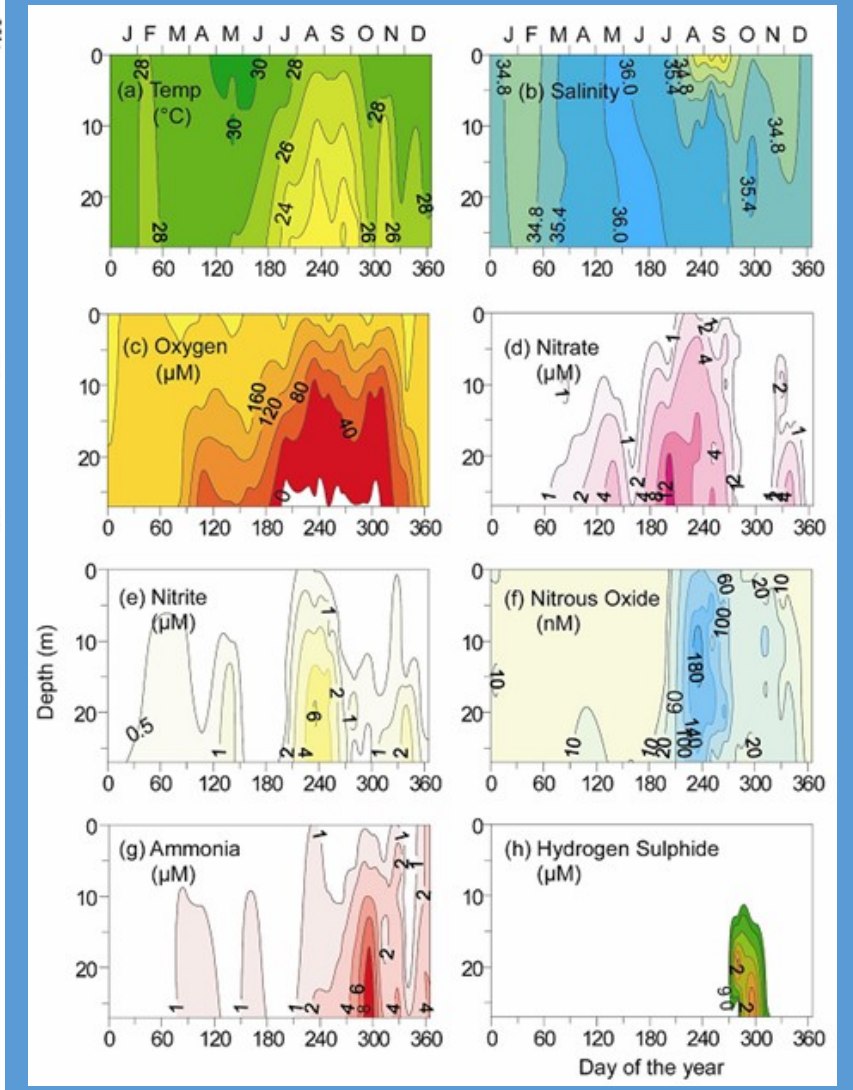


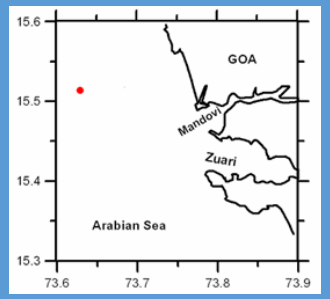


Western Indian margin: Observing system and cross-shelf transects



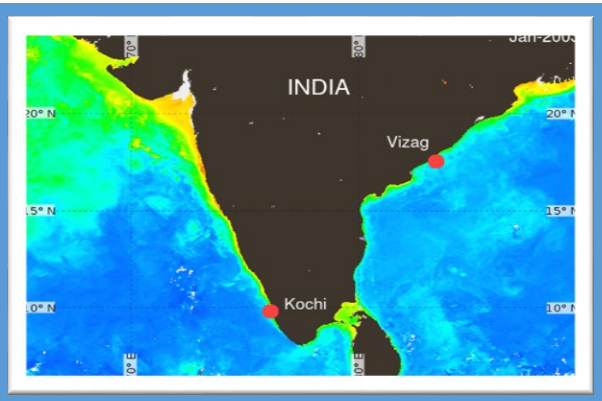






Naqvi et al 2006, 2009

MOSAIC programme (INCOIS)



Thank you
Obrigado

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