



Marine Biogeochemical Cycles of Trace Elements and their Isotopes

<http://www.geotraces.org/>

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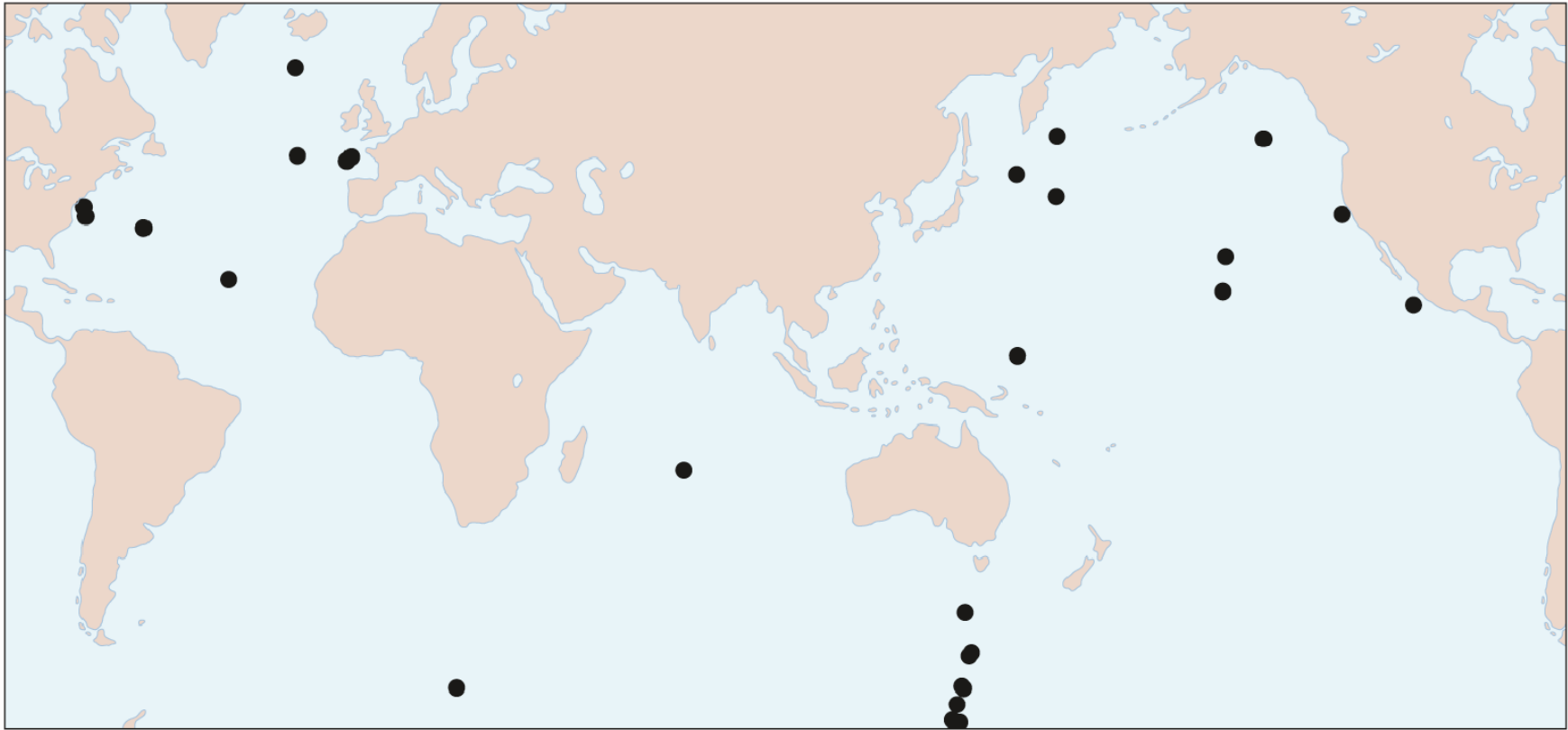


22 July, 2010 Presentation by Bob Anderson, OCB Annual Workshop

GEOTRACES: Mission

To identify processes and quantify fluxes that control the distributions of key **trace elements and isotopes** (\square TEIs) in the ocean, and to establish the sensitivity of these distributions to changing environmental conditions.

Limitation: Pre-GEOTRACES deep ocean Fe data

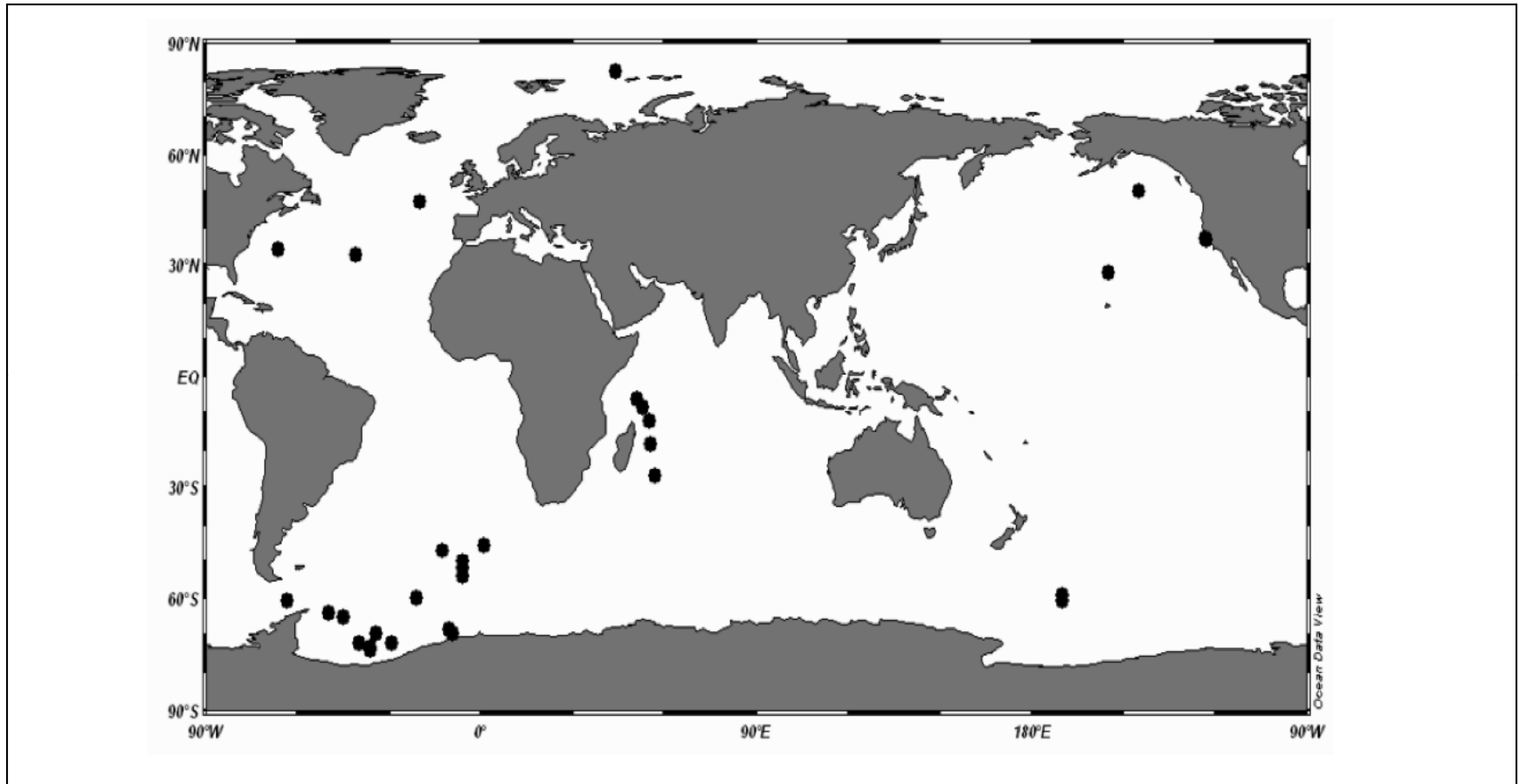


Paucity of information about deep Fe distribution limits understanding of upwelling supply and internal cycling.



Stations with Fe concentrations at depths > 2000 m.
As of 2003. From P. Parekh (MIT)

Existing deep ocean Zn data



Distribution and cycling of other micronutrients poorly known

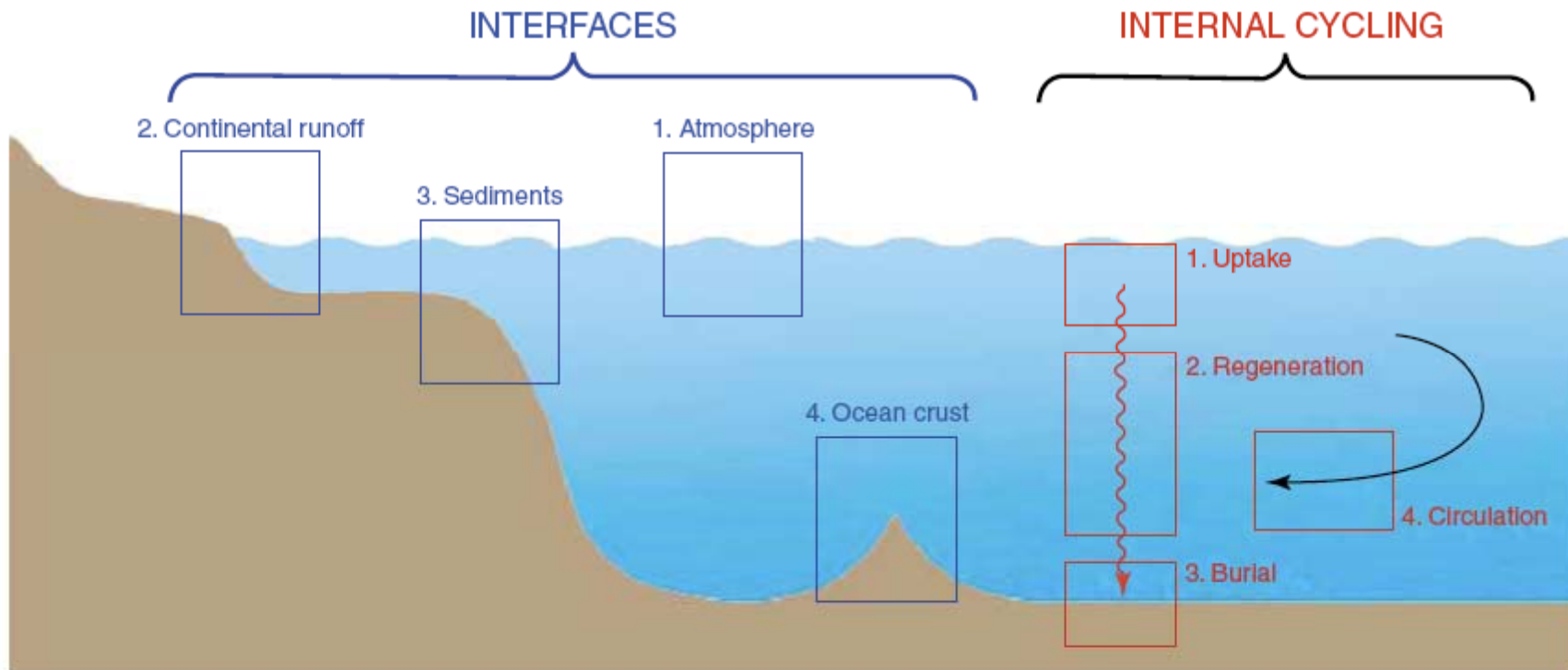


Stations with Zn concentrations at depths > 2000 m
As of 2009 - compiled by Maeve Lohan

GEOTRACES: Anticipated Benefits

- 1) Identify sources and sinks and quantify internal cycling of essential micronutrients (e.g., Fe, Zn, Co, Cd, Cu).
- 2) Calibrate geochemical tracers used to reconstruct past ocean conditions (e.g., circulation, chemistry, biological productivity, carbon fluxes) for more reliable applications.
- 3) Quantify groundwater supply of dissolved materials.
- 4) Improve predictions of the transport and fate of contaminants.

Scientific Goals



Need to understand fluxes at four interfaces
and four types of internal cycling.

Coupled to study of the capture of information as proxies

GEOTRACES: Program Elements

Enabling Activities

Standards and intercalibration

Data protocols, management, archiving

Modeling (2nd model-data synergy workshop, Paris, 7 - 10 Dec. 2009)

Capacity Building

International Polar Year

Ocean Sections

Core activity - requires international cooperation

Covering regions dominated by major processes

National cruises with international collaboration

Process Studies

Targeted at processes known to be important

Targeted at “anomalies” detected in ocean sections

Some will focus on ocean boundaries (e.g., coastal regions)

Some will exploit time-series stations



Enabling Activities

Intercalibration

Two US-led cruises in 2008 and 2009
International measurement intercalibration
(Cutter, Bruland, Sherrell)



Data management

Hosted at British Oceanographic Data Centre

<http://www.bodc.ac.uk/geotraces/>

Data Manager - Dr. Ed Mawji
(Measures, Schiltzer)

Modelling to plan cruises and benefit from data

Two international data-model workshops held in Germany and France
(Schlitzer, Dutay)



GEOTRACES

Atlantic Coverage

Firm plans

A02: Netherlands (2010/11)

A03: USA (2010 Oct.-Dec.)

A06: UK (2011)

A10: UK (2010 Oct.-Nov.)

A11: Germany (Completed)

Future plans

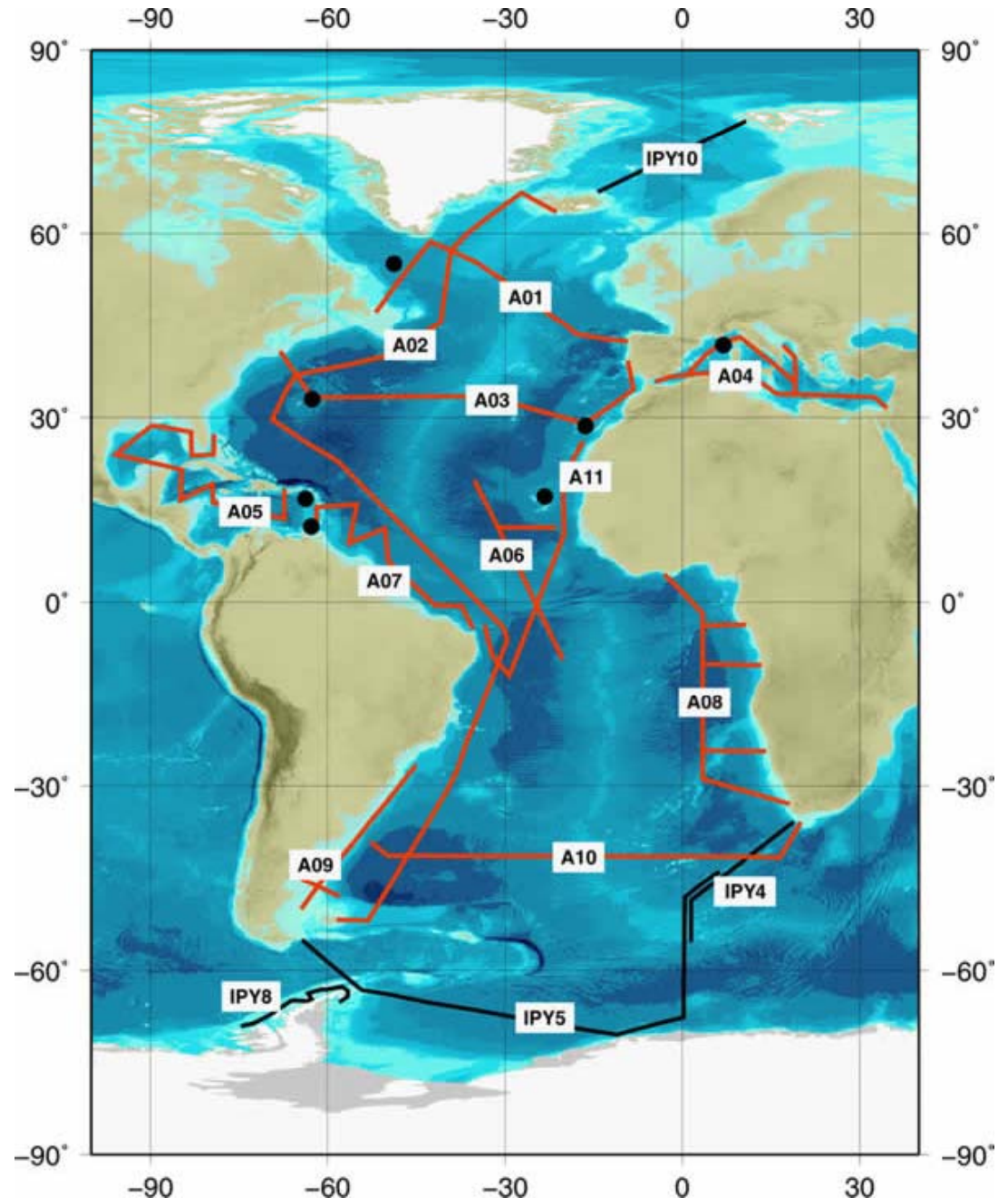
A09: Spain/Brazil

A04: France/Spain/COST

A01: France

IPY 4 and 5

Completed 2007-2008



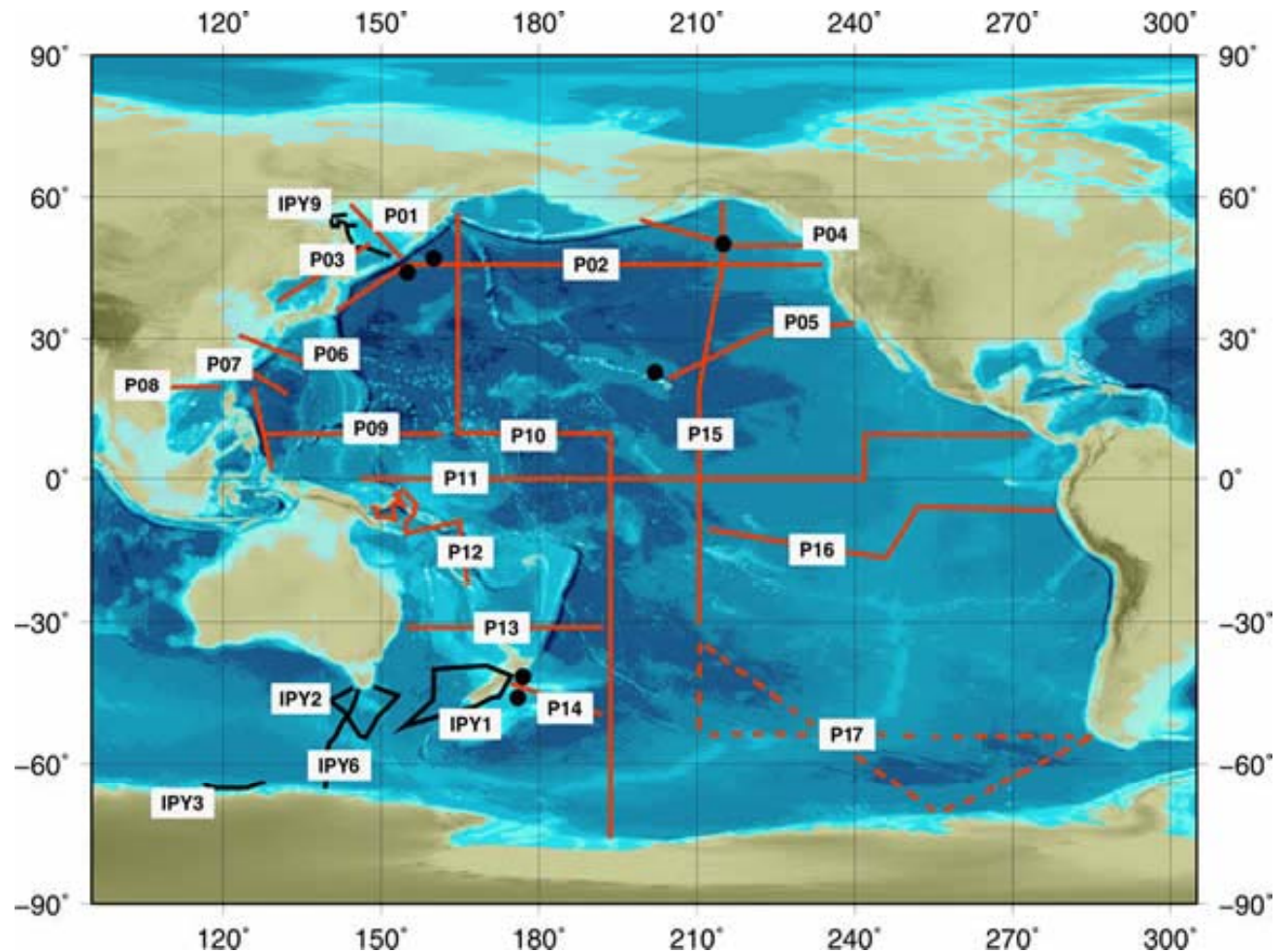
GEOTRACES Pacific Ocean Coverage

Firm Plans

P03 Japan (2010)
P13: Aus/NZ (2011)
P03 Japan (2012)
P12 France (2012)
P16: USA (2012/3)

Future plans

P04: Canada
P08: Taiwan
P09: China
P10 Japan
P11: China



GEOTRACES Indian Ocean Coverage

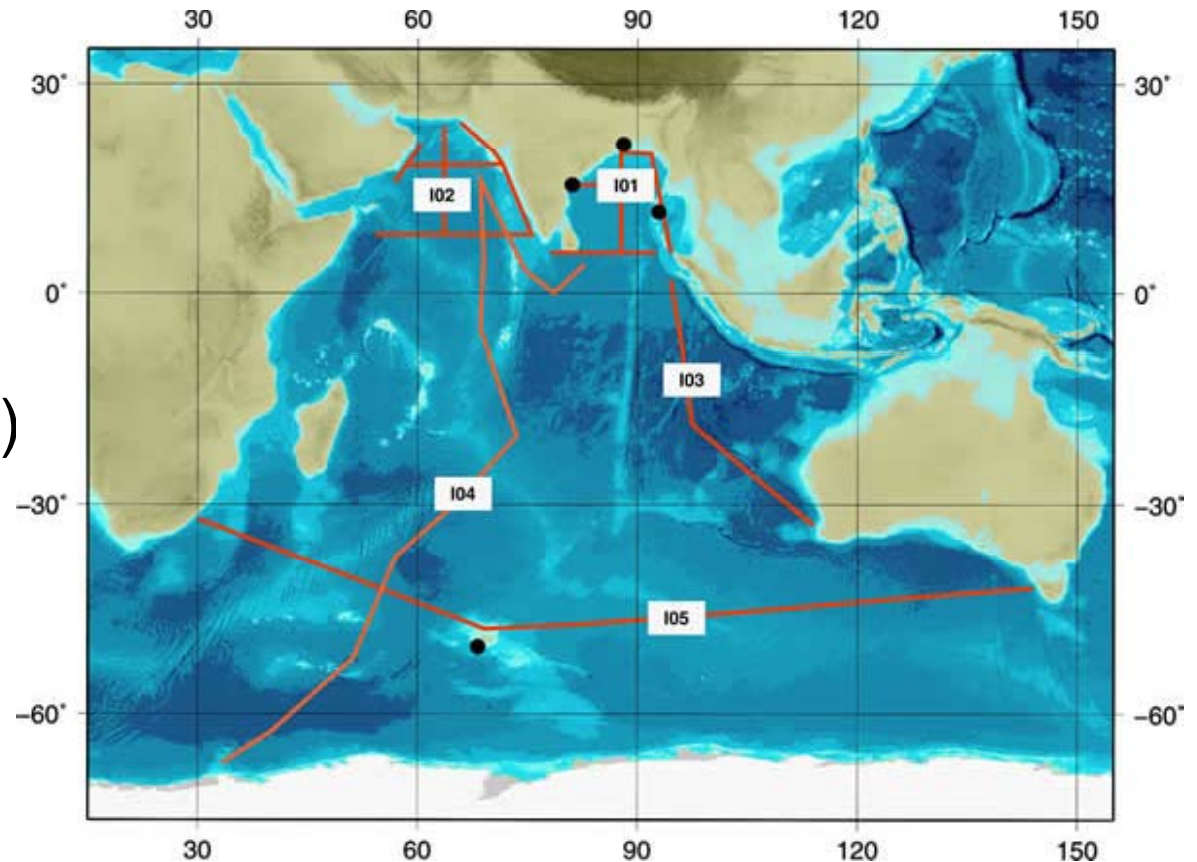
Firm plans

I01: India (2011)

I02: India (2011)

I04: Japan

Completed Jan. 2010)



General Information

WWW.GEOTRACES.ORG

Latest on Cruises

<http://www.bodc.ac.uk/geotraces/cruises/>

