

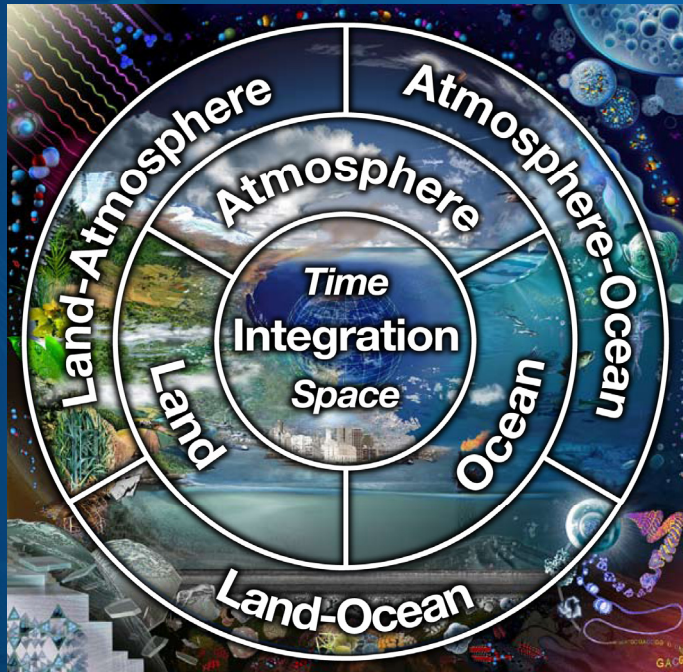


# Integrated **M**arine **B**iogeochemistry and **E**cosystem **R**esearch

2004 - 2014



# IGBP Ocean Projects 2010



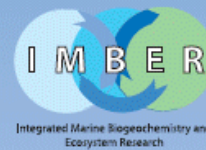


## Goal

*to investigate the sensitivity of marine biogeochemical cycles and ecosystems to global change, on time scales ranging from years to decades*

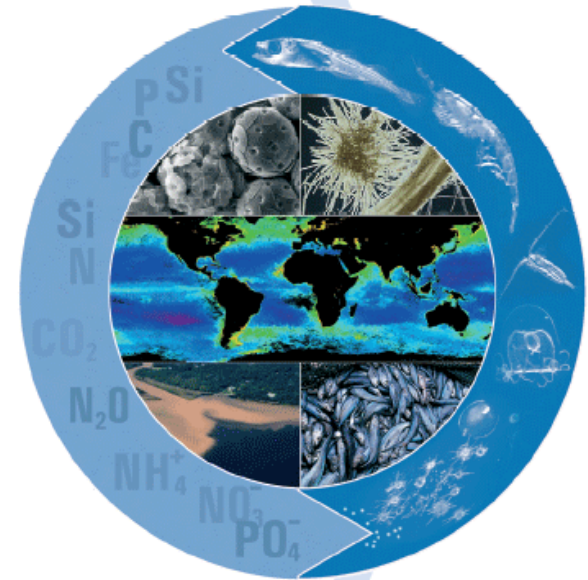
# IMBER Science Plan and Implementation Strategy

Downloadable pdf version:  
[www.IMBER.info/SPIS.html](http://www.IMBER.info/SPIS.html)



IGBP Report 52

Integrated  
Marine Biogeochemistry and  
Ecosystem Research



Science Plan and  
Implementation  
Strategy

International Council for Science  
Scientific Committee on Oceanic Research

GLOBAL  
IGBP  
CHANGE

# Theme 1: Interactions Between Biogeochemical Cycles and Marine Food Webs

## Transformation of organic matter in marine food webs

- What controls the stoichiometry and form of “bioreactive” elements in space and time?
- What controls production, transformation and breakdown of organic matter in marine food webs?

## Transfers of matter across ocean interfaces

- What are the time and space scales of remineralisation of organic matter in the mesopelagic layer?
- How does nutrient exchange between continental margins and the ocean interior impact biogeochemical cycles?
- How exchange between the seafloor and the water column impact food web structure and function?

## End-to-end food webs and material flows

- How do food web dynamics affect nutrient availability?
- How do key functional groups, species and genes affect biogeochemical cycles?
- How do species biodiversity and species interactions affect food web functioning and biogeochemical cycling?
- How are the interactions between biogeochemical processes and food webs recorded in paleo-proxies?

## Theme 2: Sensitivity to Global Change

1. Impacts of climate-induced changes through physical forcing and variability
2. Effects of increasing anthropogenic CO<sub>2</sub> and changing pH on marine biogeochemical cycles, ecosystems and their interactions (IMBER/SOLAS: Joint Implementation plan)
3. Effects of changing supplies of macro- and micronutrients
4. Impacts of harvesting on end-to-end food webs and biogeochemical cycles

# Structure

**Sponsors**



**IPO** ↔ **IMBER Scientific Steering Committee (16 members)**

**24 national contacts** ↔



## Working Groups / Task Teams

**End-to-End Food Webs** 

**Carbon Research** 

**Continental Margins** 

**Data Management**

**Capacity Building**

## Regional Activities

**ICED**

**SIBER**

## Contributing Projects

**EUR-OCEANS**

**CARBOOCEAN**



**IMBER Scientists**

# IMBER SSC (2009)

Javier ARISTEGUI (Spain)  
Mary-Elena CARR (USA)  
Kenneth DRINKWATER (Norway)  
Jean-Pierre GATTUSO (France)  
Nicolas GRUBER (Switzerland)  
**Julie HALL, Chair** (New Zealand)  
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Wajih Syed NAQVI (India)  
Hiroshi OGAWA (Japan)  
Katja PHILIPPART (The Netherlands)  
Alberto PIOLA (Argentina)  
Carol ROBINSON (UK)  
Mike ROMAN, *Vice-chair* (USA)  
Sinjae YOO (South Korea)  
Jing ZHANG (China)





# Joint SOLAS- IMBER Carbon Research Group

Three sub-groups to  
implement ocean carbon research:

1. Surface ocean CO<sub>2</sub> fluxes
2. Interior ocean carbon storage
3. Ocean Acidification

Work closely with IOCCP





## Joint SOLAS- IMBER Ocean Carbon Research Sub-group 1: Surface Ocean CO<sub>2</sub> fluxes

- Special Issue: *Surface Ocean CO<sub>2</sub> Variability and Vulnerabilities* (56: 8-10, 2009)
- IMBER-SOLAS French meeting (Paris, 22-23 June 2009)
- Coastal CO<sub>2</sub> meeting (Kiel, Jan 2009)
- SIC! Meeting at the *Ocean in High CO<sub>2</sub>* Symposium (Monaco, October 2008)
- Second technical meeting: *Second level quality control and regional synthesis issues* (June 2008)
- **SOCAT** *Surface Ocean CO<sub>2</sub> Variability and Vulnerability* (Paris, June 2008)



## Joint SOLAS- IMBER Ocean Carbon Research Sub-group 2: Interior Ocean Carbon Storage

- *Decadal variations of the ocean's interior carbon cycle: synthesis and vulnerabilities* (Ascona, Switzerland 13-17 July 2009)
- GO-SHIP at OceanObs 09 meeting (Venice, Italy 21-25 September 2009)



# IMBER-LOICZ

## Continental Margins Task Team

Continental Margins – Linking Ecosystems Implementation Plan 2009

Draft Science Plan and Implementation Strategy 2007

# Capacity Building Working Group

- Organising IMBER Summer School in Brest, France (2010)
- IMBIZO 1 - Three developing country participants supported (Miami, USA, November 2008)
- *Analysis of End-to-End Food Webs and Biogeochemical Cycles* Summer School (Ankara, Turkey, August 2008)
- CLIMECO *Climate Driving of Marine Ecosystem Changes: A training for young marine scientists* (Brest, France, April 2008)



## IMBER Regional Activities

Southern Ocean Food Web Modelling Workshop (Hobart, April 2009)

Southern Ocean Observing System study areas added to ICED Google Earth

Contributed to EUR-OCEANS International Polar Year educational film released

ICED Science Plan and Implementation Strategy adopted and published 2008



Science Plan and Implementation Strategy under review (May 2009)

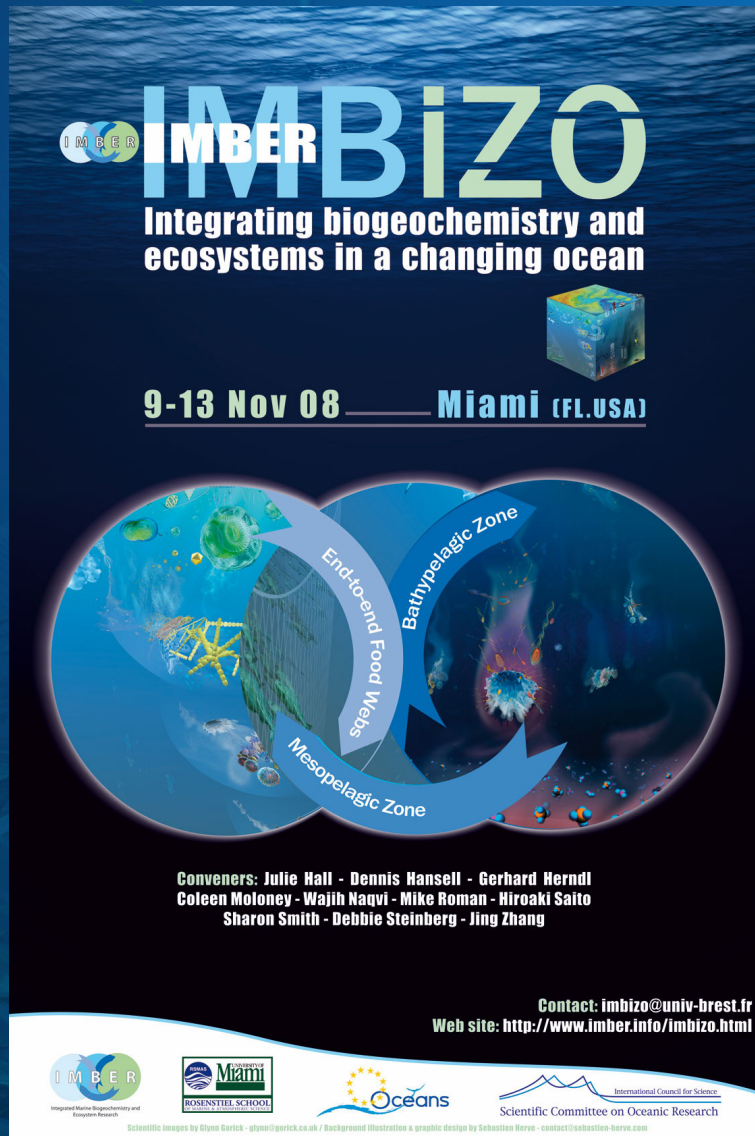
SIBER Workshop (Goa, October 2006)

## Regional Programs

- A network of complementary regional programs is essential for effective local implementation of the global IMBER program. The regional programs have different approaches and emphases according to the problems being addressed, but should proceed in parallel and assist significantly in achieving the IMBER vision and goal. **There should be comparative analyses at regular intervals in order to gain maximum benefit from the understanding gained using various approaches in different ecosystems.** The emphasis in all of them should be integration and comparison. In return for these contributions to IMBER research, IMBER should assist in obtaining funding towards supporting the regional program activities, including their SSC meetings, approved workshops and meetings.
- In order to achieve global coverage, we strongly recommend that the following regional programs be incorporated into IMBER II, **provided that they develop terms of reference in agreement with the IMBER SSC. Each study should include a coupling between biogeochemical and ecosystem research to be accepted as part of IMBER II:**
  - \*ICED (Southern Ocean)
  - SIBER (Indian Ocean, tropics)
  - CLIOTOP (Focus on top predators in open ocean, including tropics)
  - ESSAS (SubArctic Ecosystems)
  - SPACC (Small Pelagics and Climate Change, upwelling regions)
  - BASIN (Proposed North Atlantic comparative studies)
  - FUTURE (Proposed PICES North Pacific Program)
  - \* Formally accepted as a regional program of IMBER

# IMBER IMBIZO

IMBER will conduct a series of IMBIZO's over the next decade



**IMBER** **IMBIZO**  
Integrating biogeochemistry and ecosystems in a changing ocean

9-13 Nov 08 — Miami (FL, USA)

End-lobed Food Webs  
Bathypelagic Zone  
Mesopelagic Zone

Conveners: Julie Hall - Dennis Hansell - Gerhard Herndl  
Coleen Moloney - Wajih Naqvi - Mike Roman - Hiroaki Saito  
Sharon Smith - Debbie Steinberg - Jing Zhang

Contact: [imbizo@univ-brest.fr](mailto:imbizo@univ-brest.fr)  
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**IMBER** Integrated Marine Biogeochemistry and Ecosystem Research  
**University of Miami** ROSENSTIEL SCHOOL  
**Oceans** International Council for Science Scientific Committee on Oceanic Research

Scientific images by Glynis Gerick - [glynis@gerick.co.uk](mailto:glynis@gerick.co.uk) / Background illustration & graphic design by Sebastian Herze - [contact@sebastian-herze.com](mailto:contact@sebastian-herze.com)

## IMBER IMBIZO II

“Integration of biogeochemistry and ecosystems in a changing ocean: Regional comparisons”

October 2010, Crete



# Contact the IPO



www.IMBER.info

IMBER IPO

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Integrated Marine Biogeochemistry and Ecosystem Research

Welcome to the official IMBER Website

IMBER project goal: To understand how interactions between marine biogeochemical cycles and ecosystems respond to and force global change.

Science Newsletters Contact Us

Science Plan Sponsors Calendar of Meetings

IMBER is a new IGBP-SCOR project focusing on ocean biogeochemical cycles and ecosystems. The IMBER vision is to provide a comprehensive understanding of, and accurate predictive capacity for, ocean responses to accelerating global change and the associated effects on the Earth System and human society.

e-NEWS

IMBER e-NEWS

Integrated Marine Biogeochemistry and Ecosystem Research

IMBER e-NEWS - August 2007

Content:

- 1- IMBER News
- 2- Funding and Collaborative opportunities
- 3- BAC: Career Scientist Opportunities
- 4- 2008
- 5- Publications / Web Resources
- 6- Meetings / Conferences / Workshops

Newsletter

IMBER Update

Issue No. 6 - March 2007

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IMBER contribution to IPCC scientific basis

Human activities are rapidly altering Earth System processes that directly and indirectly influence society. Informed decisions require an understanding of which parts of the Earth System are most sensitive to change, and the nature and extent of anticipated impacts of global change. This new challenge has led to the goal of IMBER, which is to investigate the sensitivity of marine biogeochemical cycles and ecosystems to global change on time scales ranging from years to decades. Central to the IMBER goal is the development of a predictive understanding of how marine biogeochemical cycles and ecosystems respond to complex forcings, such as large-scale climatic variations, and changes in physical dynamics and ocean chemistry.

Because it is such a complex and challenging issue, policymakers required an objective source of information on the causes of climate changes, its potential environmental and socio-economic impacts, and promising societal responses. To satisfy these requirements, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. The IPCC was charged with assessing the scientific, technical and socio-economic factors required for understanding the risks of human-induced climate change, its potential impacts, and options for adaptation and mitigation. The IPCC's Second Assessment Report provided key input to the negotiations leading to adoption of the Kyoto Protocol in 1997. More recently, IPCC Working Group I has approved and adopted the Summary for Policymakers entitled "Climate Change 2007: The Physical Science Basis". This report describes progress in understanding the human and natural drivers of climate change, observed climate change, climate processes and attribution, and estimates of projected future climate change. It builds upon past IPCC assessments and incorporates new findings based upon large amounts of new, comprehensive data, more sophisticated analyses of data, improve-

