



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

## VISION:

To provide a comprehensive understanding of, and accurate predictive capacity for, ocean responses to accelerating global change and the consequent effects on the Earth System and human society.



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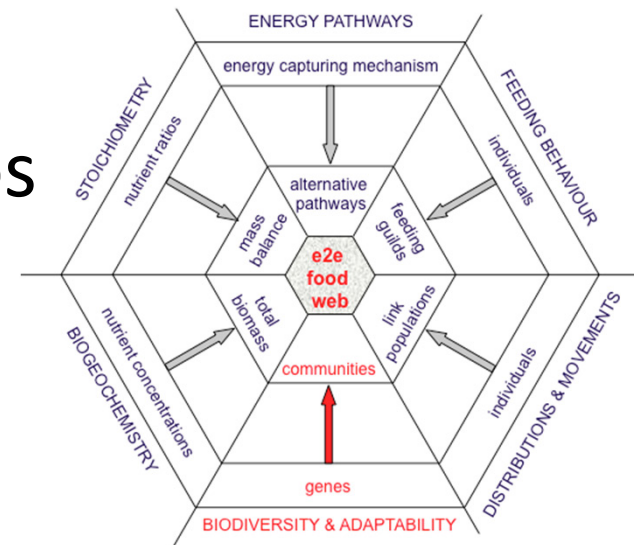
# Presentation Outline

- **Project Accomplishments**
- **5-10 year vision for IMBER**
- **Future Earth and IMBER Transition**

# IMBER Major Accomplishments

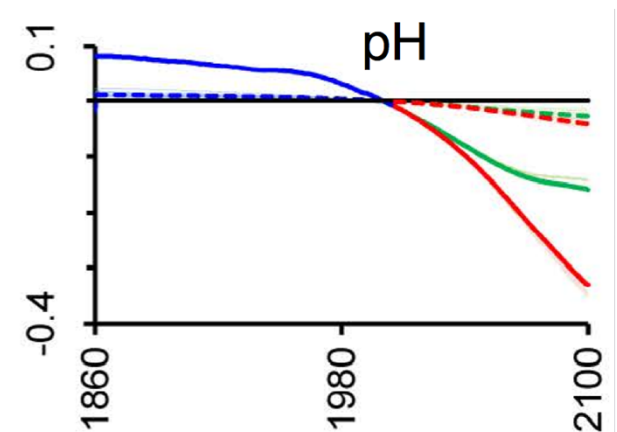
## Theme 1: Key interactions

- Approaches for linking food webs and biogeochemical cycles from end-to-end (Moloney et al. 2011)



## Theme 2: Sensitivity global change

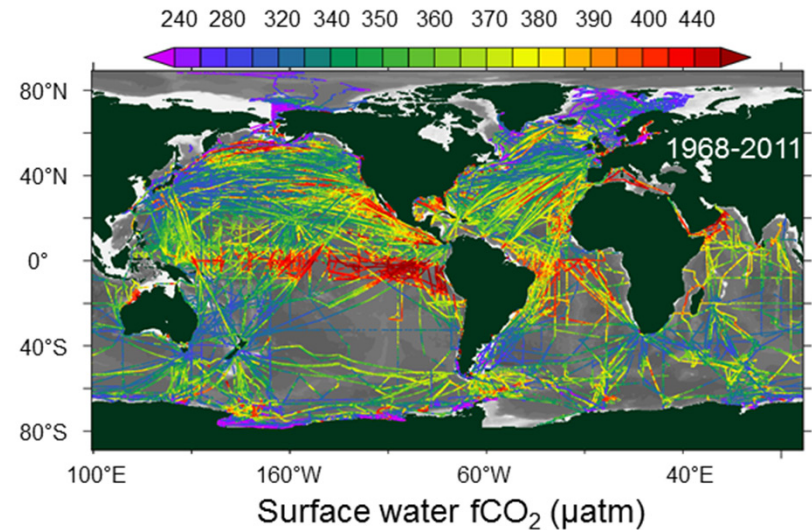
- Ocean acidification
- Comparative analyses of open ocean, Sub-Arctic, Southern Ocean, Indian Ocean and continental margin ecosystems



# IMBER Major Accomplishments

## Theme 3: Feedbacks ES

- Carbon uptake and storage
- Surface Ocean CO<sub>2</sub> Atlas
- ARGO-Oxygen



## Theme 4: Humans

- IMBER-ADApT  
Decision support tool  
(Bundy et al. 2015)



IMBER Open Science Conference

# FUTURE OCEANS

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**23-27 June 2014**  
**Bergen, Norway**

Research for marine sustainability:  
multiple stressors, drivers, challenges  
and solutions

## Open Science Meeting - 2014

- Highlight, integrate and synthesize IMBER achievements over past 10 years
- Gather community inputs for the development of a new science plan and implementation strategy to guide next decade of research
- Attended by about 500 participants



## IMBER current goal

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

## IMBER new goal

**To understand, quantify and compare past, present and future functioning of marine ecosystems, predict and project the changes including developing scenarios and options for securing or transitioning towards ocean sustainability, and integrate these with ocean-human systems**



# Implementation of Goal

Three Grand Challenges

Four Innovation Challenges





## **Grand Challenge 1**

*Understanding and quantifying marine ecosystems*

## **Grand Challenge 2**

*Developing scenarios and projections of future marine and human systems at multiple scales*

## **Grand Challenge 3**

*Improving and integrating human-ocean-human interactions*





Integrated Marine Biogeochemistry and Ecosystem Research

## **Innovation Challenge 1**

Understanding the role of genetic and evolutionary processes

## **Innovation Challenge 2**

Contributions to a global ocean ecosystem observational, modelling and data management network

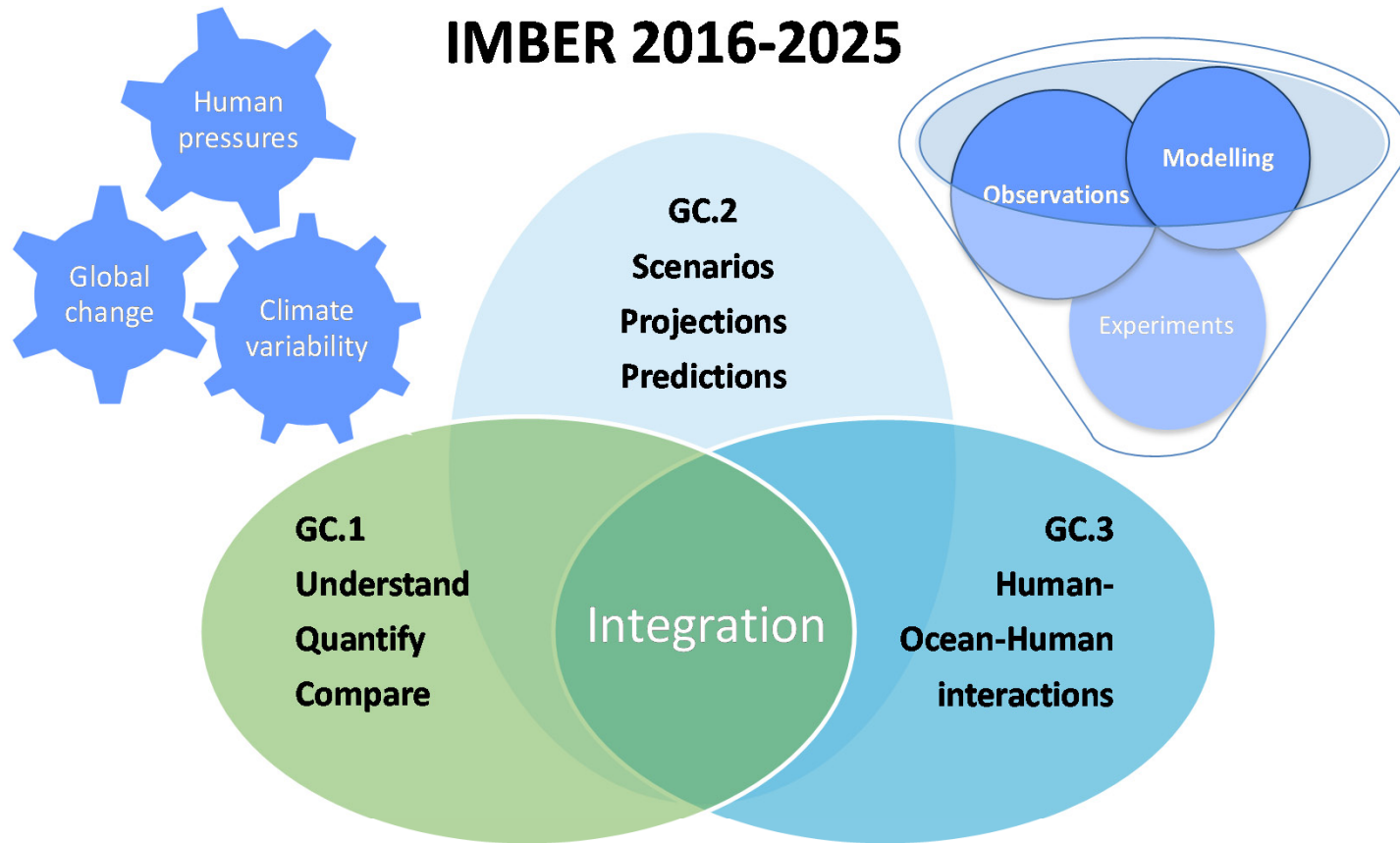
## **Innovation Challenge 3**

Understanding of ecological feedbacks in the Earth System

## **Innovation Challenge 4**

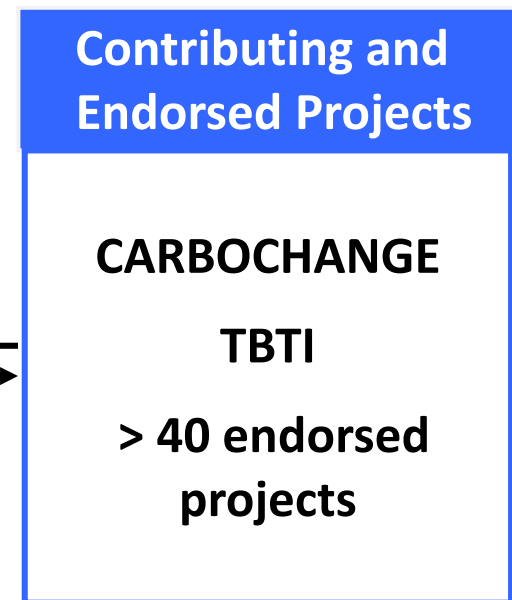
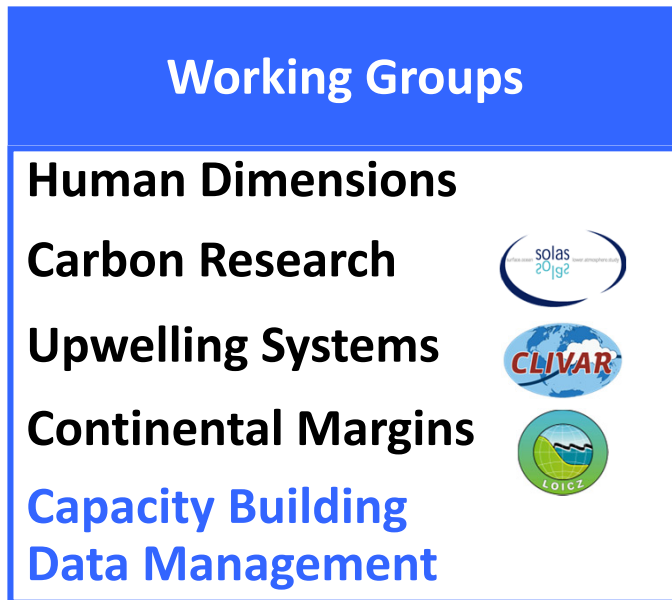
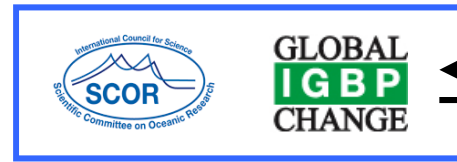
Using social science data for ocean management, decision making and policy development

# IMBER 2016-2025



- IC.1 Genetics & evolutionary processes
- IC.2 Observing networks, data management and modelling
- IC.3 Ecological feedbacks
- IC.4 Social science data linked to oceans

# IMBER Implementation



# FutureEarth aims to combine two approaches

## Policy / innovation-driven research

co-designed and co-produced projects  
with formal & informal learning & education

*Solution oriented*

*Integrative knowledge*

*on multiple key pro*

*Transformation kno*

10-year research effort  
Focus on **sustainability**

**Focus on coordinated international research**

*Target knowledge*

*Process knowledge*

Other  
research  
stakeholders  
(e.g., SCOR)

GECs  
(IHDP,  
Diversitas,  
IGBP, WCRP)

Underpinning research, technology and other relevant evidence-  
based knowledge

**Curiosity-driven research**



## Future Earth Transition

- ✓ Science Steering Committee with Mark Stafford Smith as chair
- ✓ Engagement Committee that provides link to stakeholders, policy and management with Jairam Ramesh as chair
- ✓ Project coordination is through a distributed secretariat (five hubs in Montreal, Paris, Stockholm, Tokyo, University of Colorado-Boulder, Colorado State University)
- ✓ Paul Shrivastava is executive director for Future Earth and is located at the hub in Montreal
- ✓ Four regional hubs in Cyprus, Japan, United Kingdom, and the Inter-American Institute for Global Change Research in Uruguay

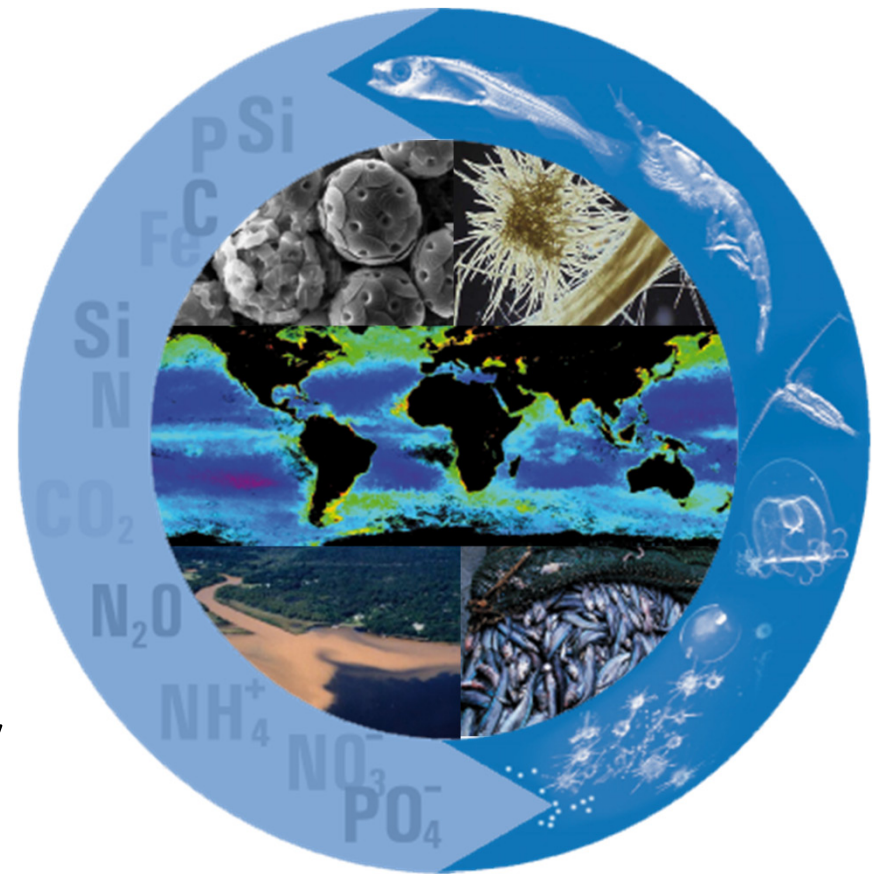


## Future Earth Transition

- ✓ IGBP ends December 2015
- ✓ IGBP Celebration at Fall 2015 AGU Meeting (~60 sessions)
- ✓ IGBP synthesis and legacy products are underway
- ✓ Eight core projects sponsored by IGBP have been invited to join Future Earth
- ✓ IMBER, SOLAS, LOICZ (Future Coasts) and PAGES have marine focus
- ✓ IMBER SPIS is basis for transition to Future Earth and a request to SCOR for a 10-year extension

## What IMBER Expects

- Recognition of need for basic ocean research
- Relevance and integration of ocean research into Future Earth
- Significant support for IMBER activities, especially human dimensions research





## IMBER Transition

- Development of a new SPIS is underway
  - Reviewed by IMBER community
  - Review by sponsors - early Fall 2015
- Submit request to SCOR for 10-year continuation
  - Fall 2015
- Request to become a core project of Future Earth
  - understand/accept mutual expectations
    - Fall 2015



**IMBER**

**IMBIZO IV**

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**MARINE AND HUMAN SYSTEMS**  
Addressing multiple scales and multiple stressors

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**26-30 Oct 2015** — **TRIESTE (Italy)**

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Marine ecosystem-based governance: from rhetoric to reality  
Upwelling ecosystems - models for interdisciplinary global change studies  
Modelling for marine social-ecological systems  
Regime shifts to novel systems

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INSTITUTE OF MARINE RESEARCH  
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SCOR  
esa

Four concurrent workshops

Marine ecosystem-based  
governance

Coastal upwelling ecosystems

Integrated modeling

Regime shifts

Socio-ecological,  
management and assessment  
components in all  
workshops

# Thank you

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## ACKNOWLEDGEMENTS

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