IMBER/Future Earth North Atlantic-Arctic Planning Workshop Results

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Presentation Outline

- Background on IMBER
- Transition to Future Earth
- International efforts for joint funding and coordinated research
- Science - North Atlantic-Arctic system
- Highlights from recent scoping workshop for North Atlantic-Arctic research

Integrated Marine Biogeochemistry and Ecosystem Research

VISION:

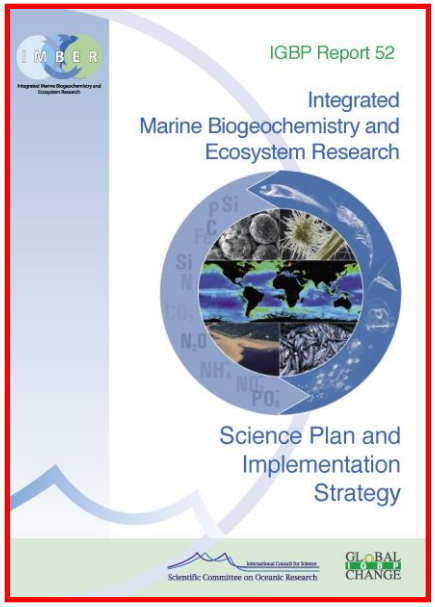
To provide a comprehensive understanding of, and accurate predictive capacity for, **ocean responses to accelerating global change** and the **consequent effects on the Earth System and human society**.

International Council for Science SCOR Scientific Committee on Oceanic Research

GLOBAL CHANGE IGBP International Geosphere-Biosphere Programme

www.imber.info

IMBER History



futureearth
research for global sustainability

SCOR
International Council for Science
Scientific Committee on Oceanic Research

GLOBEC

LOICZ

2003 2005 2007 2009 2010 2011 2013 2014 2015

JGOFS

solas
surface.ocean lower.atmosphere.study

IMBER

Climate Variability & Predictability
CLIVAR
World Climate Research Programme

International Ocean Carbon Coordination Project
IOCCP
UNESCO/IOC and SCOR

GEOTRACES

SCOR
International Council for Science
Scientific Committee on Oceanic Research

GLOBAL IGBP CHANGE

+ PICES, ICES, POGO,
US-OCB, EUROCEANS,
EUROMARINE, IHDP-ESG

FOUR RESEARCH THEMES

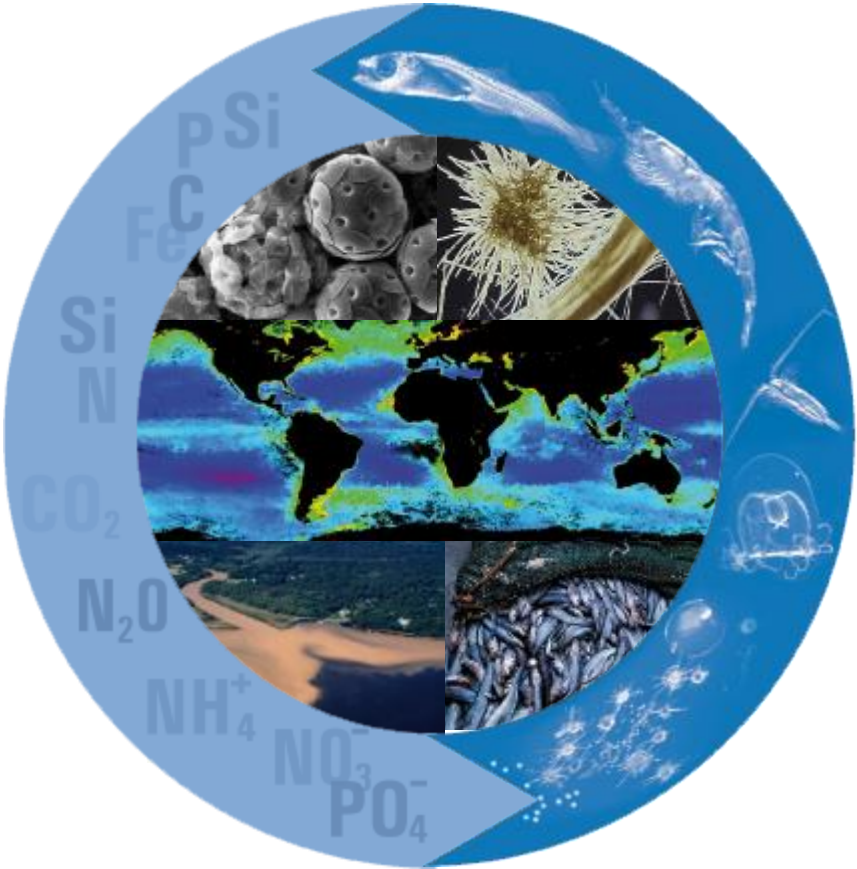
- Interactions between biogeochemical cycles and marine food webs
- Sensitivity to global change
- Feedbacks to the Earth System
- Responses of society

Theme 1
Key Interactions

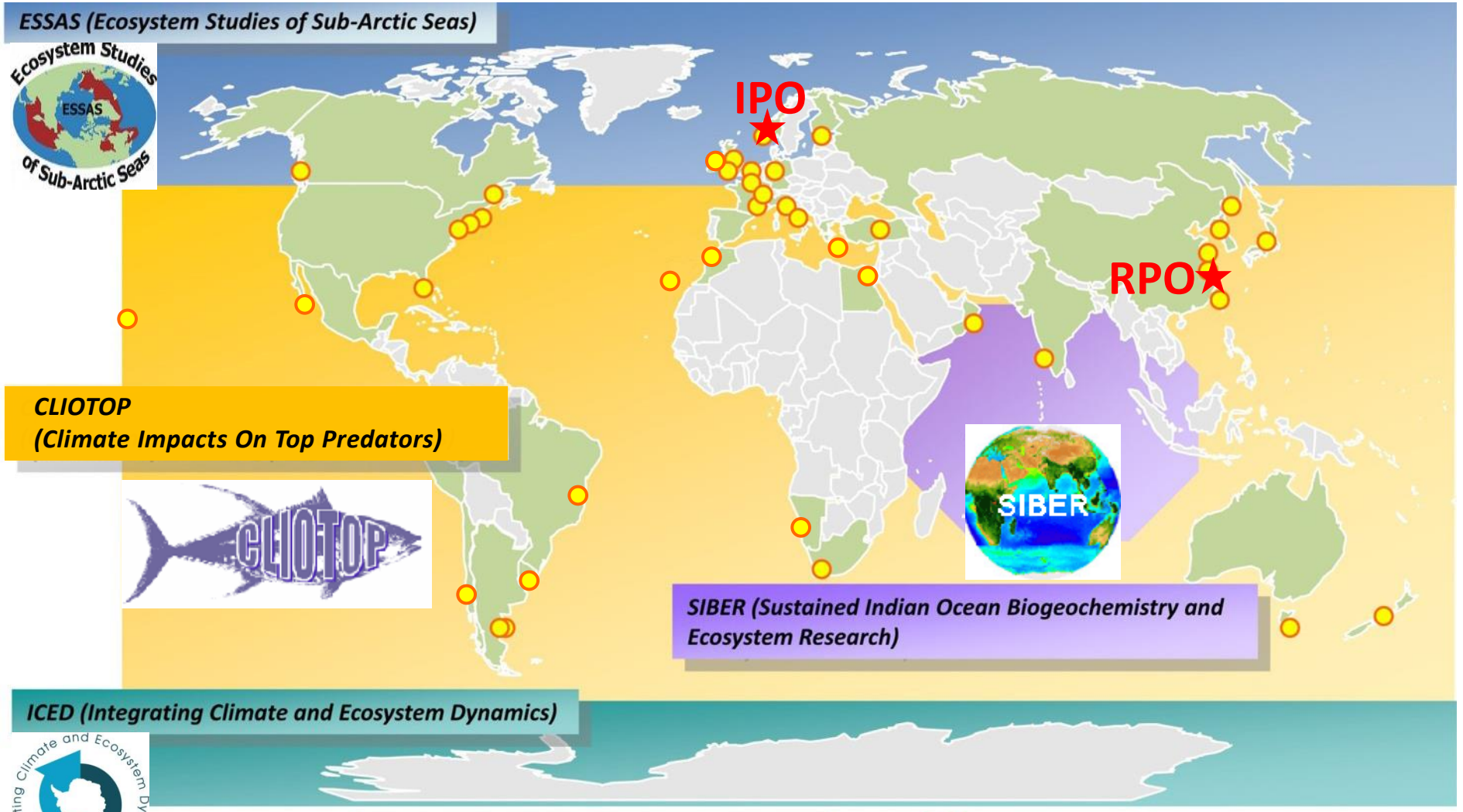
Theme 2
Sensitivity to Global Change

Theme 3
Feedbacks to Earth Systems

Theme 4
Responses of Society



IMBER Regional Programmes, International Network and Working Groups



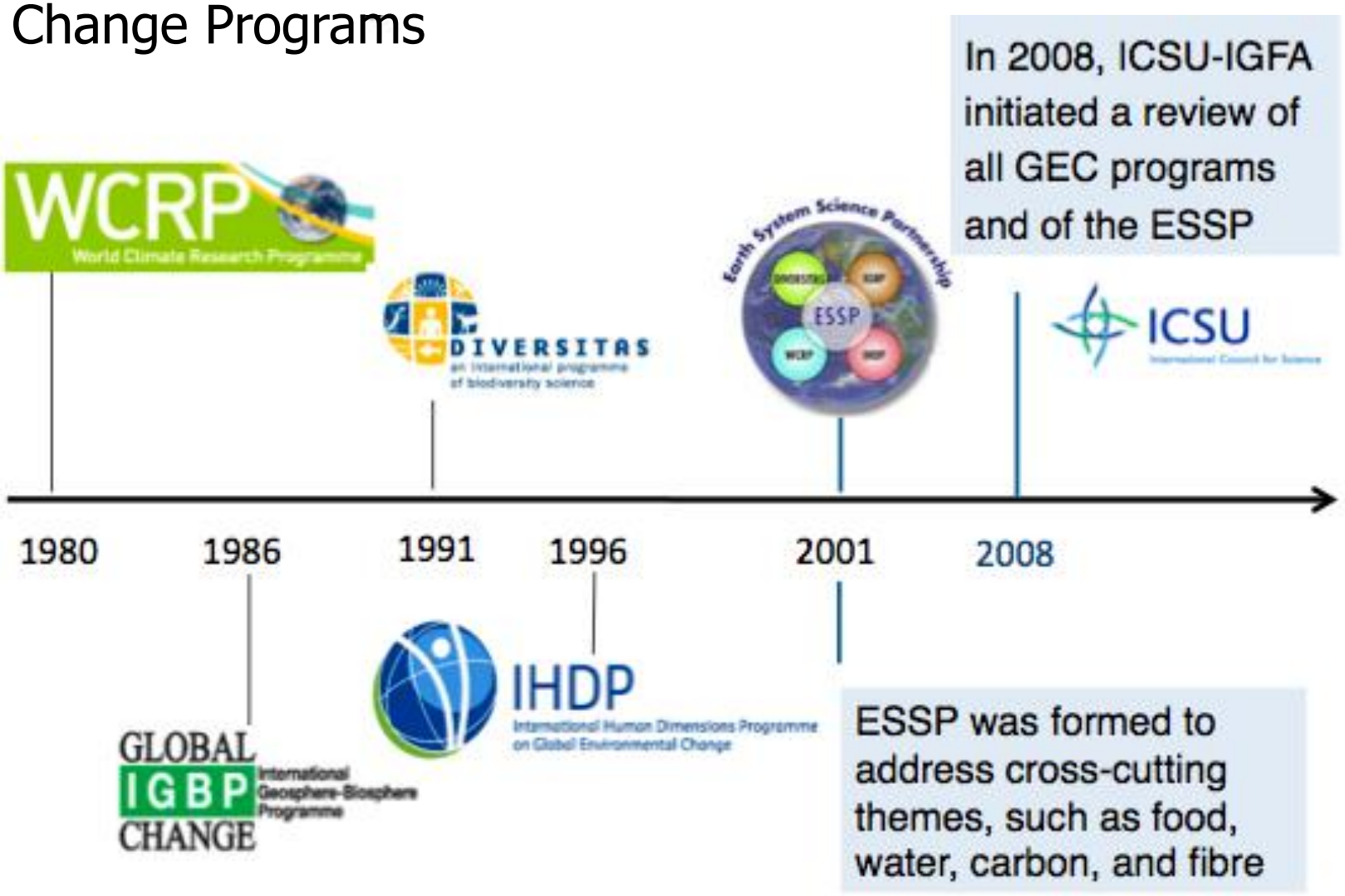
IMBER Endorsed Projects (41)

National IMBER contacts (35)

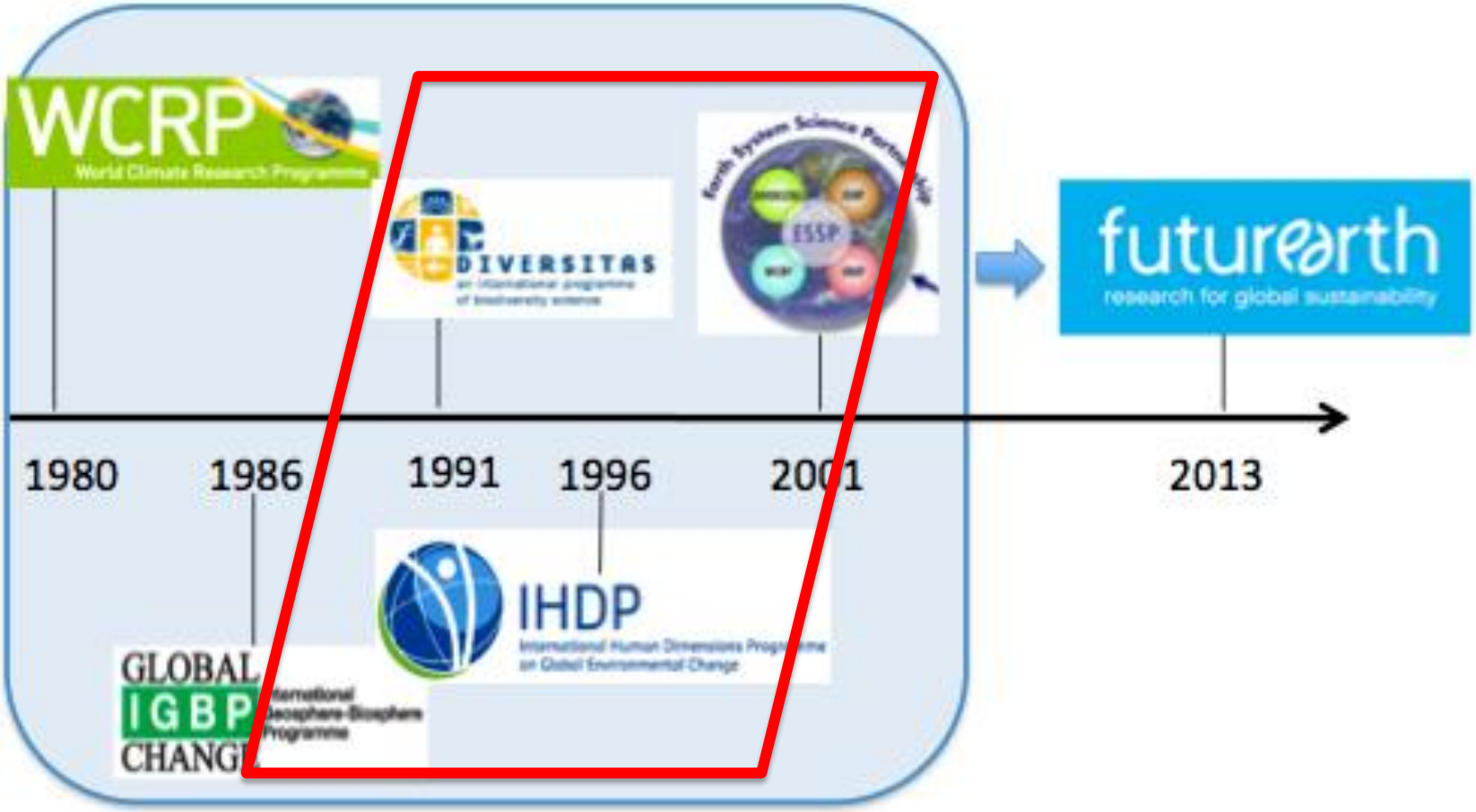
Working Groups: • Carbon Research; • Human Dimensions; • Continental Margins; • Data Management; • Capacity Building

Achievements - Activities

Historical Perspective – Global Environmental Change Programs



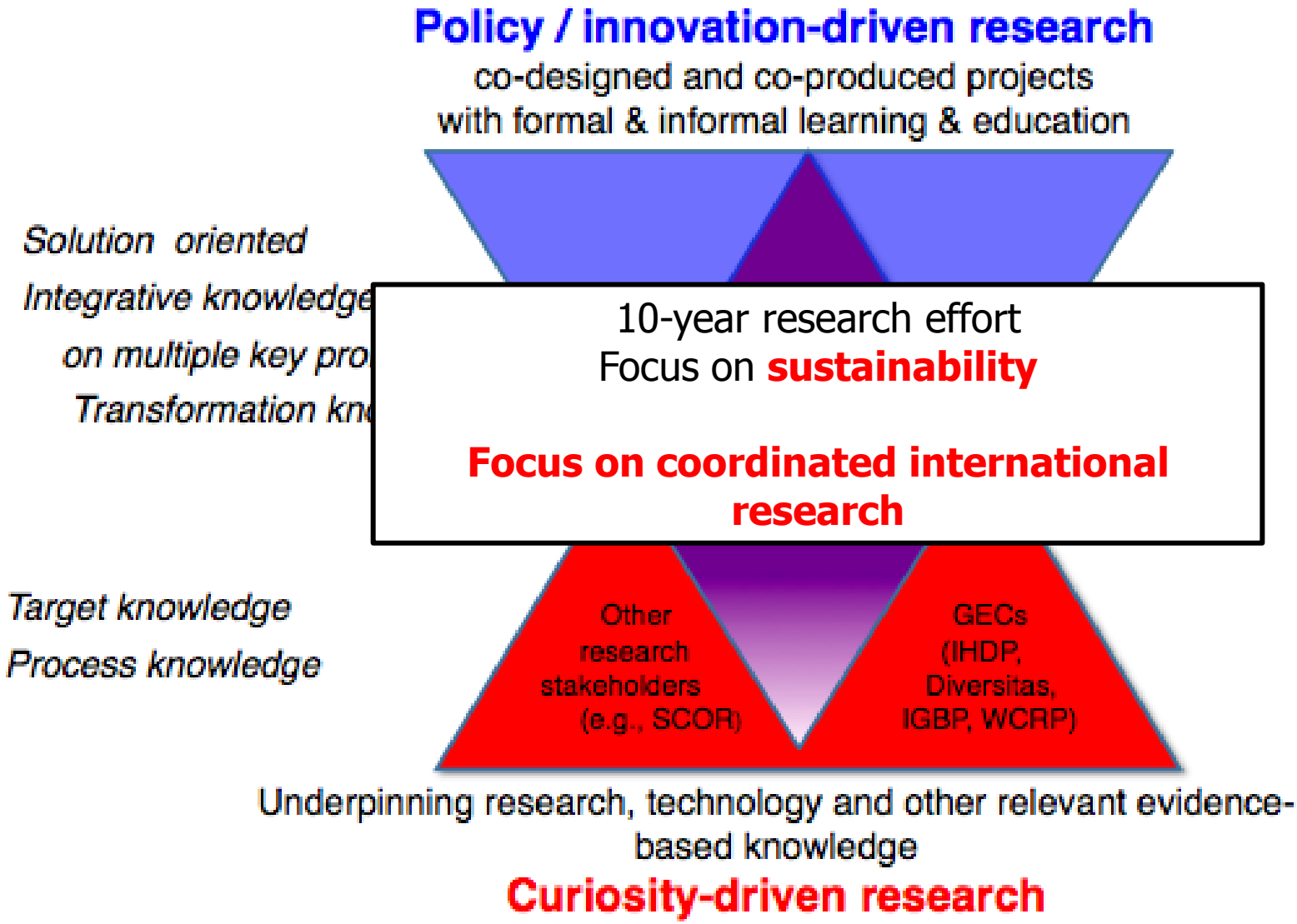
Future Earth is response



Alliance of partners

International Council for Science (ICSU), Belmont Forum, International Social Science Council, UNEP

FutureEarth aims to combine two approaches



IMBER Open Science Conference

FUTURE OCEANS

www.imber.info

23-27 June 2014

Bergen, Norway

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

- "***Future Oceans: Research for marine sustainability: multiple stressors, drivers, challenges and solutions***"
- Highlight and synthesize IMBER science achievements
- Integrate IMBER science to provide a basis for developing a science plan for the next decade of research
- Science plan will be basis for request to SCOR for an extension and for transition to Future Earth – community engagement

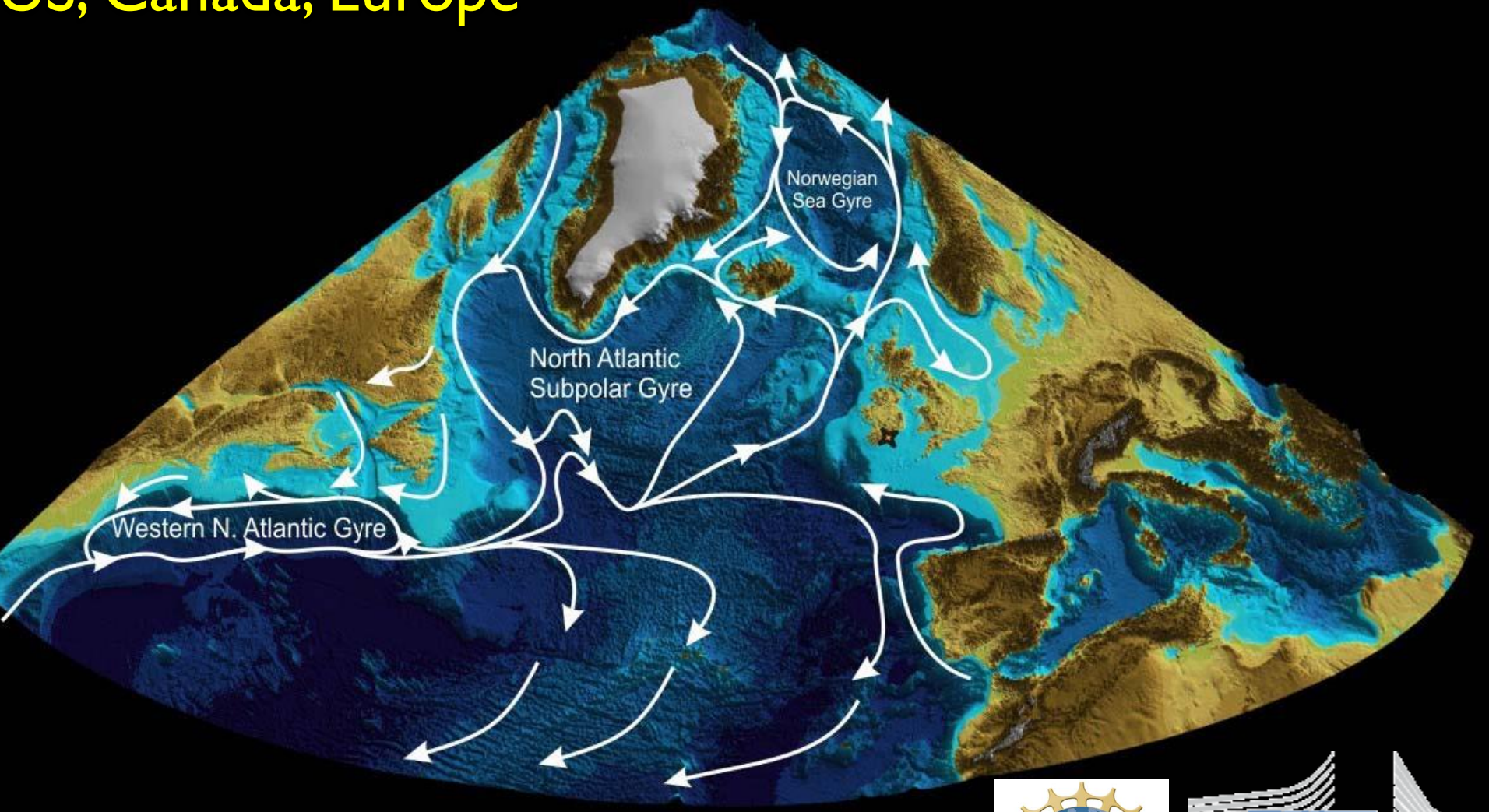
Research Directions for next 5-10 Years

- Continue four basic themes of IMBER and focus on climate variability and climate change – much has been learned but there is still more to learn
- Focus on multiple drivers and stressors – changes do not occur in isolation
- Include multidisciplinary research and interactions (natural, social and governing systems) as integral part of all project activities
- Include policy-relevant and stakeholder-relevant science

Value Added - Science
Global Environmental Change Programs

- Enables global comparisons, essential for complex issues (human-natural systems) and essential for new ideas and approaches
- Promotes capacity development to help strengthen research and governance at all levels
- Access to networks and funding resources; latter can be leveraged
- Recognition of the value of the science by supporting national and international bodies
- Belonging to a global change program provides the recognition that we are not simply “doing our own thing” but are part of a larger and well-coordinated organization

North Atlantic-Arctic Workshop
US, Canada, Europe



EURO-BASIN
BASIN SCALE ANALYSIS, SYNTHESIS AND INTEGRATION

NSF

European
Commission

Background

- EU-U.S. Joint Consultative Group Meeting on Science and Technology Cooperation – February 2013
  - Focus on developing the knowledge and technologies that can foster economic growth, create jobs and help solve shared challenges, such as in health, climate change and food security
  - Explored how to advance cooperation in transatlantic marine, maritime and Arctic research, as well as identifying links to transport research, health research and materials science

Background

- Galway Statement on Atlantic Ocean Cooperation Signed May 2013
  - Agreement between US, European Union, Canada to join forces on Atlantic research
  - Goals are to better understand the Atlantic Ocean and to promote the sustainable management of its resources
  - Study the interplay of the Atlantic Ocean with the Arctic Ocean, particularly with regards to climate change
  - Recognizes that Atlantic research will in many areas be more effective if coordinated on a transatlantic basis

A New Era of Trans-Atlantic Cooperation

Signed in Galway on 24 May 2013 in three originals in the English language.

For the European Union	For the Government of Canada	For the Government of the United States of America
Máire GEOGHEGAN-QUINN Commissioner for Research, Innovation and Science	Edward FAST Minister of International Trade and Minister for the Asia-Pacific Gateway	Dr Kerri-Ann JONES Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs
Maria DAMANAKI Commissioner for Maritime Affairs and Fisheries		

The Galway Statement on Atlantic Ocean Cooperation

Launching a European Union – Canada – United States of America Research Alliance

24th May 2013

To provide a vision for enhanced cooperation on both sides of the Atlantic and a set of jointly agreed priority actions to provide the means to achieve these goals .

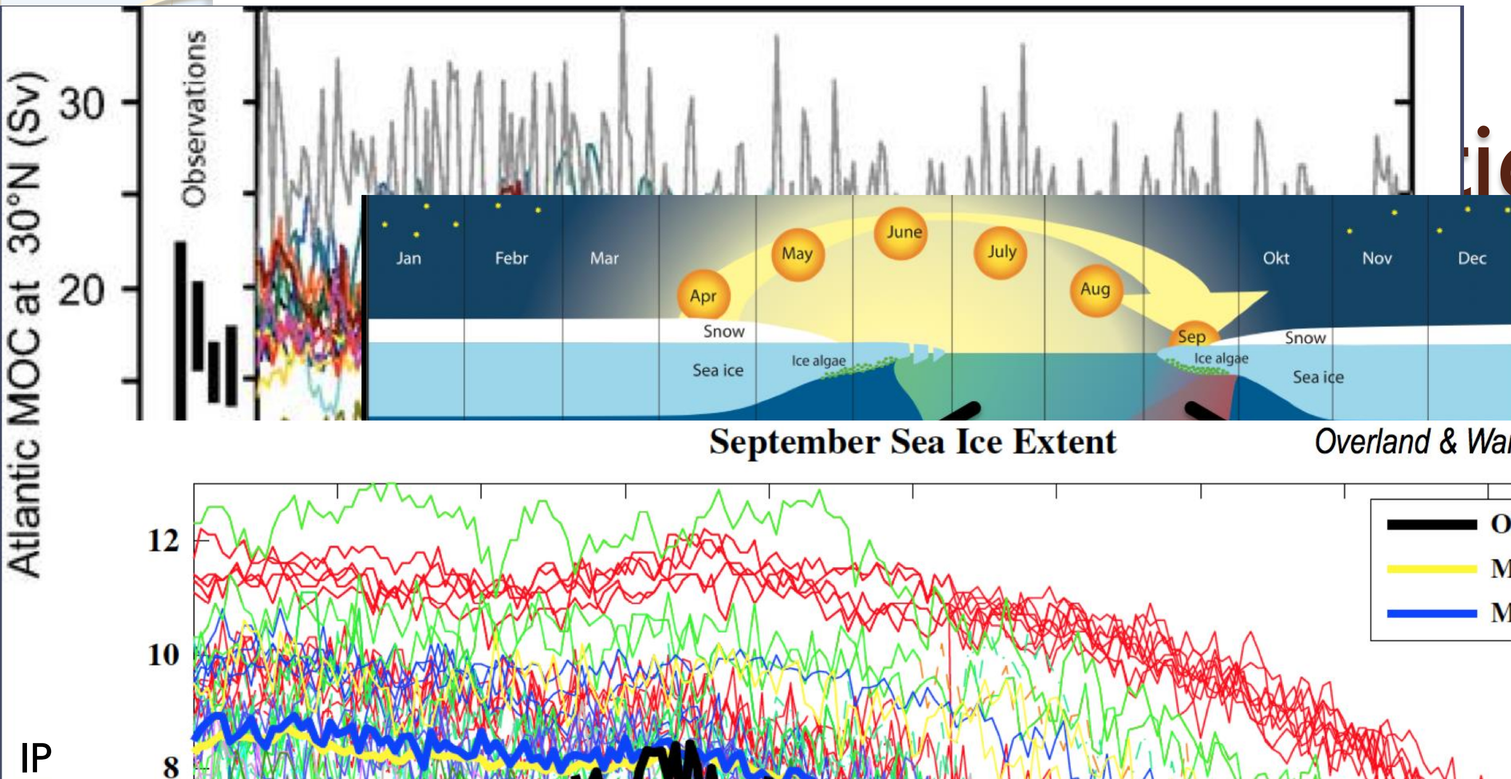
European Commission

www.marine.ie/atlanticasharedresource

Marine Institute
Foras na Mara

Background

- Euro-Basin 2010-2014 – focus on North Atlantic - planning next phase of research
- OCB 2013 workshop summer NSF expressed interest in a North Atlantic-Arctic initiative
- Proposal to develop workshop for joint US, Canada, EU effort in North Atlantic-Arctic began summer 2013
- Workshop convened April 2014



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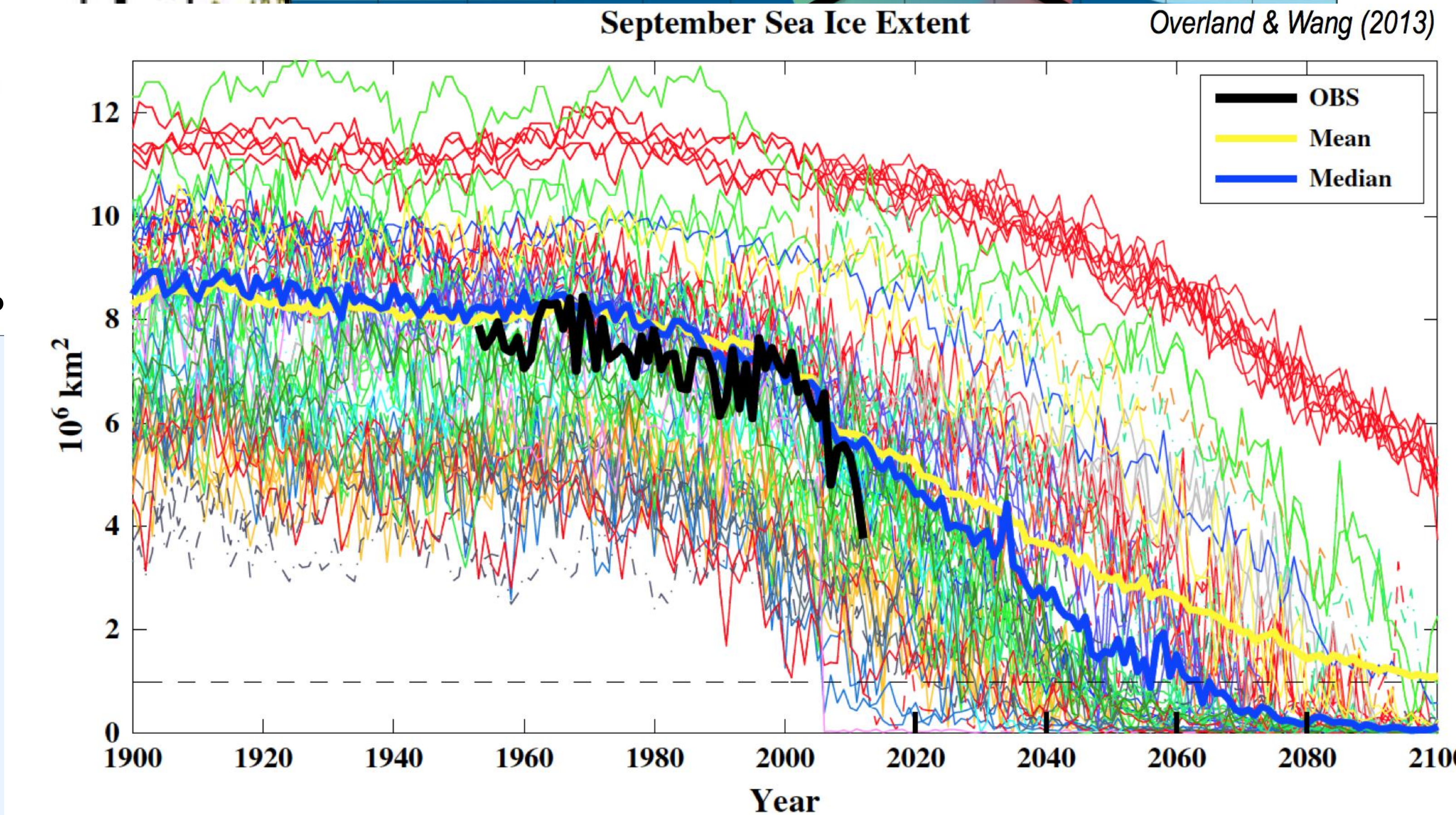

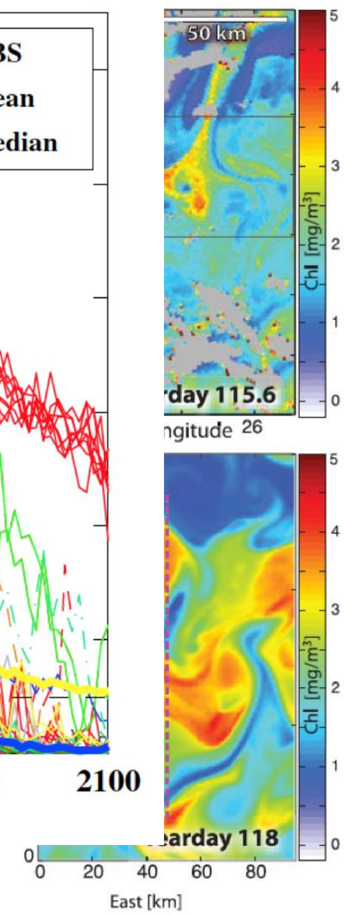

Mahadevan et al. 2012

Planned and Existing Programs

- OSNAP – Overturning in the Subpolar North Atlantic Program (US, UK, Germany, Netherlands, France, Canada)
- US and UK RAPID/Mocha Monitoring Array
- Euro-BASIN, EU Blue Growth, Horizon 2020
- Numerous Canadian programs
- **EX**port **P**rocesses in the **O**cean from **R**emote **S**ensing (EXPORTS)
- Arctic-COLORS NASA Scoping Activity
- Arctic productivity round robin

Workshop Scientific Themes

- **Gateways:** Implications of warming, freshening, and more open Arctic-North Atlantic gateways for circulation, biogeochemical cycling, and marine ecosystems
- **Circulation:** Role of large-scale (e.g. AMOC) versus meso- to sub-mesoscale processes (e.g, eddies, fronts) in different parts of the Atlantic-Arctic system and feedbacks to biogeochemistry and ecosystem structure and function
- **Spring bloom dynamics:** Interactions between physical, biogeochemical, and ecological processes involved in the initiation, evolution, and termination of the spring bloom and associated sensitivities to climate and circulation changes

Workshop Scientific Themes

- **Sustainable fisheries:** Collective impacts of fishing pressures, climate, and ocean circulation changes on key North Atlantic fisheries, including the lower trophic levels that support them
- **Marine ecosystem health:** Sensitivity of marine biodiversity and ecosystem resilience to climate and circulation changes
- **Prediction:** Development, validation, and application of advanced earth system models to predict future changes and inform decision-making

- New Knowledge
- Translation of new knowledge into advice

Overarching Questions

- Physical Circulation and Climate
- Shelf-Ocean Interactions
- Food Web Dynamics and Community Structure
- Linking of Social and Natural Science
  - Two-way interactions between human pressure and the North Atlantic-Arctic coupled marine system services feeding back to human well-being, in the context of management of a natural resource

Cross-Cutting Research Themes

- Changing biogeographic distribution of fish stocks/species
- Storage of anthropogenic carbon
- Sustainable delivery of ecosystem and climatic regulation services in the changing coupled North Atlantic-Arctic system
- Cryosphere and riverine input effects

Future Plans

- Workshop report is being drafted and will be available to community for comments
- North Atlantic-Arctic session at 2014 OCB summer workshop that includes presentation of workshop results
- Near-final report available by late summer with final report by end of year
- Proposals to NSF in August 2015, with field efforts beginning in 2016/17
- EU Blue Growth – focus on Atlantic, 20M euro, proposals due in June 2015 with field work in 2016/17; Horizon 2020

Outlook

- Many changes occurring in international science
- Recognition at many levels for need for collaborative, coordinated, interdisciplinary science programs
- Opportunities for international collaborative research are increasing but continued discussion between funding agencies and scientists is needed
- Website for North Atlantic-Arctic Program http://www.whoi.edu/website/NAtl_Arctic/