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.**

[www.imber.info](http://www.imber.info)
FOUR RESEARCH THEMES

- Interactions between biogeochemical cycles and marine food webs
- Sensitivity to global change
- Feedbacks to the Earth System
- Responses of society
IMBER Regional Programmes, International Network and Working Groups

Working Groups: • Carbon Research; • Human Dimensions; • Continental Margins; • Data Management; • Capacity Building
Achievements - Activities
Historical Perspective – Global Environmental Change Programs

In 2008, ICSU-IGFA initiated a review of all GEC programs and of the ESSP.

ESSP was formed to address cross-cutting themes, such as food, water, carbon, and fibre.
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

Policy / innovation-driven research
- co-designed and co-produced projects with formal & informal learning & education

Solution oriented
Integrative knowledge on multiple key projects
Transformation knowledge

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

10-year research effort
Focus on sustainability
Focus on coordinated international research
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
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

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.
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
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
- Export Processes in the Ocean from Remote Sensing (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/