

Symposium Report

*3rd GEO Blue Planet Symposium: The Role of the
Oceans in Earth's Life Support System*





Background

The Group of Earth Observations (GEO) “Oceans and Society: Blue Planet” Initiative (hereafter “GEO Blue Planet”) aims to ensure the sustained development and use of ocean and coastal observations for the benefit of society. GEO Blue Planet is a network made up of participants from a variety of existing international organizations, regional organizations, national institutes, universities, government agencies, project groups and other interested parties.

Symposium Overview

The 3rd Blue Planet Symposium was held in College Park, Maryland, USA from 31 May to 2 June 2017. The symposium was co-hosted by the National Oceanic and Atmospheric Administration, the University of Maryland and the University System of Maryland Foundation.

The symposium served as a forum for discussion of societal information needs resulting from the important role the oceans play in Earth’s life-support system and the challenge of minimizing the impacts of human activities on the oceans while utilizing the resources of the oceans to meet our needs. The symposium also served as a platform for the participating communities to exchange information on their activities and discuss potential pilot and prototype projects for Blue Planet to focus on in the coming years.

Day 1

Sessions on Day 1 reviewed the drivers and pressures on the oceans, the current and predicted states and impacts to the Earth’s life support system. These sessions were organized around four subthemes:

- The changing oceans
- Threats from pollution, warming and acidification
- Processes and life at the Interfaces with the oceans
- Sustainable use of ocean resources

Days 2 and 3

The 2nd and 3rd days of the symposium identified and reviewed user information needs related to the impacts on the oceans discussed on day 1 and presented examples of existing information services. Discussion sessions sought to review the added value and role of GEO Blue Planet discuss potential prototype and pilot projects for the Initiative. These sessions will be organized around the four thematic focus areas of GEO Blue Planet:

- Healthy Ecosystems and Food Security
- Coastal Communities
- The Blue Economy
- Maritime Awareness

See appendix A for the meeting agenda.

Symposium Outcomes and Recommendations

The symposium brought together a diverse group of participants to discuss the challenges facing the ocean and how Blue Planet can add value to existing ocean observing activities and programmes by highlighting the societal benefits of ocean observations, engaging with end-users and supporting informed decision making. See appendix B for a full list of attendees.

Recommendations from the symposium discussions include:

- Blue Planet should focus on building the user engagement working group as a priority.
- The user engagement working group should identify priority user types (with a focus on intermediary users such as industry service providers). This task should include an analysis and compilation of past and current efforts within the GEO and ocean observing community to identify and engage with users.
- To engage users, Blue Planet should travel to meetings of different user groups.
- Blue Planet should focus efforts around needs to support the ocean-related Sustainable Development Goals and support other policy mandates.
- Blue Planet should consider building high level products and services that can be tailored to specific regional and local needs, potentially by the regional GEOSS groups or intermediary users.
- Blue Planet should work to produce and compile case studies and examples of how ocean observations support the three pillars of sustainable development: environment, society and the economy. These collaborations could be done with the support of OECD and economic experts that are now involved in Blue Planet.

Future Activities (July 2017 - 2018)

- Blue Planet will work to establish and build working groups.
- The Blue Planet Implementation Plan will be updated.
- Blue Planet will select prototype and pilot projects and begin implementing the projects.
- Blue Planet will work to support sustainable development activities in the Caribbean.
- The next Blue Planet symposium will be held from July 4-6, 2018 in Toulouse. The symposium will be held prior to the EuroScience Open Forum in Toulouse to attract attendees.

APPENDIX A: MEETING AGENDA

Day 1: Wednesday, May 31, 2017

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| 07:40 – 08:30 | Registration | |
| Welcome and Introductory Keynotes | | |
| 08:30 – 08:35 | Welcome and Opening Comments | Paul DiGiacomo, National Oceanic and Atmospheric Administration |
| 08:35 – 08:40 | Welcome from the University of Maryland | James Carton, University of Maryland, College Park |
| 08:40 – 09:00 | Remarks by NOAA's Assistant Administrator for Oceanic and Atmospheric Research | Craig McLean, National Oceanic and Atmospheric Administration |
| 09:00 – 09:15 | The Group on Earth Observations | Douglas Cripe, GEO Secretariat |
| 09:15 – 09:30 | The Group on Earth Observations "Oceans and Society: Blue Planet" Initiative | Sophie Seeyave, Partnership for the Observation of the Global Oceans |
| Session 1: The Changing Oceans | | |
| Session Co-chairs: Sinead Farrell, University of Maryland & Eric Lindstrom, National Aeronautics and Space Administration | | |
| 09:30 – 09:35 | Opening Comments and Speaker Introductions | Sinead Farrell, University of Maryland Eric Lindstrom, National Aeronautics and Space Administration |
| 09:35 – 09:45 | Observing the Changing Ocean | David Legler, National Oceanic and Atmospheric Administration |
| 09:45 – 10:05 | Understanding Sea Level Change on Global and Local Scales | Benjamin Hamlington, Old Dominion University |
| 10:05 – 10:25 | The Changing Cryosphere and Impact on Regional Sea Level | Isabella Velicogna, University of California, Irvine |
| 10:25 - 10:45 | Arctic Ocean Dynamics and Links to the Global Oceans | Mary-Louise Timmermans, Yale University |
| 10:45 – 11:00 | Coffee Break | |
| 11:00 – 11:30 | Panel Discussion | |
| Session 2: Threats from Pollution, Warming and Acidification | | |
| Session Co-Chairs: Jan Newton, University of Washington & Emily Smail, University of Maryland | | |
| 11:30 – 11:40 | Opening Comments and Speaker Introductions | Jan Newton, University of Washington Emily Smail, University of Maryland |
| 11:40 – 11:55 | Marine Pollution: Status, Trends and Opportunities | Christopher Corbin, UN Environment Caribbean Environment Programme |
| 11:55 – 12:10 | Marine Pollution and the Toxic Legacy of Our Consumer Culture | Susan Shaw, Marine & Environmental Research Institute |

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| 12:10 - 12:25 | Ocean Warming and Acidification: Present Conditions and Future Projections | Richard Feely, National Oceanic and Atmospheric Administration |
| 12:25 - 12:40 | Societal Impacts of Ocean Acidification and Warming | Jan Newton, University of Washington |
| 12:40 - 13:10 | Panel Discussion | |
| 13:10 – 14:10 | Lunch and Lunchtime Presentation | |
| 13:40 – 14:10 | The Open Data Cube and Coastal Applications | Jonathan Ross, Geosciences Australia |
| Session 3: Processes and Life at the Interfaces with the Oceans | | |
| Session Co-Chairs: Katja Fennel, Dalhousie University; Nico Caltabiano, Climate and Ocean - Variability, Predictability, and Change & Anton Post, Florida Atlantic University - Harbor Branch Oceanographic Institute | | |
| 14:10 – 14:20 | Opening Comments and Speaker Introductions | Anton Post, Florida Atlantic University - Harbor Branch Oceanographic Institute |
| 14:20 – 14:50 | Corals and Climate Change: A Shifting Landscape of Risk | Kim Cobb, Georgia Tech |
| 14:50 – 15:20 | Tracking Carbon and Nitrogen Pollution from Headwaters to Coasts | Sujay Kaushal, University of Maryland, College Park |
| 15:20 – 15:50 | Panel Discussion | |
| Session 4: Sustainable use of Ocean Resources | | |
| Session Co-chairs: Gabrielle Canonico, National Oceanic and Atmospheric Administration & Tim Moltmann, University of Tasmania | | |
| 15:50 – 16:00 | Opening Comments and Speaker Introductions | |
| 16:00 – 16:15 | COVERAGE: CEOS Ocean Variables Enabling Research and Applications | Eric Lindstrom, National Aeronautics and Space Administration |
| 16:15 – 16:30 | The Copernicus Marine Environment Monitoring Service: Its Use for Marine Resource Applications | Pierre-Yves Le Traon, Ifremer and Mercator Ocean |
| 16:30 – 16:45 | The Marine Biodiversity Observation Network (MBON): A Global Partnership for the Systematic Study of Life in the Sea | Frank Muller-Karger, University of South Florida |
| 16:45 – 17:00 | Incentivizing Sustainable Fisheries Management on a Global Scale: The Role of Markets and Science | Werner Kiene, Marine Stewardship Council |
| 17:00 – 17:30 | Panel Discussion | |
| 18:00 – 19:30 | Poster Session | |

Day 2: Thursday, June 1, 2017

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| 08:00 – 08:40 Registration | | |
| Introductory Keynote | | |
| 08:40 – 09:00 | Remarks from the World Bank on Marine Management Programs | Christoph Aubrecht, World Bank |
| Session 5: Services and Information for Healthy Ecosystems and Food Security | | |
| Session Co-Chairs: Kwame Adu Agyekum, University of Ghana & Andy Steven, Commonwealth Scientific and Industrial Research Organisation | | |
| 09:00 – 09:10 | Opening Comments and Speaker Introductions | Andy Steven, Commonwealth Scientific and Industrial Research Organisation |
| 09:10 – 09:30 | Advancing Aquaculture in a Changing World | Megan Davis, Florida Atlantic University - Harbor Branch Oceanographic Institute |
| 09:30 – 09:50 | The use of Earth Observation Data for Decision Support and the Management of Fisheries Resources in West Africa | Kwame Adu Agyekum, University of Ghana |
| 09:50 – 10:10 | The Economic Benefits and Impacts of Sustaining the Global Ocean | Rashid Sumaila, University of British Columbia |
| 10:10 – 10:30 Coffee Break | | |
| 10:30 – 12:30 | Facilitated Discussion | |
| 12:30 – 13:30 Lunch and Lunchtime Presentation | | |
| 13:00 – 13:30 | Global Ecological Marine Units (EMUs): An Environmental Stratification of the Ocean | Roger Sayer, United States Geological Survey |
| Session 6: Services and Information for Coastal Communities | | |
| Session Co-Chairs: Louis Celliers, Council for Scientific & Industrial Research & J. Ru Morrison, Northeastern Regional Association of Coastal Ocean Observing Systems | | |
| 13:30 – 13:40 | Opening Comments and Speaker Introductions | Louis Cellier, Council for Scientific & Industrial Research, South Africa J. Ru Morrison, Northeastern Regional Association of Coastal Ocean Observing Systems |
| 13:40 – 13:55 | Earth Observation Data and Information for Mitigation of Vulnerability to Climatic Hazards of Coastal Areas | Chide Ibe, University of Port Harcourt |
| 13:55 – 14:10 | Building a Futures assessment process to identify pathways to sustainability for coastal communities | Martin Le Tissier, Future Earth Coasts |
| 14:10 – 14:25 | Marine Monitoring for Evidence-based Action in Two Small Island Developing States: Barbados and Grenada | Kristin Qui, Yale University |

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| 14:25 – 14:40 | Climate Services as a Model for Deriving Value from Earth Observation for Coastal Management | Maria Manez Cost, Climate Service Center Germany |
| 14:40 – 15:00 | Coffee Break | |
| 15:00 – 17:00 | Facilitated Discussion | |
| 17:00 – 17:45 | Review of Status, Priorities, Potential Projects and Partnership Opportunities | |

Day 3: Friday, June 2, 2017

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| 08:00 – 08:40 | Registration | |
| Session 7: Services and Information for the Blue Economy | | |
| Session Co-chairs: Ralph Rayner, National Oceanic and Atmospheric Administration & Pierre-Yves La Traon, Mercator Océan, France | | |
| 08:30 – 08:40 | Opening Comments and Speaker Introductions | Ralph Rayner, National Oceanic and Atmospheric Administration |
| 08:40 – 09:00 | The Ocean Economy in 2030 | Claire Jolly, Organisation for Economic Co-operation and Development |
| 09:00 – 09:20 | Ocean Observations and Models and Their Impact Upon Ocean and Weather Services | John Siddorn, Met Office |
| 09:20 – 09:40 | Coastal Ocean Observations, Risk Modeling and Reinsurance | Dail Rowe, WeatherPredict Consulting Inc. |
| 09:40 – 10:00 | The Impact of Ocean Observations on Wind and Wave Models for Application in the Offshore Industry | Andrew Cox, Oceanweather Inc. |
| 10:00 – 10:20 | Q & A | |
| 10:20 – 10:40 | Coffee Break | |
| 10:40 – 12:00 | Facilitated Discussion | |
| 12:00 – 13:00 | Lunch and Lunchtime Presentation | |
| 12:30 – 13:00 | Earth Observation Processing and Analytics Services | Lauryn Gutowski, EOS Data Analytics, Inc. |
| Session 8: Services and Information for Maritime Awareness | | |
| Session Co-Chairs: Samy Djavidnia, European Maritime Safety Agency & Paul DiGiacomo, National Oceanic and Atmospheric Administration | | |
| 13:00 – 13:10 | Opening Comments and Speaker Introductions | Samy Djavidnia, European Maritime Safety Agency |
| 13:10 – 13:25 | Domain Awareness at High Latitudes | Ruth Lane, National Ice Center |
| 13:25 – 13:40 | Collaborative Arctic Observations | Vera Metcalf, Eskimo Walrus Commission |
| 13:40 - 13:55 | Use of Satellite Data and Information for Monitoring Illegal, Unreported, and Unregulated Fishing Activities | Mark Richardson, The Pew Charitable Trusts |
| 13:55 - 14:10 | Reinforcing and Moving Beyond Pacific SIDS Monitoring of Illegal, Unreported and Unregulated Fisheries Activities | James Movick, Pacific Islands Forum Fisheries Agency |
| 14:10 - 14:30 | Coffee Break | |
| 14:30 – 16:30 | Facilitated Discussion | |
| 16:30 – 17:15 | Review of Status, Priorities, Potential Projects and Partnership Opportunities | |
| 17:15 – 17:30 | Wrap up and Next Steps | |

APPENDIX B: PARTICIPANT LIST

- Kwame Adu Agyekum, University of Ghana
- Fumihiko Akazawa, Japan Agency for Marine-Earth Science and Technology
- Taylor Armstrong, National Oceanic and Atmospheric Administration
- Chris Aubrecht, European Space Agency/World Bank
- Lenore Bajona, Ocean Tracking Network
- Eric Bayler, National Oceanic and Atmospheric Administration
- Amber Bellamy, NOAA Sea Grant Knauss Marine Policy Fellow
- Kriti Bhargava, University of Maryland
- Alexandra Bijak, U.S. Environmental Protection Agency
- Ellie Bors, National Oceanic and Atmospheric Administration
- Jennifer Bosch, National Oceanic and Atmospheric Administration
- Christopher Brown, National Oceanic and Atmospheric Administration
- Alessandra Burgos, Old Dominion University
- Gabrielle Canonico, National Oceanic and Atmospheric Administration
- James Carton, University of Maryland
- Louis Celliers, Council for Scientific and Industrial Research
- Jongkuk Choi, Korea Institute of Ocean Science & Technology
- Pablo Clemente-Colon, US Arctic Research Commission
- Nora Cohen, Saildrone
- Christopher Corbin, Programme Officer, UN Environment Caribbean Environment Programme.
- Andrew T.Cox, Oceanweather Inc.
- Douglas Cripe, GEO Secretariat
- Brittany Croll, National Oceanic and Atmospheric Administration
- Megan Davis, Florida Atlantic University/Harbor Branch Oceanographic Institute
- Kruti Desai, Consortium For Ocean Leadership
- Frederic Dias, University College Dublin
- PaulDiGiacomo, National Oceanic and Atmospheric Administration
- SamyDjavidnia, European Maritime Safety Agency
- Jeff Donze, ESRI
- Dr. Mark Eakin, National Oceanic and Atmospheric Administration
- Richard Feely, National Oceanic and Atmospheric Administration
- Sinead Ferrell, University of Maryland/National Oceanic and Atmospheric Administration
- Joe Flasher, Amazon
- Carla Friederich, United Nations Environment Programme
- Carlos Garcia Soto, Spanish Institute of Oceanography
- René Garello, IEEE Oceanic Engineering Society
- Coumba Gaye, Senegalese Permanent Mission of the United Nations
- Anita Gibson, Organisation for Economic Co-operation and Development
- Sarah Giltz, National Oceanic and Atmospheric Administration
- Dana Goodson, Udall Foundation
- Ed Gorecki, National Oceanic and Atmospheric Administration
- Carl Gouldman, U.S. Integrated Observing System
- Semyan A.Grodsky, University of Maryland
- Lauryn Gutowski, EOS Inc.
- Sebastien Halleux, Saildrone



- Benjamin Hamlington, Old Dominion University
- Honorata Hansen, Contractor
- Naomi Harada, Japan Agency for Marine-Earth Science and Technology
- Jessica Hardy, Regenerative Seas
- Alex Harper, U.S. Integrated Observing System
- Corinne Hartin, Joint Global Change Research Institute
- Michael Harvey, National Oceanic and Atmospheric Administration
- Sean Helfrich, National Oceanic and Atmospheric Administration
- Natalie Hilmi, Centre Scientifique de Monaco
- Jonathan Hodge, Commonwealth Scientific and Industrial Research Organisation
- Chide Ibe, University of Port Harcourt
- Celeste Jarvis, Global Science and Technology
- Inseong Jeong, National Oceanic and Atmospheric Administration
- Libby Jewett, National Oceanic and Atmospheric Administration
- Claire Jolly, Organization for Economic Co-operation and Development
- Max Kaplan, National Oceanic and Atmospheric Administration
- Ellen Kappel, The Oceanography Society
- Sujay Kaushal, University of Maryland
- Takeshi Kawano, Japan Agency for Marine-Earth Science and Technology
- Werner Kiene, Marine Stewardship Council
- Taiyo Koboyashi, Japan Agency for Marine-Earth Science and Technology
- Melanie Kolb, Instituto de Geografía, National Autonomous University of Mexico
- Charles Kovach, National Oceanic and Atmospheric Administration
- Derrick Lampkin, University of Maryland
- Ruth Lane, U.S. National Ice Center
- Amanda L. Laverty, Old Dominion University
- Marvourneen Le Dolor, Great Lakes Observing System
- Pierre-Yves Le Traon, Mercator Ocean
- Martin Le Tissier, Future Earth Coasts (LOICZ)
- David M. Legler, National Oceanic and Atmospheric Administration
- Eric Lindstrom, National Aeronautics and Space Administration
- Laura Lorenzoni, National Aeronautics and Space Administration
- Julia Luthringer, National Oceanic and Atmospheric Administration
- Vivian Lutz, CONICET- Instituto Nacional de Investigación y Desarrollo Pesquero
- Dominic MacCormack, U.S. Environmental Protection Agency
- Kate McClure, Department of the Treasury
- Craig Mclean, National Oceanic and Atmospheric Administration
- Vera Metcalf, Eskimo Walrus Commission
- Mark Middlebush, NAVOCEANO support - Vencore, Inc.
- Tim Moltmann, Integrated Marine Observing System
- Ru Morrison, Northeastern Regional Association of Coastal Ocean Observing Systems
- James T. Movick, Pacific Islands Forum Fisheries Agency
- Frank Muller-Karger, University of South Florida, College of Marine Science
- Marilyn Murphy, National Oceanic and Atmospheric Administration
- Lou Nadeau, Eastern Research Group, Inc.
- Aimee Neeley, National Aeronautics and Space Administration
- Laura Newcomb, National Oceanic and Atmospheric Administration



- Jan Newton, University of Washington
- Michael Ondrusek, National Oceanic and Atmospheric Administration
- Francoise Pearlman, Institute of Electrical and Electronics Engineers
- Jay Pearlman, Institute of Electrical and Electronics Engineers
- Malaquias Pena, National Oceanic and Atmospheric Administration
- Christine Pequignet, Met Office
- Hans-Peter Plag, Old Dominion University
- Nadia Pniardi, University of Bologna
- Anton F. Post, Florida Atlantic University - Harbor Branch Oceanographic Institute
- Kristin Qui, Yale University
- Ralph Rayner, National Oceanic and Atmospheric Administration
- Mark Richardson, The Pew Charitable Trusts
- Jonathon Ross, Committee on Earth Observation Satellites
- Dail Rowe, WeatherPredict Consulting
- Saiontoni Sarkar, National Oceanic and Atmospheric Administration/Riverside Technology, Inc.
- Kerry Sawyer, National Oceanic and Atmospheric Administration
- Stephanie Schaollaert Uz, National Aeronautics and Space Administration/Global Science and Technology
- Michael Schmidt, National Oceanic and Atmospheric Administration
- Sophie Seeyave, Partnership for Observation of the Global Oceans
- Susan D.Shaw, Marine & Environmental Research Institute
- John Siddorn, Met Office
- Andrew Simmons, Urban development contractor
- Samantha Simmons, US Marine Mammal Commission
- Travis Sluka, National Oceanic and Atmospheric Administration
- Emily Smail, University of Maryland/National Oceanic and Atmospheric Administration
- Michael Soracco, National Oceanic and Atmospheric Administration
- Urzula Stankiewicz, Blue Ventures
- Andrew Steven, Commonwealth Scientific and Research Organisation
- Rashid Sumaila, University of British Columbia
- Roger Syre, U.S. Geological Survey
- Mary-Louise Timmermans, Yale University
- Katrina Tomecek, National Oceanic and Atmospheric Administration
- Ryan Vandermeulen, National Aeronautics and Space Administration
- Isabella Velicogna, University of California - Irvine
- Valerie Were, National Oceanic and Atmospheric Administration
- Neil Weston, National Oceanic and Atmospheric Administration
- Doug Wilson, Caribbean Wind LLC/IOCARIBE-GOOS
- Zdenka Willis, Consultant
- Leonid Yurganov, Joint Center for Earth Systems Technology
- Guangming Zheng, National Oceanic and Atmospheric Administration