European Projects and International Activities

Jean-Pierre Gattuso
Laboratoire d'Océanographie de Villefranche
CNRS-Université Pierre et Marie Curie-Paris 6

European Projects and International Activities

Jean-Pierre Gattuso
Laboratoire d'Océanographie de Villefranche
CNRS-Université Pierre et Marie Curie-Paris 6

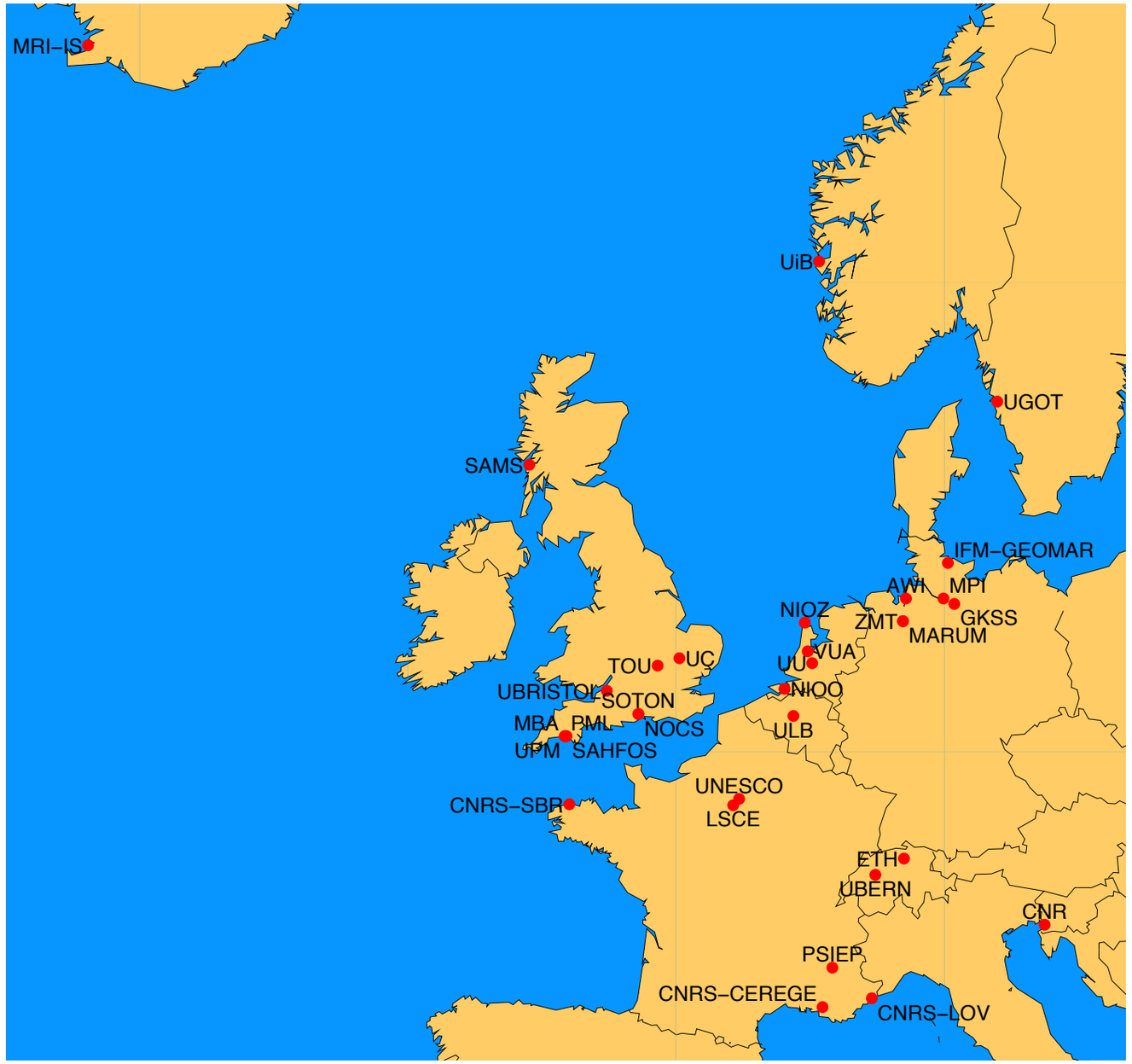
1. European projects
    1. EPOCA
    2. BIOACID
    3. UKOA
    4. MedSeA
2. International activities
    1. SIOA
    2. IPCC
    3. ICO

Fast facts

- A large-scale integrating project of the European Union which investigates ocean acidification and its consequences

- 160+ scientists from 31 laboratories and 10 countries

- Total budget:16 M€, including 6.5 M€ from the EU (2008-2012)



What is EPOCA about?

- **Theme 1** (J. Bijma):

  Improve the understanding of the past and present changes of ocean acidification

- **Theme 2** (U. Riebesell):

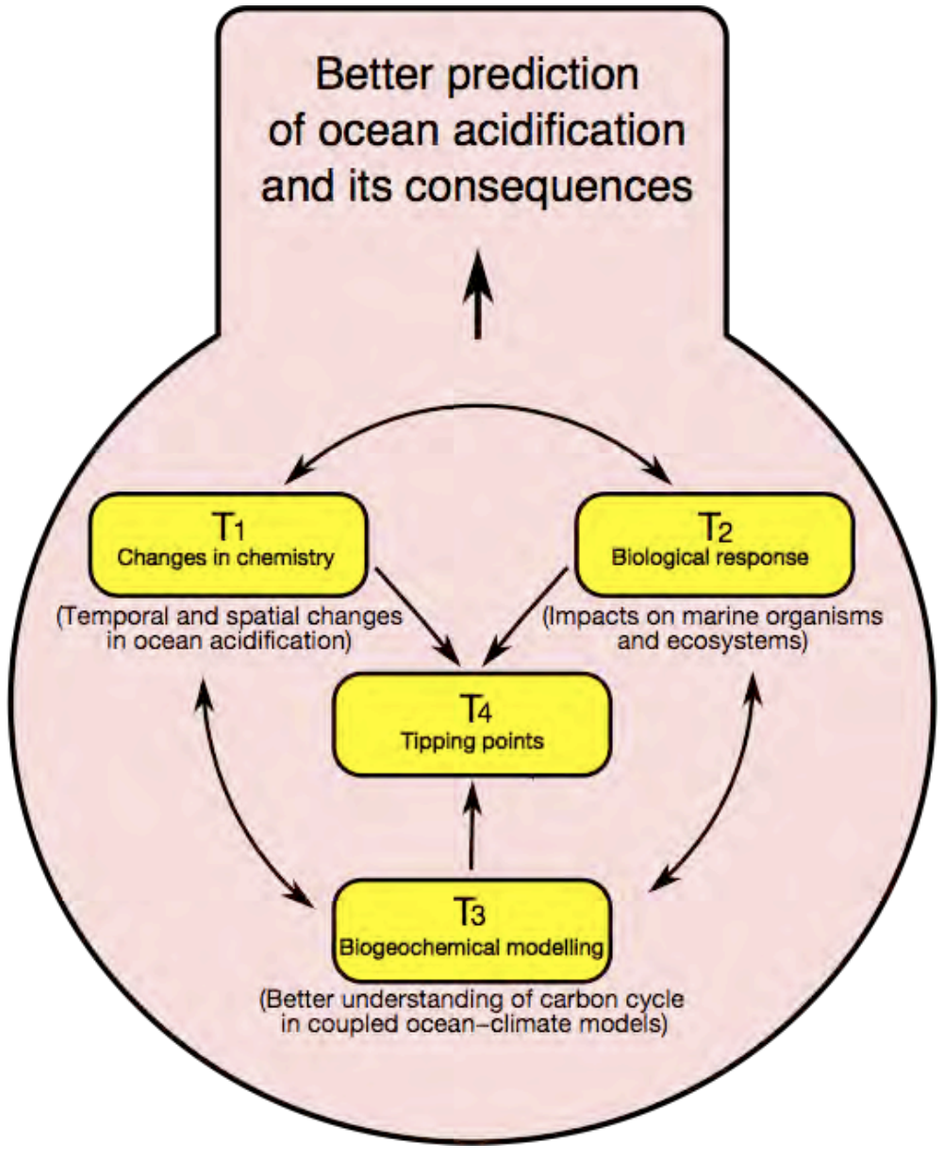
  Determine the impacts of ocean acidification on marine biota

- **Theme 3** (J. Orr):

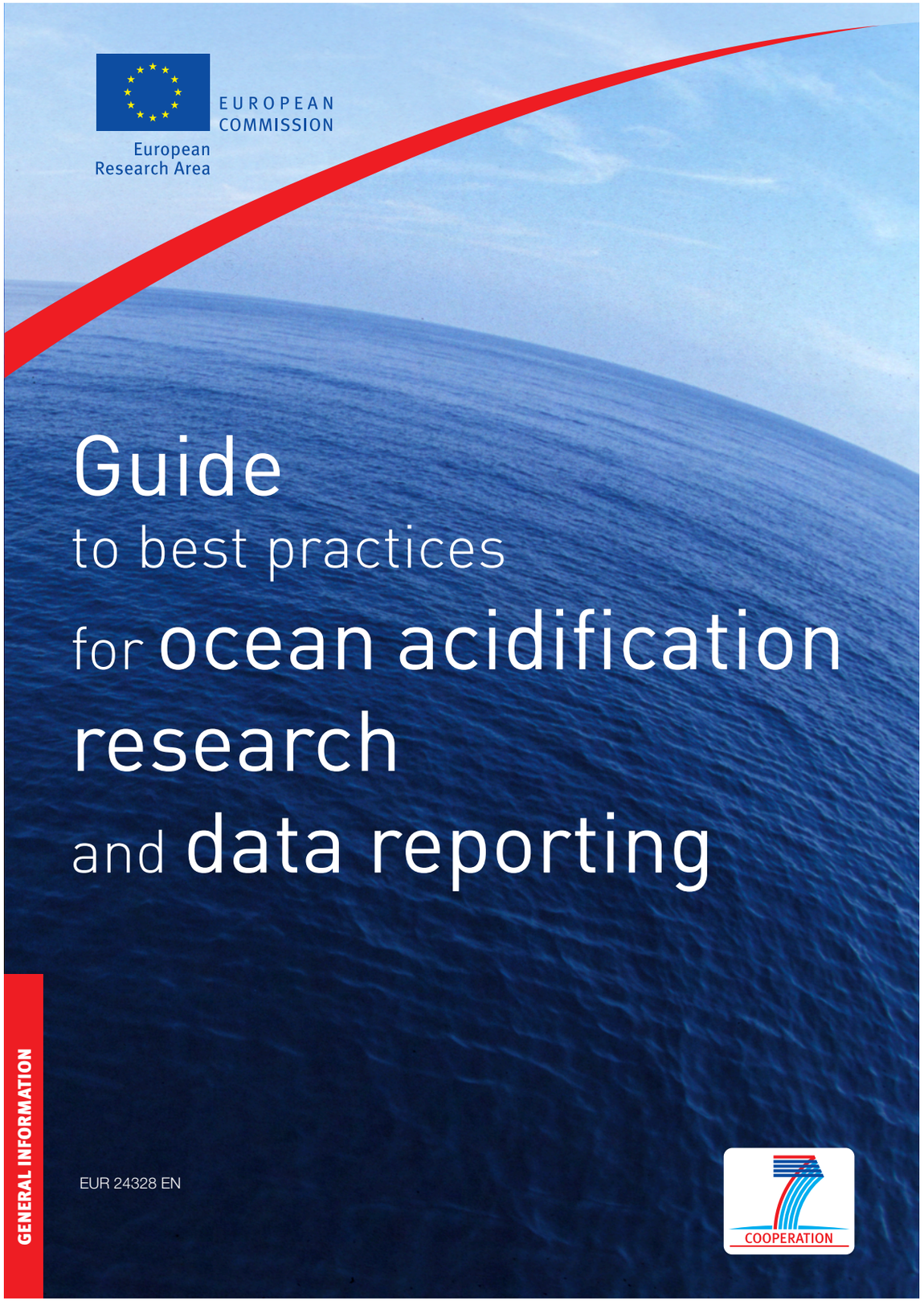
  Improve understanding of future changes in ocean chemistry and biogeochemical feedbacks

- **Theme 4** (C. Turley):

  Synthesize information on tipping points; outreach; link with end-users and policy makers (RUG)

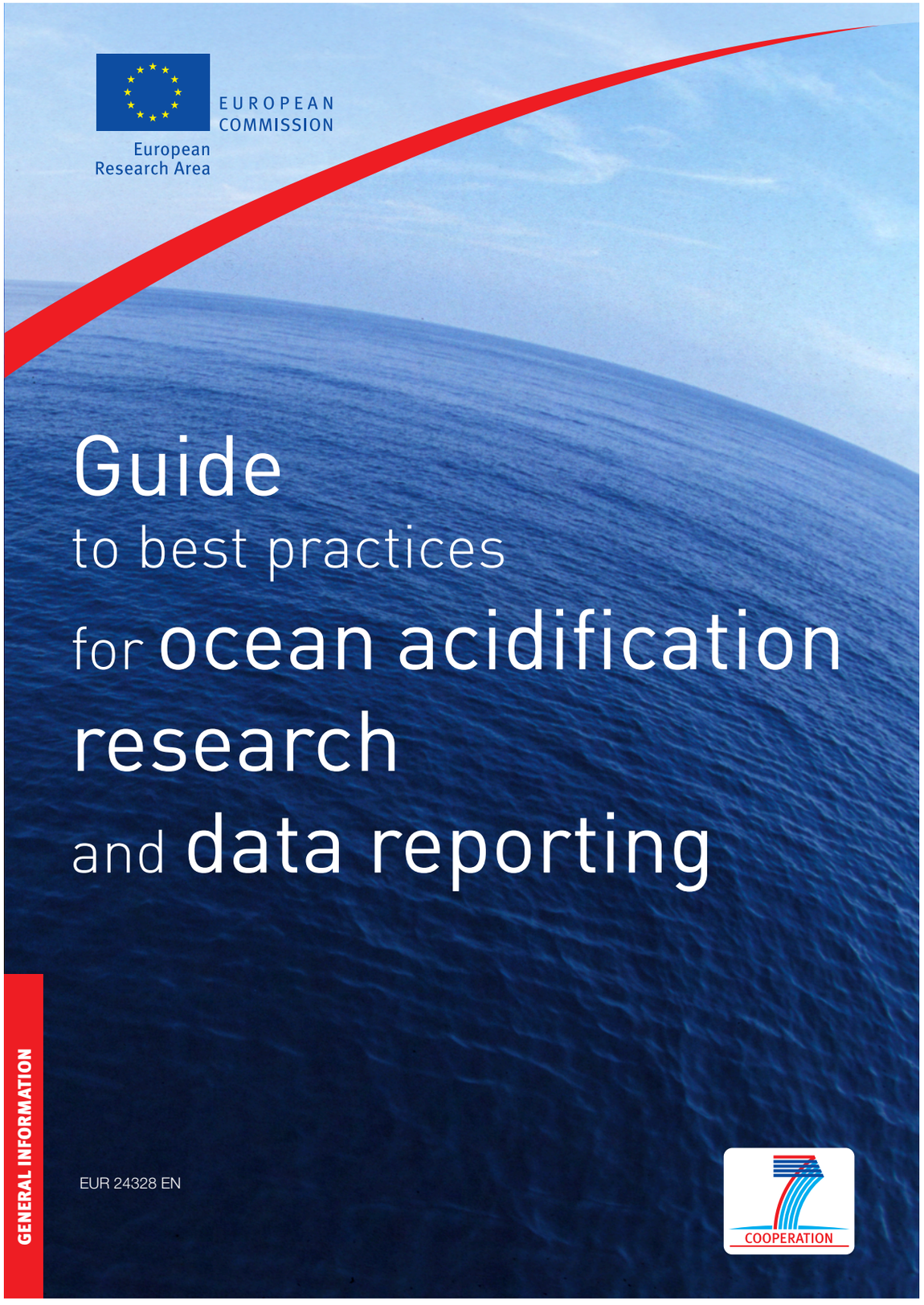


Key overarching products



Key overarching products

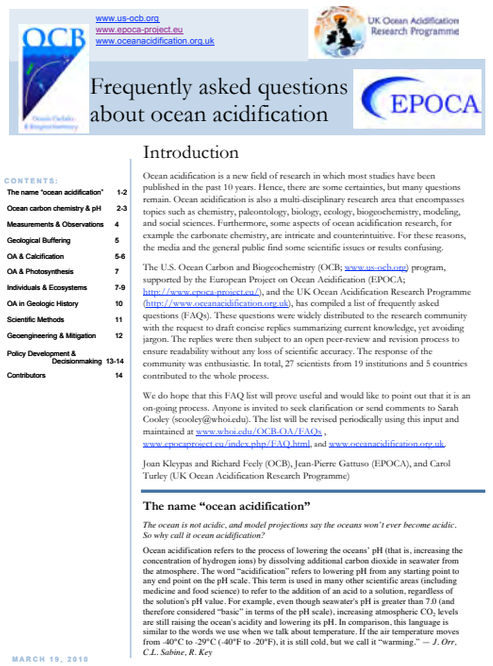
- **Key publication** (note: erratum)



Key overarching products

- **Key publication** (note: erratum)
- **EPOCA RUG (now I-RUG):**
  - "Ocean Acidification – The facts"
  - "Ocean Acidification – Questions answered"
  - Monaco Ocean Acidification Action Plan (May 2011)

FAQ (EN, FR, CN)



www.us-ocb.org
www.epoca-project.eu
www.oceanacidification.org.uk

UK Ocean Acidification Research Programme

Frequently asked questions about ocean acidification

EPOCA

Introduction

CONTENTS:

Ocean acidification is a new field of research in which most studies have been published in the past 10 years. Hence, there are some certainties, but many questions remain. Ocean acidification is also a multi-disciplinary research area that encompasses topics such as chemistry, paleontology, biology, ecology, biogeochemistry, modeling, and social sciences. Furthermore, some aspects of ocean acidification research, for example the carbonate chemistry, are intricate and counterintuitive. For these reasons, the media and the general public find some scientific issues or results confusing.

The U.S. Ocean Carbon and Biogeochemistry (OCB; www.us-ocb.org) program, supported by the European Project on Ocean Acidification (EPOCA; http://www.epoca-project.eu/), and the UK Ocean Acidification Research Programme (http://www.oceanacidification.org.uk), has compiled a list of frequently asked questions (FAQs). These questions were widely distributed to the research community with the request to draft concise replies summarizing current knowledge, yet avoiding jargon. The replies were then subject to an open peer-review and revision process to ensure readability without any loss of scientific accuracy. The response of the community was enthusiastic. In total, 27 scientists from 19 institutions and 5 countries contributed to the whole process.

We do hope that this FAQ list will prove useful and would like to point out that it is an on-going process. Anyone is invited to seek clarification or send comments to Sarah Cooley (scooley@whoi.edu). The list will be revised periodically using this input and maintained at www.whoi.edu/OCB-OA/FAQs , www.epoca-project.eu/index.php/FAQ.html, and www.oceanacidification.org.uk

Joan Kleypas and Richard Feely (OCB), Jean-Pierre Gattuso (EPOCA), and Carol Turley (UK Ocean Acidification Research Programme)

The name "ocean acidification"

The ocean is not acidic, and model projections say the oceans won't ever become acidic. So why call it ocean acidification?

Ocean acidification refers to the process of lowering the oceans' pH (that is, increasing the concentration of hydrogen ions) by dissolving additional carbon dioxide in seawater from the atmosphere. The word "acidification" refers to lowering pH from any starting point to any end point on the pH scale. This term is used in many other scientific areas (including medicine and food science) to refer to the addition of an acid to a solution, regardless of the solution's pH value. For example, even though seawater's pH is greater than 7.0 (and therefore considered "basic" in terms of the pH scale), increasing atmospheric CO_2 levels are still raising the ocean's acidity and lowering its pH. In comparison, this language is similar to the words we use when we talk about temperature. If the air temperature moves from -40°C to -29°C (-40°F to -20°F), it is still cold, but we call it "warming." — *J. Orr, C.L. Sabine, R. Key*

MARCH 19, 2010

EPOCA RUG Guide #1 (10 Dec. 2009)

A special introductory guide for policy advisers and decision makers

There is a clear consensus from the many scientific statements that are now being made about ocean acidification, that rapid, unprecedented changes are occurring.

This introductory guide is written especially for policy advisers and decision makers worldwide and is a wake-up call about the double impact on our seas, of climate change and ocean acidification caused by increasing atmospheric carbon dioxide levels. It sets out the basic facts about the alarming and progressive acidification of our oceans that is threatening our marine ecosystems. The Earth's geological record shows that previous episodes of ocean acidification were linked to mass extinctions of some species, and it is reasonable to assume that this episode could have the same consequences. There can be little doubt that our oceans are undergoing dramatic changes that will impact many human lives now and in the coming generations, unless we act quickly and decisively.

EPOCA

COOPERATION

FAST FACTS...

- Currently, each year the oceans absorb nearly 25% of all the carbon dioxide (CO_2) we emit.
- This hidden ocean 'service' has been estimated to represent an annual subsidy to the global economy of US$60 – US$400 billion per year.[1]
- The increasing volume and rate of our CO_2 emissions is progressively impacting the ocean system, causing the acidity of seawater to increase – this phenomenon is termed 'ocean acidification'.
- Ocean acidity has increased by 30% since the beginning of the Industrial Revolution and the rate of acidification will accelerate in the coming decades. This rate of change, to the best of our knowledge, is many times faster than anything previously experienced over the last 65 million years.
- Numerous animals and plants in the sea have calcium carbonate skeletons or shells. Some are especially sensitive to small changes in acidity and there is some evidence they are already being affected. Many of these sensitive species are directly or indirectly of great cultural, economic, or biological importance as primary producers, reef builders, etc.
- The impact of ocean acidification on marine species and food webs will affect major economic interests and could increasingly put at risk food security, particularly in regions especially dependent on seafood protein.
- Valuable ecosystems are being damaged or destroyed by acidification – it is predicted that if atmospheric CO_2 levels continue to rise as expected, by 2050 conditions for warm water coral reefs will be marginal and we can expect extinctions of some species. By 2100 70% of cold water corals may be exposed to corrosive waters.
- The impact of ocean acidification on coral reefs will compromise community security in low-lying areas that are protected from erosion and inundation by these ecosystems.
- Aggressive and immediate cuts in CO_2 emissions leading to stabilization and ideally reductions in atmospheric CO_2 levels will be necessary to slow the progression of ocean acidification, as well as global climate change.

1 This assumes a theoretical replacement cost based on sequestration of 2Gt C/yr at an expected future carbon credit price of $30 – $200/t CO_2.

Ocean Acidification THE FACTS

EPOCA RUG Guide #2 (Nov. 2010)

Making it clear

A fresh look at the global problem of ocean acidification for those people who want to know a little more

In this guide we do four new things. We answer some key questions many people are now asking about ocean acidification. We say how sure the international scientific community is about what is already happening to the ocean, we discuss what the future may hold for the ocean in a high carbon dioxide (CO_2) world, and we explore the consequences for all of us of what is now happening.

Questions Answered follows on from the highly successful multi-lingual guide called *Ocean Acidification: The Facts*, which was launched in winter 2009 at the UN climate change conference at Copenhagen. *Questions Answered* is inevitably more technical in nature than *The Facts* as it begins to help champion the science and reasoning behind frequently asked questions.

By getting to the point and improving understanding around these critical issues, we hope that many more people will not only be better informed about ocean acidification, but will also act with greater consensus, greater ambition and greater urgency to tackle one of the most significant environmental issues faced by present and future generations.

Two years on from the Monaco Declaration

Two years ago I hosted a meeting of more than 150 leading marine scientists from 26 countries organised and supported by the Intergovernmental Oceanographic Commission, the Scientific Committee on Oceanic Research and the Government of Monaco. These scientists joined in a call for immediate action by policy makers to reduce carbon dioxide emissions. A sharp reduction was urged from that meeting to avoid widespread and severe damage to marine ecosystems from ocean acidification. This warning formed the heart of the Monaco Declaration to which I was happy to lend my full support.

Two years on, significant work has been undertaken by science teams around the world on ocean acidification. Sometimes the results from this work confounded early predictions on the impacts of ocean acidification, but most of what we have learnt since the Monaco Declaration substantially increases concern about the speed and potential scale of impact that our emissions of carbon dioxide will have on the ocean, and in turn on us.

I am delighted to support *Ocean Acidification: Questions Answered*. Once again the science world has come together, this time in concert with the Ocean Acidification Reference User Group, to tackle a new issue – that of uncertainty and misinformation about ocean acidification.

I am convinced that armed with these clarifications and answers to new questions that have arisen, this work will help unlock decisions and overcome barriers that stand between us and more rapid progress towards tackling ocean acidification.

HSH Prince Albert of Monaco

Ocean Acidification QUESTIONS ANSWERED

Key overarching products

- **Key publication** (note: erratum)
- **EPOCA RUG (now I-RUG):**
  - "Ocean Acidification – The facts"
  - "Ocean Acidification – Questions answered"
  - Monaco Ocean Acidification Action Plan (May 2011)
- **Data management:** 35 EPOCA data sets + compilation (137 data sets from 157 papers)

Earth Syst. Sci. Data, 2, 167–175, 2010
www.earth-syst-sci-data.net/2/167/2010/
doi:10.5194/essd-2-167-2010

Open Access Earth System Science Data

EPOCA/EUR-OCEANS data compilation on the biological and biogeochemical responses to ocean acidification

A.-M. Nisumaa[1,2], S. Pesant[3], R. G. J. Bellerby[4,5], B. Delille[6], J. J. Middelburg[7,8], J. C. Orr[9], U. Riebesell[10], T. Tyrrell[11], D. Wolf-Gladrow[12], and J.-P. Gattuso[1,2]

[1]CNRS-INSU, Laboratoire d'Océanographie de Villefranche (UMR 7093), B.P. 28, 06234 Villefranche-sur-Mer Cedex, France
[2]Université Pierre et Marie Curie-Paris 6, Observatoire Océanologique de Villefranche, 06230 Villefranche-sur-Mer, France
[3]MARUM, Center for Marine Environmental Sciences, Leobener Strasse, 28359, Bremen, Germany
[4]Bjerknes Centre for Climate Research, University of Bergen, Bergen, Allégaten 55, 5007 Bergen, Norway
[5]Geophysical Institute, University of Bergen, Bergen, Allégaten 70, 5007 Bergen, Norway
[6]Unité d'Océanographie Chimique, Université de Liège, 4000 Liège, Belgium
[7]Netherlands Institute of Ecology, Centre for Estuarine and Marine Ecology, Korringaweg 7, P.O. Box 140, 4400 AC Yerseke, The Netherlands
[8]Faculty of Geosciences, Utrecht University, P.O. Box 80021, 3508 TA Utrecht, The Netherlands
[9]LSCE/IPSL, Laboratoire des Sciences du Climat et de l'Environnement, CEA/CNRS/UVSQ, Orme des Merisiers, Bat. 712, 91191 Gif–sur-Yvette cedex, France
[10]Leibniz Institute of Marine Sciences, IFM-GEOMAR, Düsternbrooker Weg 20, 24105 Kiel, Germany
[11]School of Ocean and Earth Science, University of Southampton, National Oceanography Centre Southampton, European Way, Southampton, Hants, SO14 3ZH, UK
[12]AWI for Marine and Polar Research, Am Handelshafen 12, 27570 Bremerhaven, Germany

Received: 17 March 2010 – Published in Earth Syst. Sci. Data Discuss.: 30 March 2010
Revised: 2 July 2010 – Accepted: 2 July 2010 – Published: 8 July 2010

Abstract. The uptake of anthropogenic CO_2 by the oceans has led to a rise in the oceanic partial pressure of CO_2, and to a decrease in pH and carbonate ion concentration. This modification of the marine carbonate system is referred to as ocean acidification. Numerous papers report the effects of ocean acidification on marine organisms and communities but few have provided details concerning full carbonate chemistry and complementary observations. Additionally, carbonate system variables are often reported in different units, calculated using different sets of dissociation constants and on different pH scales. Hence the direct comparison of experimental results has been problematic and often misleading. The need was identified to (1) gather data on carbonate chemistry, biological and biogeochemical properties, and other ancillary data from published experimental data, (2) transform the information into common framework, and (3) make data freely available. The present paper is the outcome of an effort to integrate ocean carbonate chemistry data from the literature which has been supported by the European Network of Excellence for Ocean Ecosystems Analysis (EUR-OCEANS) and the European Project on Ocean Acidification (EPOCA). A total of 185 papers were identified, 100 contained enough information to readily compute carbonate chemistry variables, and 81 data sets were archived at PANGAEA – The Publishing Network for Geoscientific & Environmental Data. This data compilation is regularly updated as an ongoing mission of EPOCA.

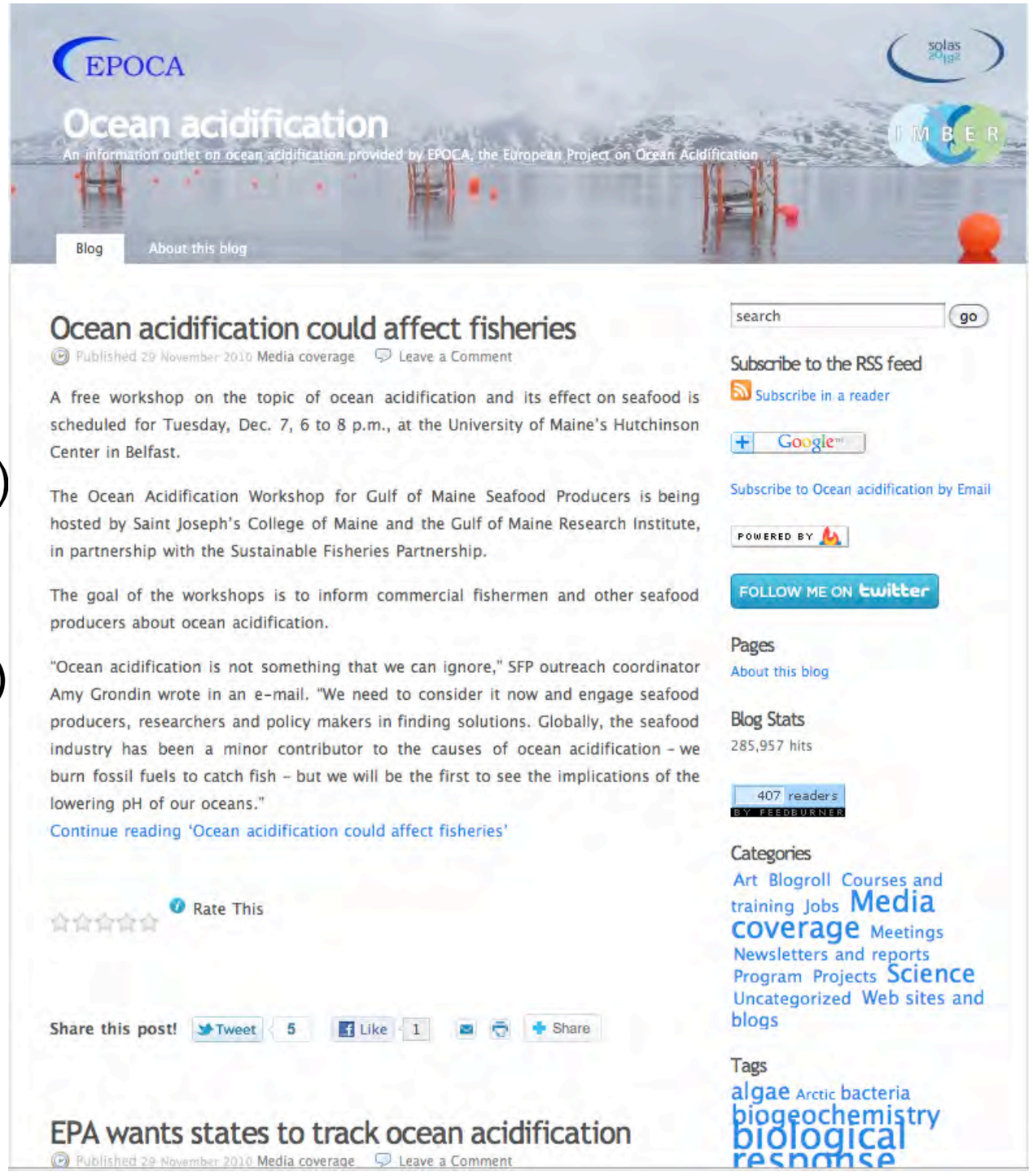
Data access: http://doi.pangaea.de/10.1594/PANGAEA.735138

Correspondence to: A.-M. Nisumaa
(nisumaa@obs-vlfr.fr)

Published by Copernicus Publications.

Key overarching products

- **Key publication** (note: erratum)
- **EPOCA RUG (now I-RUG):**
  - "Ocean Acidification – The facts"
  - "Ocean Acidification – Questions answered"
  - Monaco Ocean Acidification Action Plan (May 2011)
- **Data management:** 35 EPOCA data sets + compilation (137 data sets from 157 papers)
- **Blog:**
  - Posts: 2640
  - Average views: ~548 per day (past 3 mo)
  - Subscribers: ~470
  - Twitter followers: ~172
  - FaceBook: ?



Key overarching products

- **Key publication** (note: erratum)
- **EPOCA RUG (now I-RUG):**
  - "Ocean Acidification – The facts"
  - "Ocean Acidification – Questions answered"
  - Monaco Ocean Acidification Action Plan (May 2011)
- **Data management:** 35 EPOCA data sets + compilation (137 data sets from 157 papers)
- **Blog:**
  - Posts: 2640
  - Average views: ~548 per day (past 3 mo)
  - Subscribers: ~470
  - Twitter followers: ~172
  - FaceBook: ?
- **Web site:**
  - Pages: ~150
  - Average views: ~100 per day

Key overarching products

- **Key publication** (note: erratum)
- **EPOCA RUG (now I-RUG):**
  - "Ocean Acidification – The facts"
  - "Ocean Acidification – Questions answered"
  - Monaco Ocean Acidification Action Plan (May 2011)
- **Data management:** 35 EPOCA data sets + compilation (137 data sets from 157 papers)
- **Blog:**
  - Posts: 2640
  - Average views: ~548 per day (past 3 mo)
  - Subscribers: ~470
  - Twitter followers: ~172
  - FaceBook: ?
- **Web site:**
  - Pages: ~150
  - Average views: ~100 per day
- **Training courses** (also with OCB and BIOACID)

1. European projects
    1. EPOCA
    2. **BIOACID**
    3. UKOA
    4. MedSeA
2. International activities
    1. SIOA
    2. IPCC
    3. ICO

Bundesministerium
für Bildung
und Forschung

BIOACID

Projektträger Jülich
Forschungszentrum Jülich

BIOACID – Biological Impacts of Ocean ACIDification

- Coordinated project, 16 partner institutes, 1 SME, 62 PIs
- Funded by German Ministry for Education and Science (BMBF)
- Start: September 1, 2009
- Funding: 8.9 M€

  for first phase (2009-2012)

CARL VON OSSIETZKY universität OLDENBURG

HEINRICH HEINE UNIVERSITÄT DÜSSELDORF

GKSS FORSCHUNGSZENTRUM in der HELMHOLTZ-GEMEINSCHAFT

IFM-GEOMAR

IGB

Institut für Ostseeforschung Warnemünde

AWI

z m t bremen

BIOACID
Biological Impacts of Ocean ACIDification

JACOBS UNIVERSITY

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

WESTFÄLISCHE WILHELMS-UNIVERSITÄT MÜNSTER

UHH Universität Hamburg

Max-Planck-Institut für Marine Mikrobiologie

Universität Bremen

PreSens

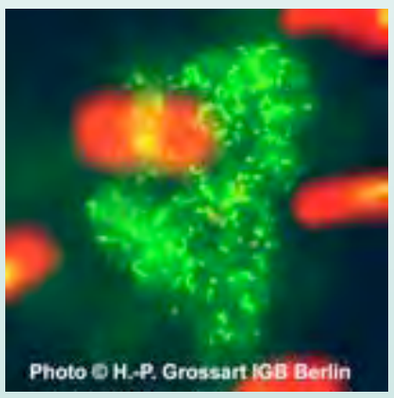
Mission

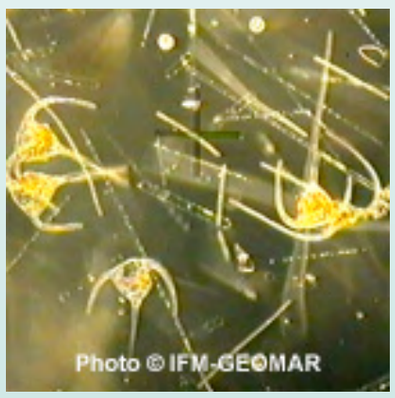
BIOACID combines

… molecular, biochemical, physiological, ecological, evolutionary approaches and paeleoceanographic reconstructions with biogeochemical and socio-economic modelling …

… to address **acute and long-term effects** at the **organism to ecosystem level**

… to better understand the impacts of ocean acidification on **marine food webs, climate system feedbacks,** and **human welfare.**





Project structure

Ulf Riebesell
coordinator

Maren Voß

Hans Pörtner
deputy coordinator

Project coordination

Data management

Infrastructure development

Training and transfer of knowhow

Theme 1
Primary production, microbial processes and biogeochemical feedbacks

Theme 2
Performance characters: reproduction, growth and behaviours in animal species

Theme 3
Calcification: Sensitivities across phyla and ecosystems

Dirk de Beer

Theme 4
Species interactions and community structure in a changing ocean

Maarten Boersma

Theme 5
Integrated assessment: Sensitivities and uncertainties

Andreas Oschlies

1. European projects
    1. EPOCA
    2. BIOACID
    3. **UKOA**
    4. MedSeA
2. International activities
    1. SIOA
    2. IPCC
    3. ICO

UK Ocean Acidification Research Programme

Funded by NERC, Defra and DECC*

Overview

7 — *Service for carbonate chemistry analyses*

1 — *Improved estimates of ocean CO_2 uptake*

6 — *Modelling of interactive effects on ecosystems and climate*

~$18m over 5 yr to meet 7 science-policy objectives

2 — *Impacts on upper ocean biology, bio-geochemistry and climate*

5 — *Evidence of past acidification impacts*

3 — *Impacts on benthic species and ecosystems*

4 — *Impacts on commercially-important species and socio-economics*

*NERC Natural Environment Research Council
Defra Department of Environment, Food & Rural Affairs
DECC Department of Energy & Climate Change

www.oceanacidification.org.uk

UK Ocean Acidification Research Programme

Main components

Multi-institute consortium projects

Ocean acidification carbonate chemistry facility. *Led by Eric Achterberg, Southampton*

7

1

Observations and synthesis to establish variability and trends of oceanic pH. *Led by Andrew Watson, Univ of East Anglia*

CO_2 - carbon cycle- climate interactions . *Led by Andy Ridgwell, Bristol*

6

2

Ocean acidification impacts on sea surface biology, biogeochemistry and climate. *Led byToby Tyrrell, Southampton*

Regional ecosystem & bio-geochemical impacts of ocean acidification. *Led by Jerry Blackford, PML*

5

3

Abrupt ocean acidifica-tion events. *Led by Paul Pearson, Cardiff*

Impacts of ocean acidification on key benthic ecosystems, communities, habitats, species and life cycles. *Led by Steve Widdicombe, PML*

4

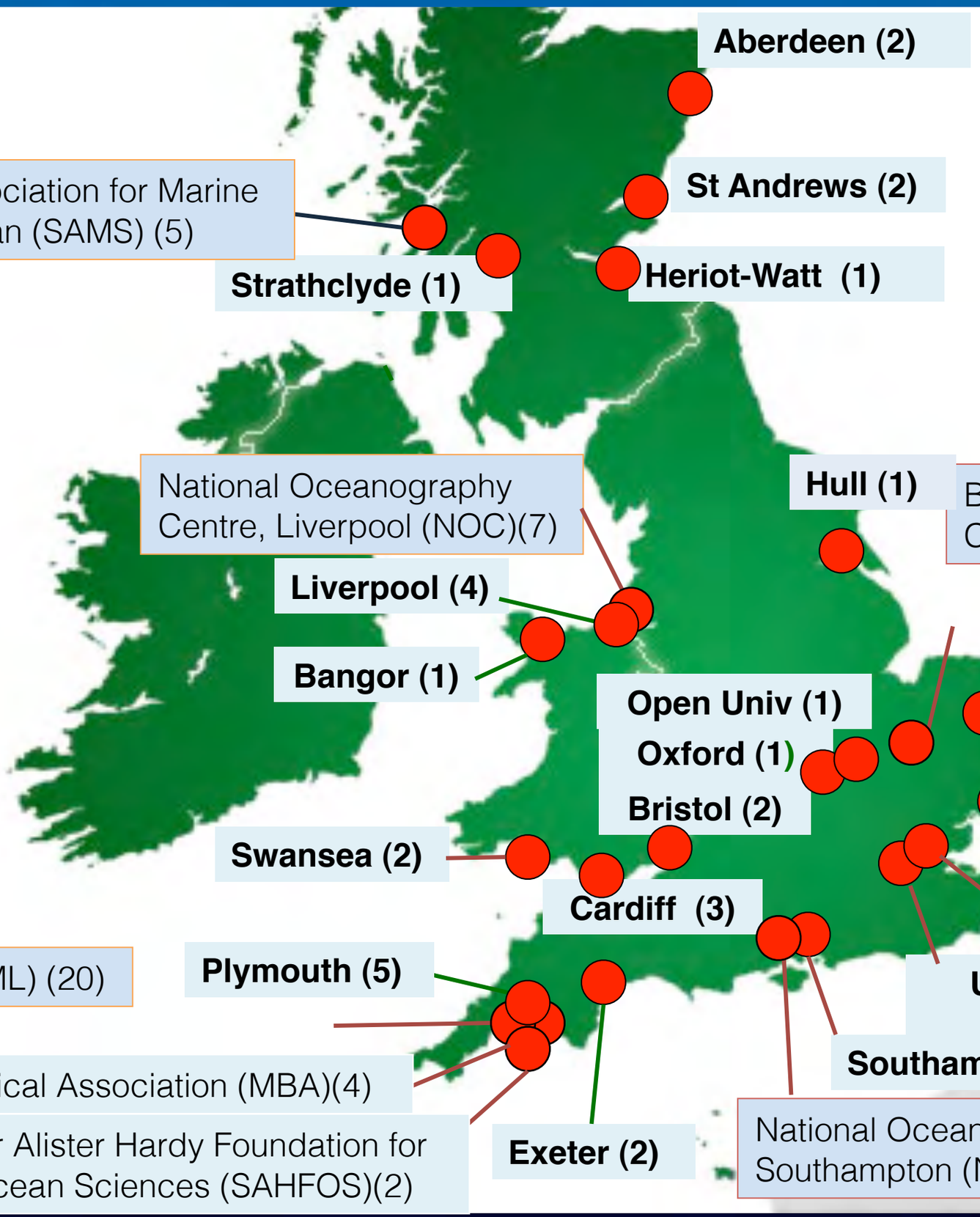
Improve understanding of impacts on commercially-important species at population-to-ecosystem level, and socio-economic implications . *Led by Kevin Flynn, Swansea*

www.oceanacidification.org.uk

UK Ocean Acidification Research Programme

Participating groups

~120 researchers at 26 sites



Scottish Association for Marine Science, Oban (SAMS) (5)

National Oceanography Centre, Liverpool (NOC)(7)

British Antarctic Survey Cambridge (BAS) (3)

Cefas Lowestoft (5)

Plymouth Marine Laboratory (PML) (20)

Marine Biological Association (MBA)(4)

Sir Alister Hardy Foundation for Ocean Sciences (SAHFOS)(2)

National Oceanography Centre, Southampton (NOC)(10)

Further information:

Phil Williamson
p.williamson@uea.ac.uk
Carol Turley
ct@pml.ac.uk

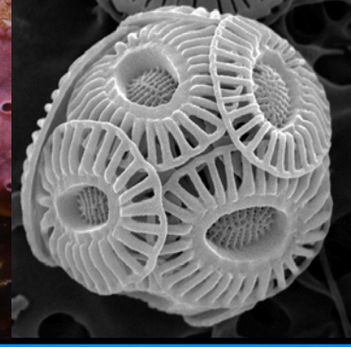
www.oceanacidification.org.uk

1. European projects
    1. EPOCA
    2. BIOACID
    3. UKOA
    4. **MedSeA**
2. International activities
    1. SIOA
    2. IPCC
    3. ICO

MedSeA

MEDITERRANEAN SEA ACIDIFICATION IN A CHANGING CLIMATE

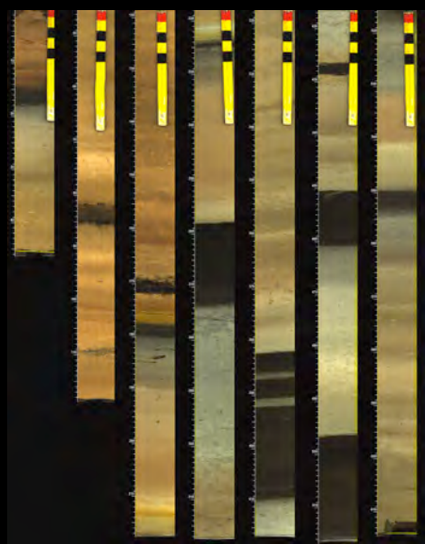
COOPERATION



European project on

Mediterranean Sea Acidification in a changing climate (MedSeA)

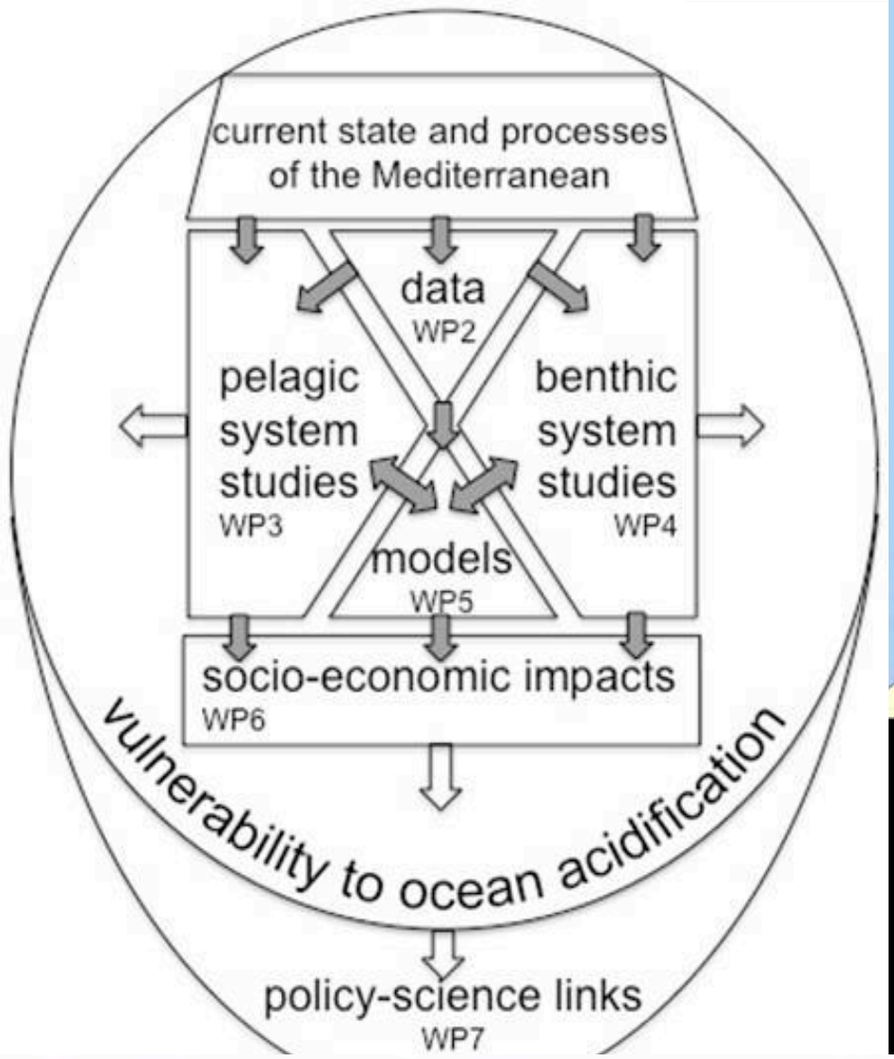
- identify where the impacts of acidification on Med. waters will be more significant (ocean chemistry through marine biology to socio-economic costs)
- focus on a selected set of key ecosystem and socio-economic variables that are likely to be affected by both acidification and warming, studying the combination of both effects
- provide best estimates and related uncertainties of future changes in Med. Sea pH, $CaCO_3$ saturation states, and other biogeochemical-ecosystem variables, assessing the changes in habitat suitability of relevant ecological and economically-important species

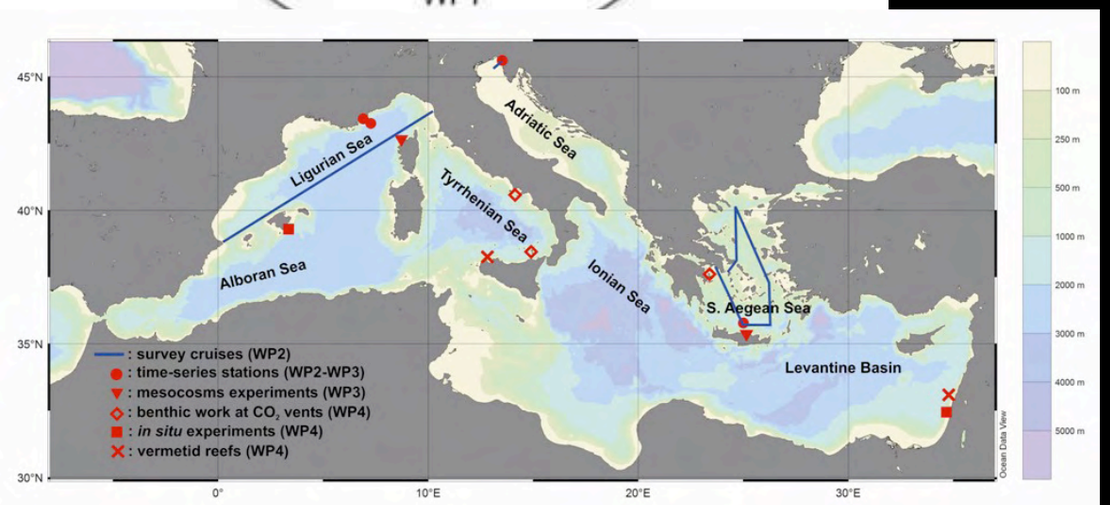


MedSeA

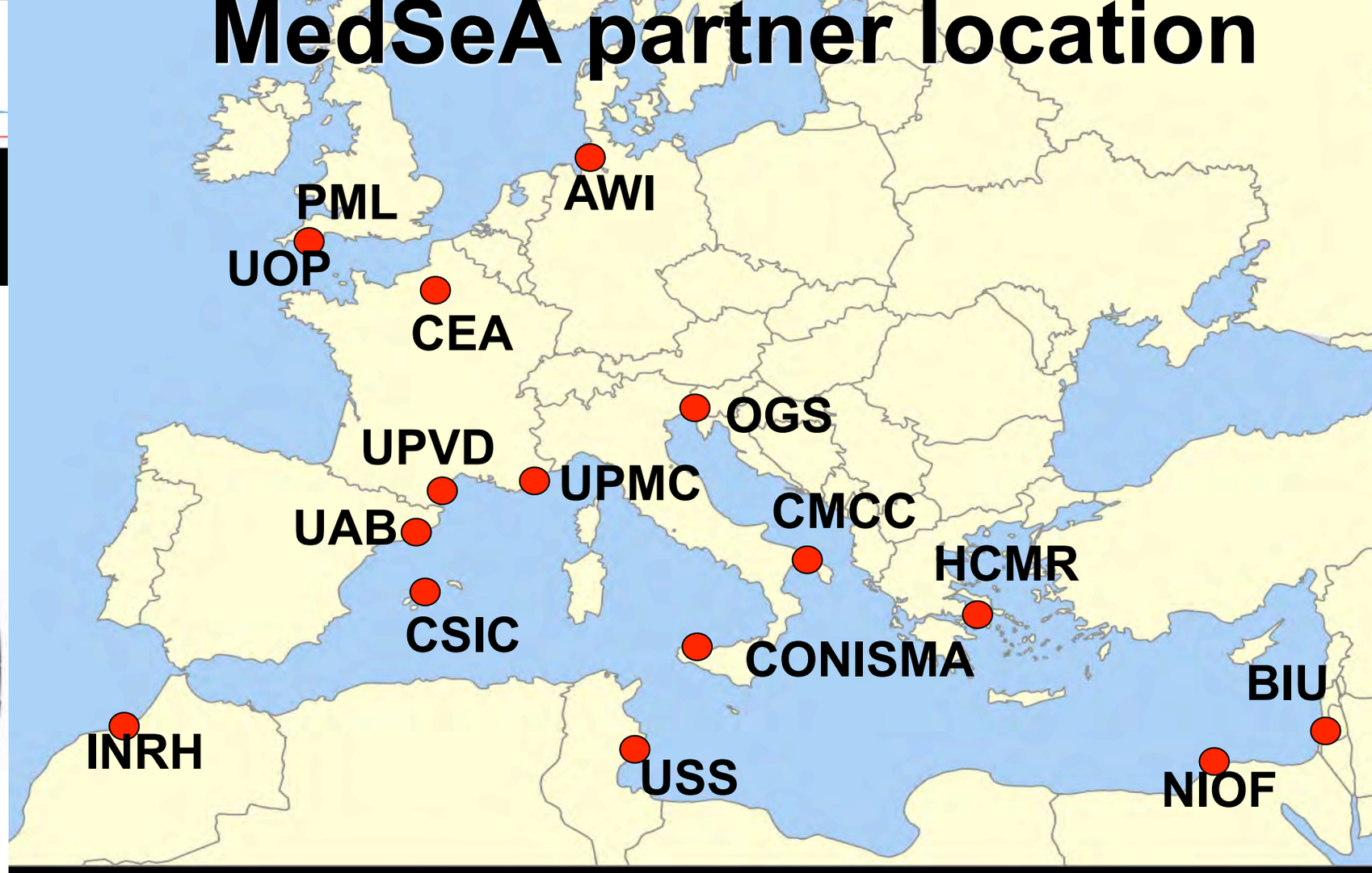
MEDITERRANEAN SEA ACIDIFICATION IN A CHANGING CLIMATE

COOPERATION





MedSeA partner location



MedSeA selected model species:

- **Unique or endemic to the Med. Sea**
- **Major contributors to habitat building**
- **Major contributors to ecological function**
- **Species of economic value in the Mediterranean region**

- **MedSeA is a EU research initiative on ocean acidification**
- **3-year long, FP7 project (2011-2014)**
- **84 PIs from 16 institutes and 10 countries (8 Mediterranean countries)**
- **Total budget: about 6 M€, EU contribution: 3.49 M**
- **Project coordinator: Patrizia Ziveri, Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona, patrizia.ziveri@uab.cat**
- **www.MedSeA-project.eu (working by March 20th)**





For more information

Project	Scientific coordinator	Email enquiries
EPOCA	Jean-Pierre Gattuso	hansson@obs-vlfr.fr
BIOACID	Ulf Riebesell	uriebesell@ifm-geomar.de
UKOA	Phil Williamson	p.williamson@uea.ac.uk
MedSeA	Patrizia Ziveri	patrizia.ziveri@uab.cat

1. European projects
    1. EPOCA
    2. BIOACID
    3. UKOA
    4. MedSeA
2. **International activities**
    1. **SIOA**
    2. **IPCC**
    3. **ICO**

SOLAS-IMBER Working Group on Ocean Acidification

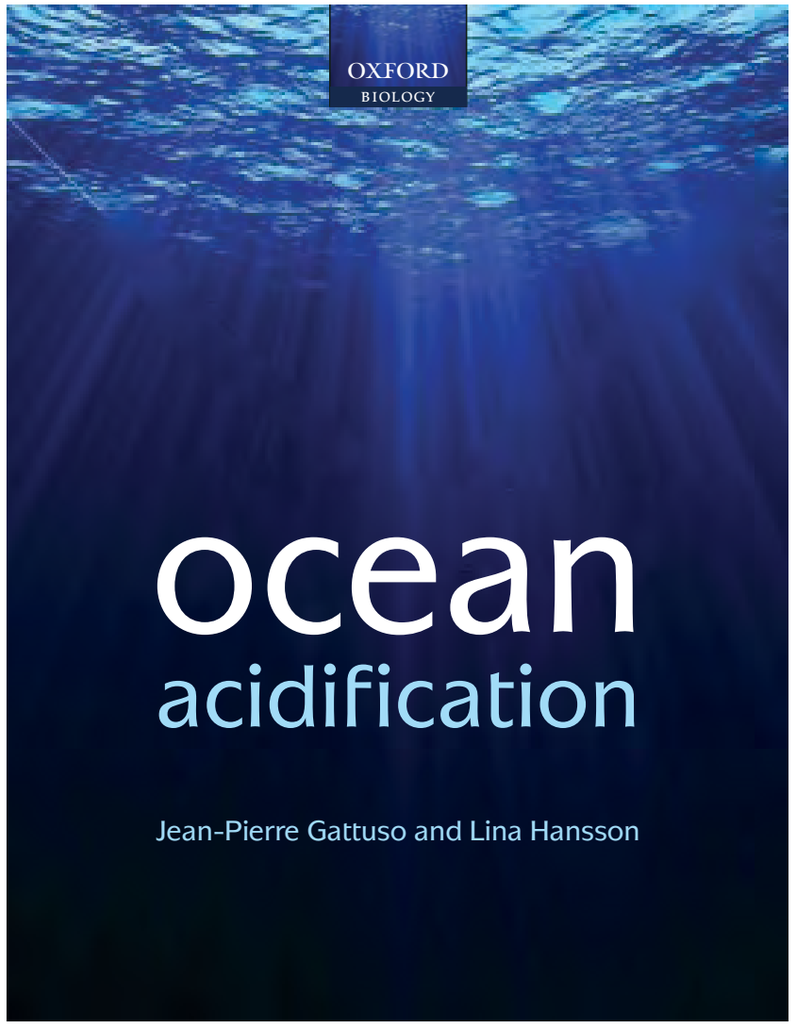
- **Launched:** Sep. 2009
- **Terms of reference**:
  - Coordinate international research efforts in ocean acidification
  - Undertake synthesis activities in ocean acidification at the international level
- **Meetings**:
  - December 2009, Paris (coordinating program)
  - December 2010, Washington DC. With science managers and key representatives of IWG-OA, NOAA, NSF, USGS, OCB, ORRAP

SIOA Membership

- Jim Barry (USA)
- Jelle Bijma (Germany)
- Minhan Dai (China)
- Richard Feely (USA)
- Jean-Pierre Gattuso, Chair (France)
- Richard Matear (Australia)
- Yukihiro Nojiri (Japan)
- James Orr (France)
- Ulf Riebesell (Germany)
- Lisa Robbins (USA)
- Carol Turley (UK)

SIOA activities

- Undertake synthesis activities in ocean acidification at the international level:
  - Books published by Oxford in 2011
  - IPCC AR5 in preparation; publication in March 2014
    - Should cover ocean acidification well
    - 13 key experts involved:
      - WG I: L. Bopp, K. Caldeira, R. Feely, C. Heinze, Y. Nojiri, C. Sabine
      - WG II: P. Brewer, V. J. Fabry, J.-P. Gattuso, O. Hoegh-Guldberg, Y. Nojiri, H.-O. Pörtner, D. Schmidt, C. Turley
      - WGI and WGII meeting organized, Okinawa, January 2011
  - cut-off dates:
    - WGI: 31 July 2012 (submitted) and 15 March 2013 (accepted)
    - WGII: 31 January 2013 (submitted) and 31 August 2013 (accepted).
- Focus on the coordination of international research efforts on ocean acidification



ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

The need

- Increasing number of research projects
- Overarching, international activities largely unsupported

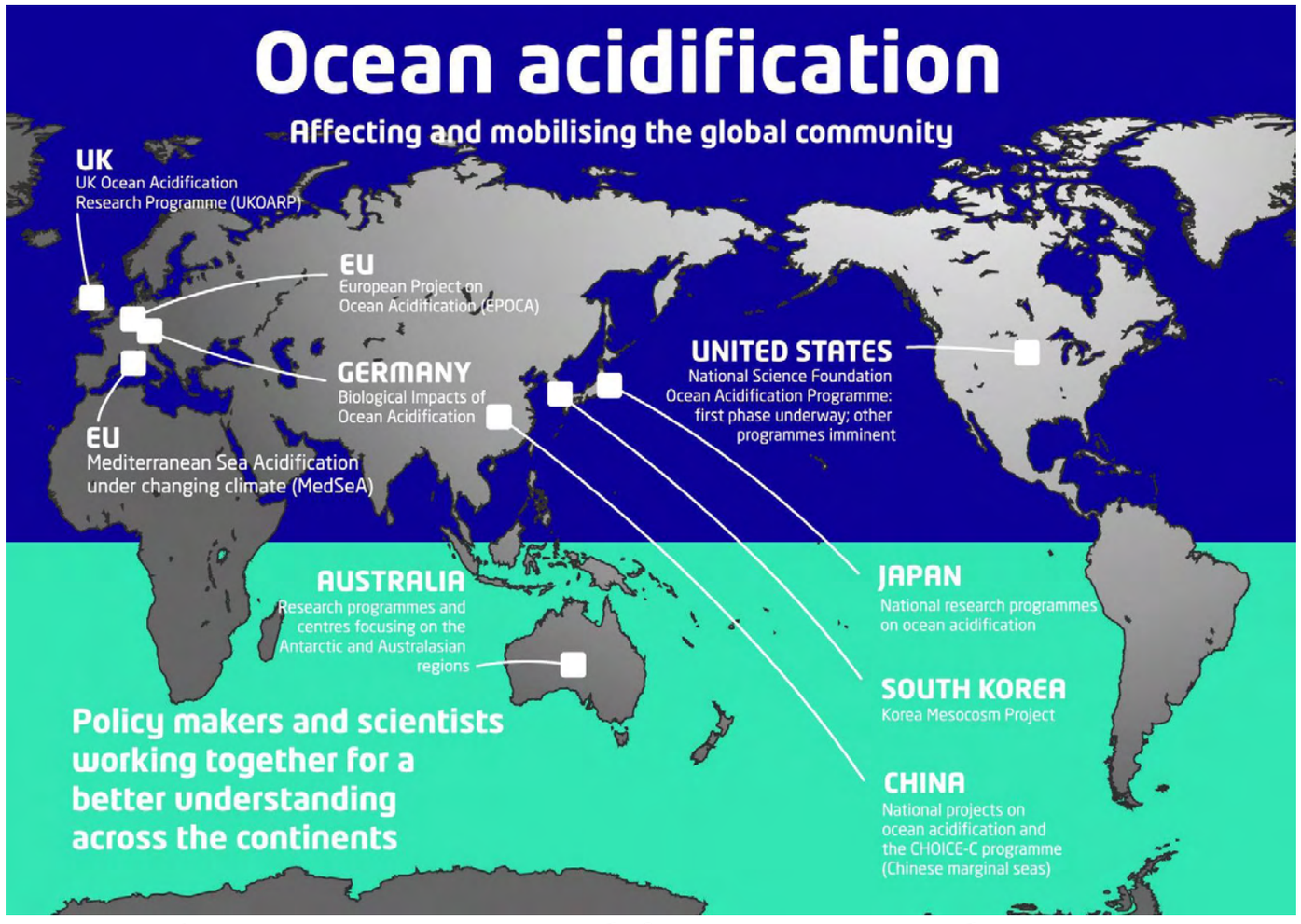
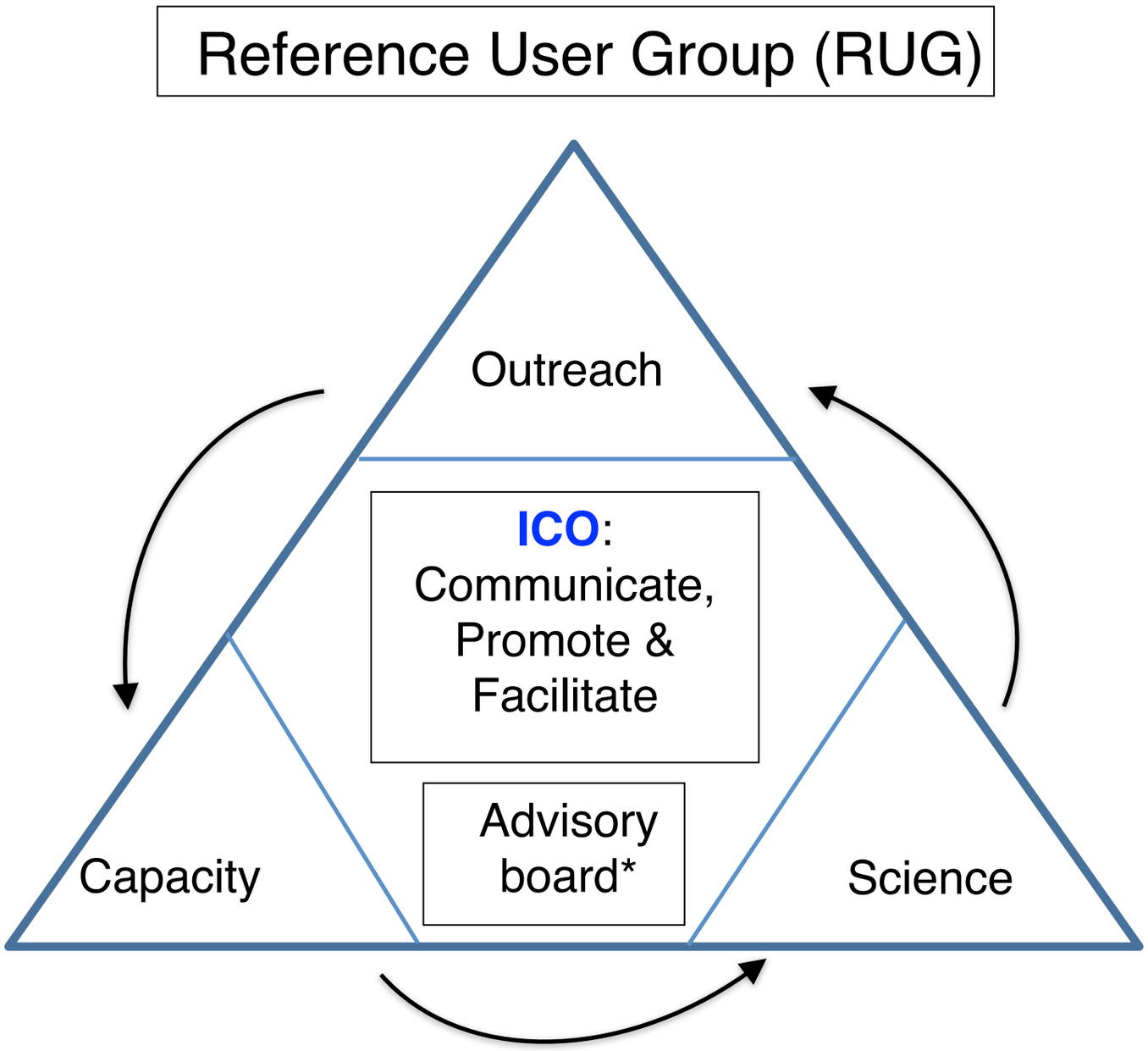


Figure 1: Major ocean acidification research programmes around the world in 2011 (Courtesy Keizer et al., PML).

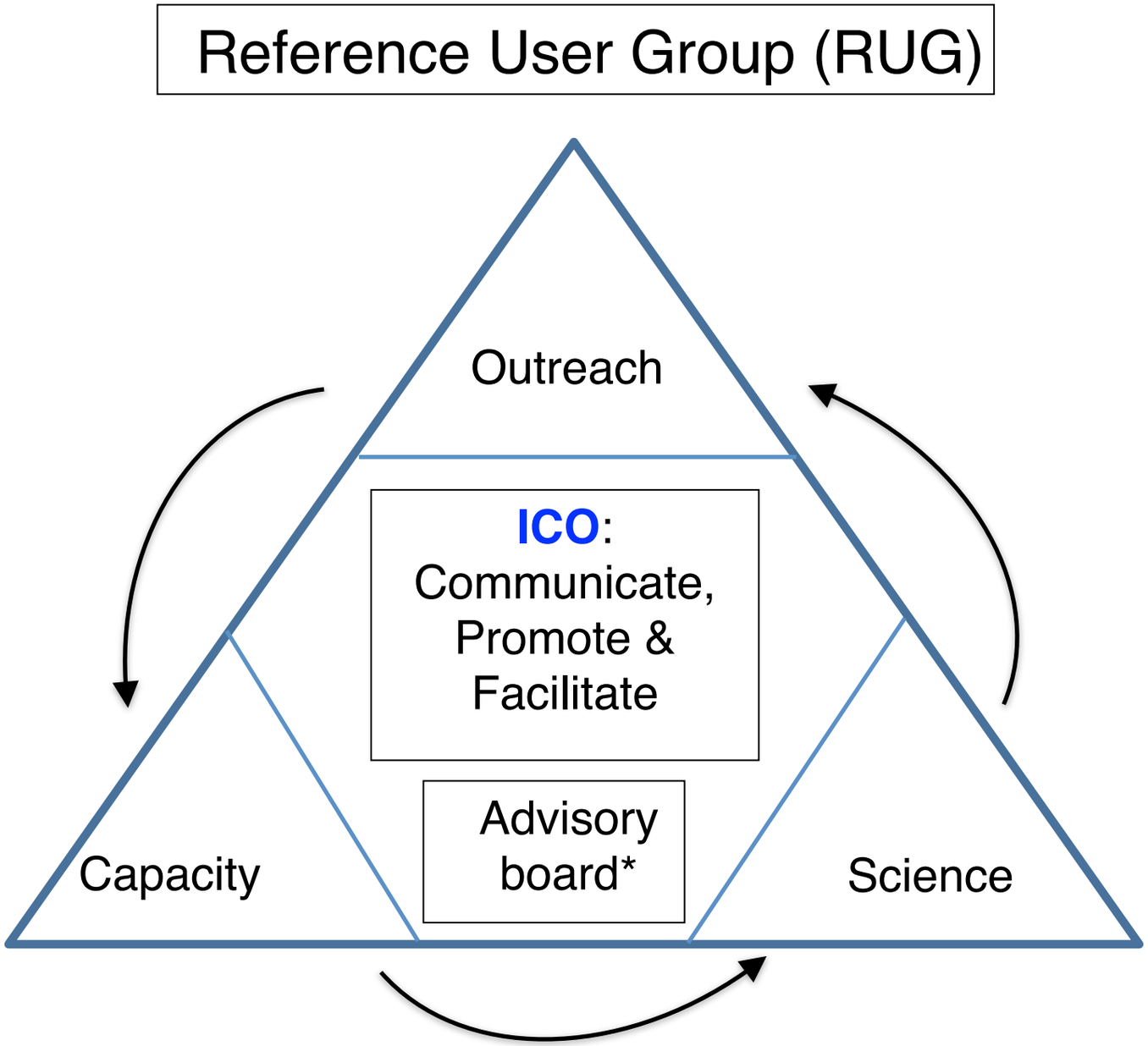
Implementation: International Coordination Office

Implementation: International Coordination Office



ICO: International Coordination Office
*__Advisory board:__ project coordinators + other key members (RUG, communication...)

Implementation: International Coordination Office

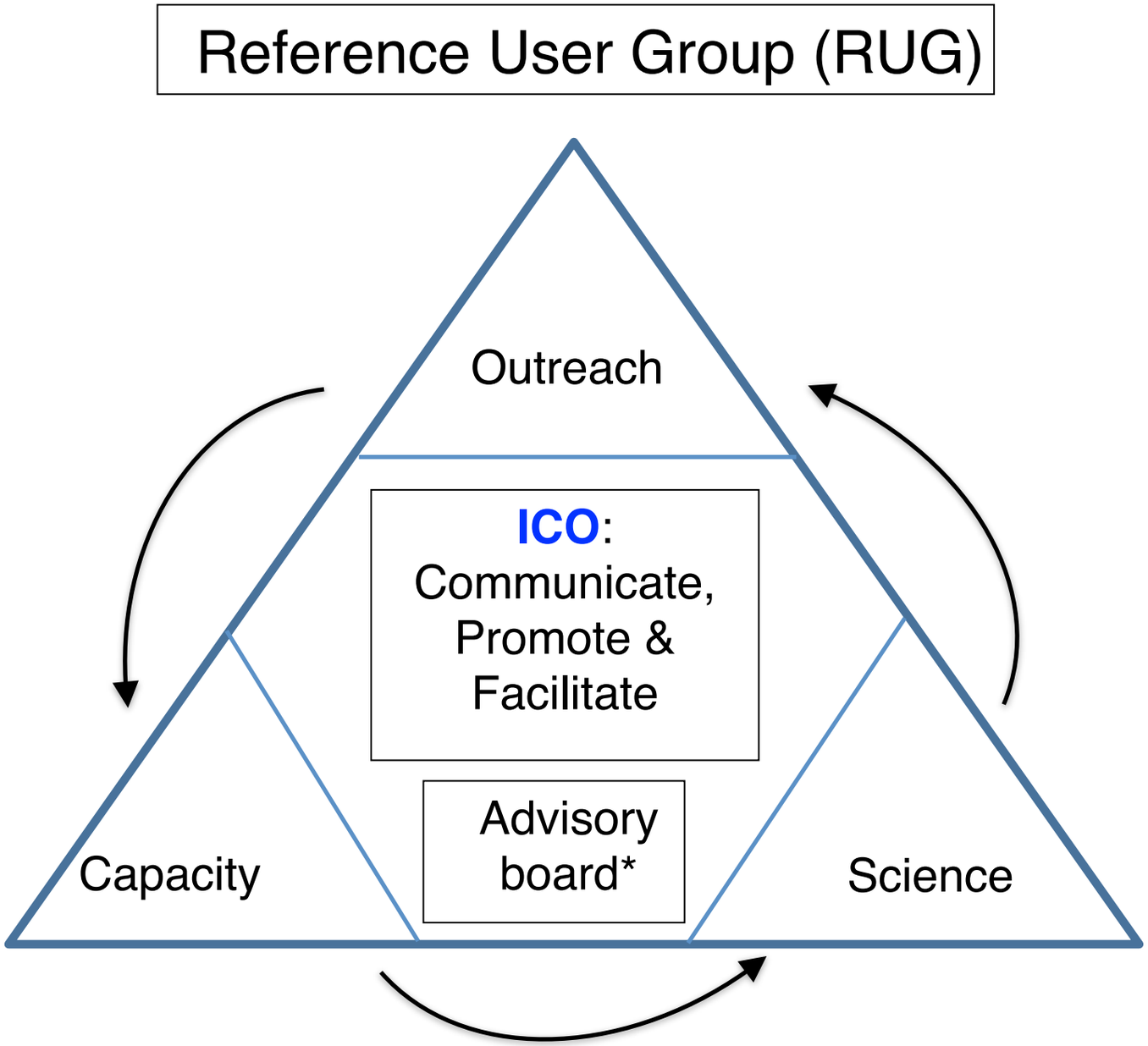


ICO: International Coordination Office
*__Advisory board:__ project coordinators + other key members (RUG, communication...)

ICO tasks

- **Scientific activities:**
  - Joint experiments
  - Social science
  - Observation program
  - Intercomparison studies
  - Support for synthesis
- **Capacity building:**
  - Joint facilities
  - Best practices
  - Training
  - Post doc/ student exch.
  - Data management
- **Outreach:**
  - Reference User Group
  - Communication
  - Education

Implementation: International Coordination Office



ICO: International Coordination Office
*__Advisory board:__ project coordinators + other key members (RUG, communication...)

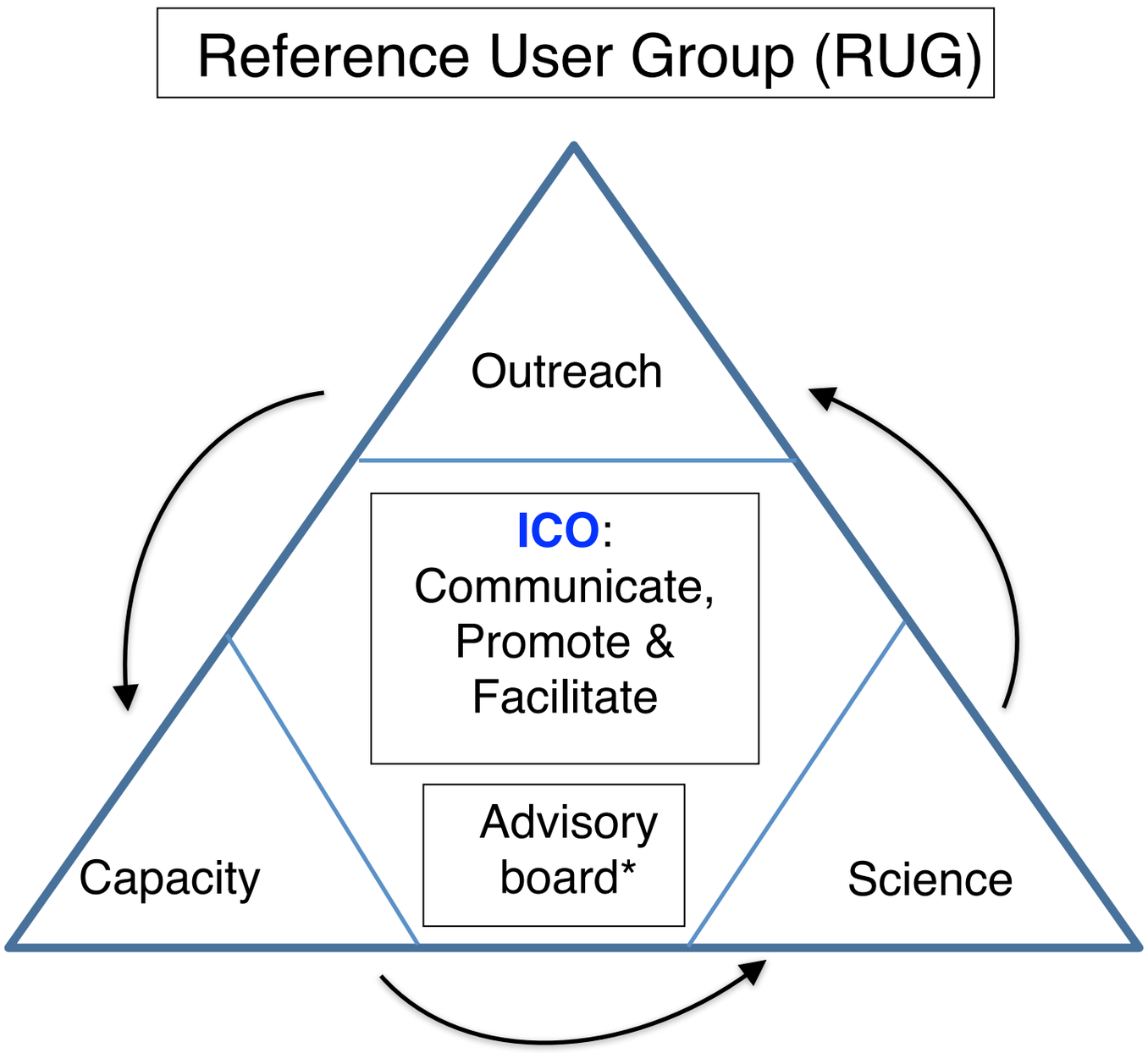
ICO tasks

- **Scientific activities:**
  - Joint experiments
  - Social science
  - Observation program
  - Intercomparison studies
  - Support for synthesis
- **Capacity building:**
  - Joint facilities
  - Best practices
  - Training
  - Post doc/ student exch.
  - Data management
- **Outreach:**
  - Reference User Group
  - Communication
  - Education

ICO structure

- Senior scientist (20%)
- Program office director (100%)
- Data manager (100%)
- Communication officer (50%)
- Assistant and web master (100%)

Implementation: International Coordination Office



ICO: International Coordination Office
*__Advisory board:__ project coordinators + other key members (RUG, communication...)

ICO tasks

- **Scientific activities:**
  - Joint experiments
  - Social science
  - Observation program
  - Intercomparison studies
  - Support for synthesis
- **Capacity building:**
  - Joint facilities
  - Best practices
  - Training
  - Post doc/ student exch.
  - Data management
- **Outreach:**
  - Reference User Group
  - Communication
  - Education

ICO structure

- Senior scientist (20%)
- Program office director (100%)
- Data manager (100%)
- Communication officer (50%)
- Assistant and web master (100%)

ICO Support

- Office
- Activities (to be internationally open)

Current status

- Proposal prepared by SIOA WG and OAI-RUG
- Endorsements
- It is likely that an offer will be made to host the office in the Principality of Monaco
- Will know, hopefully, in April

1- Supporting international research projects

Project	Country
European Project on Ocean Acidification (EPOCA)	EU
Arctic Tipping Point (ATP)	EU
Changes in carbon uptake and emissions by oceans in a changing climate (CarboChange)	EU
Mediterranean Sea Acidification in a Changing Climate (MedSeA)	EU

Current status

- Proposal prepared by SIOA WG and OAI-RUG
- Endorsements
- It is likely that an offer will be made to host the office in the Principality of Monaco
- Will know, hopefully, in April

2- Supporting national research projects

Project	Country
CHOICE-C	China
UK Ocean Acidification Research Programme	UK
Biological Impacts of Ocean Acidification (BIOACID)	Germany
Ocean Carbon Biogeochemistry (OCB)	USA
National Program for Marine and Coastal Research	The Netherlands
Interagency Working Group on Ocean Acidification (IWG-OA)	USA

Current status

- Proposal prepared by SIOA WG and OAI-RUG
- Endorsements
- It is likely that an offer will be made to host the office in the Principality of Monaco
- Will know, hopefully, in April

3- Supporting organizations

Organization	Country
University of Sydney Technology	Australia
State Key Laboratory of Marine Environmental Science (Xiamen University)	China
Biogeosciences Division of the European Geosciences Union (BG-EGU)	International
European Geosciences Union (EGU)	International
Integrated Marine Biogeochemistry and Ecosystem Research (IMBER; IGBP-SCOR)	International
International Geosphere-Biosphere Programme (IGBP)	International
International Human Dimensions Programme (IHDP)	International
Land-Ocean Interaction in the Coastal Zone (LOICZ; IGBP-IHDP)	International
Mediterranean Sea Commission (CIESM)	International
Surface Ocean Lower Atmosphere Study (SOLAS; IGBP-SCOR)	International
Past Global Changes (PAGES)	International
Scientific Committee on Oceanic Research (SCOR)	International
Scientific Committee on Antarctic Research (SCAR)	International
Centre Scientifique de Monaco (CSM)	Principality of Monaco
Musée océanographique de Monaco	Principality of Monaco
Darwin Centre for Biogeosciences	The Netherlands
Department for Environment, Food and Rural Affairs (Defra)	UK
Department of Energy and Climate Change (DECC)	UK
Natural Environment Research Council (NERC)	UK
Scottish Natural Heritage (SNH)	UK
Norwegian Fram Centre flagship on Ocean Acidification (NorfOA)	Norway
International Atomic Energy Agency's Environment Laboratories, Monaco (IAEA)	United Nations
International Oceanographic Commission of Unesco (IOC-UNESCO)	United Nations
UNEP-World Conservation Monitoring Centre	United Nations
American Society for Limnology and Oceanography (ASLO)	USA
Interagency Working Group on Ocean Acidification	USA

Current status

- Proposal prepared by SIOA WG and OAI-RUG
- Endorsements
- It is likely that an offer will be made to host the office in the Principality of Monaco
- Will know, hopefully, in April

National Oceanic and Atmospheric Administration (NOAA)	USA
U.S. National Science Foundation (NSF)	USA
U.S. Geological Survey (USGS)	USA