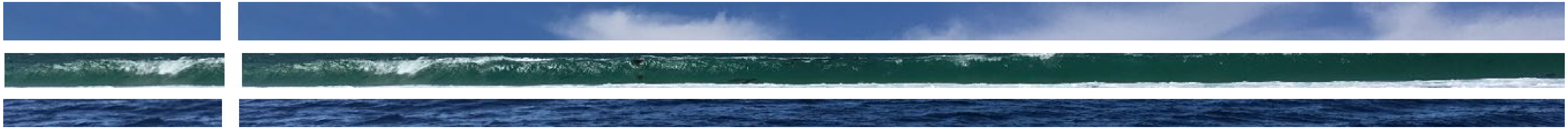
# SCOR Virtual Annual Meeting 2020

## 20-22 October 2020



## Session 1. Chair: Marie-Alexandrine Sicre / Note taker: Paul Myers

**7:00 – 8:20 am (EDT)**

1. Welcome and introduction to agenda
2. Report from SCOR President
3. Report from SCOR Executive Director
4. Results of the 2020 election for SCOR Officers

5. Results of the 2020 selection of Early Career Scientist
6. Approval of revised SCOR constitution
7. Presentation of new WG proposals

**8:20 – 8:30 am (EDT):** Break

**8:30 – 9:50 am (EDT):** Discussion of new WG proposals
**9:50 – 10:00 am (EDT):** Wrap and final decision

# Welcome and introduction to agenda – Marie-Alexandrine Sicre

# In Memoriam

Sir Anthony Laughton (1927-2019)

Robert (Bob) Dickson (1941-2019)

Karl Föllmi (1954-2019)

Taro Takahashi (1930-2019)

Trevor Platt (1942-2020)

Ron O'Dor (1944-2020)

Jacco Kromkamp (1956-2020)

# In Memoriam

George Hemmen (1926-2020)

*The first Executive Director of SCOR from 1972-1980 (called Executive Secretary then).*

*George also served the Scientific Committee on Antarctic Research (SCAR) for more than 27 years, first as Assistant Secretary then as Executive Secretary. In the picture below, three generations of SCOR Executive Directors. George Hemmen (center), Liz Gross (left) who took over from George in 1980, and Ed Urban (right) who took over from Liz in 2000.*

# Report from SCOR President – Marie-Alexandrine Sicre

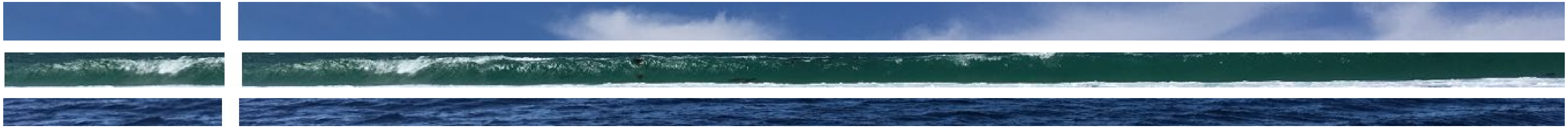
**27-29 January 2020.** Participated and co-chaired the special session entitled “Harnessing the Resources of International Ocean Science Organizations to develop Sustainable Ocean Science and Actions in the Indian Ocean” at the Regional Consultation Workshop for Africa and the Adjacent Island States of the United Nation Decade of Ocean Science for Sustainable Development, Nairobi, Kenya, 27-29 January 2020.
With Ed and then Patricia, I to continued participate in the monthly webinars of **Future Earth**

**O-KAN Development Team** that has now produced it “Guidelines and Strategic Plan”. As sponsor we are now part of the selection committee of the host the IPO of the O-KAN.

**Due to the Covid-19 situation**, several meetings that I should have attended were cancelled:

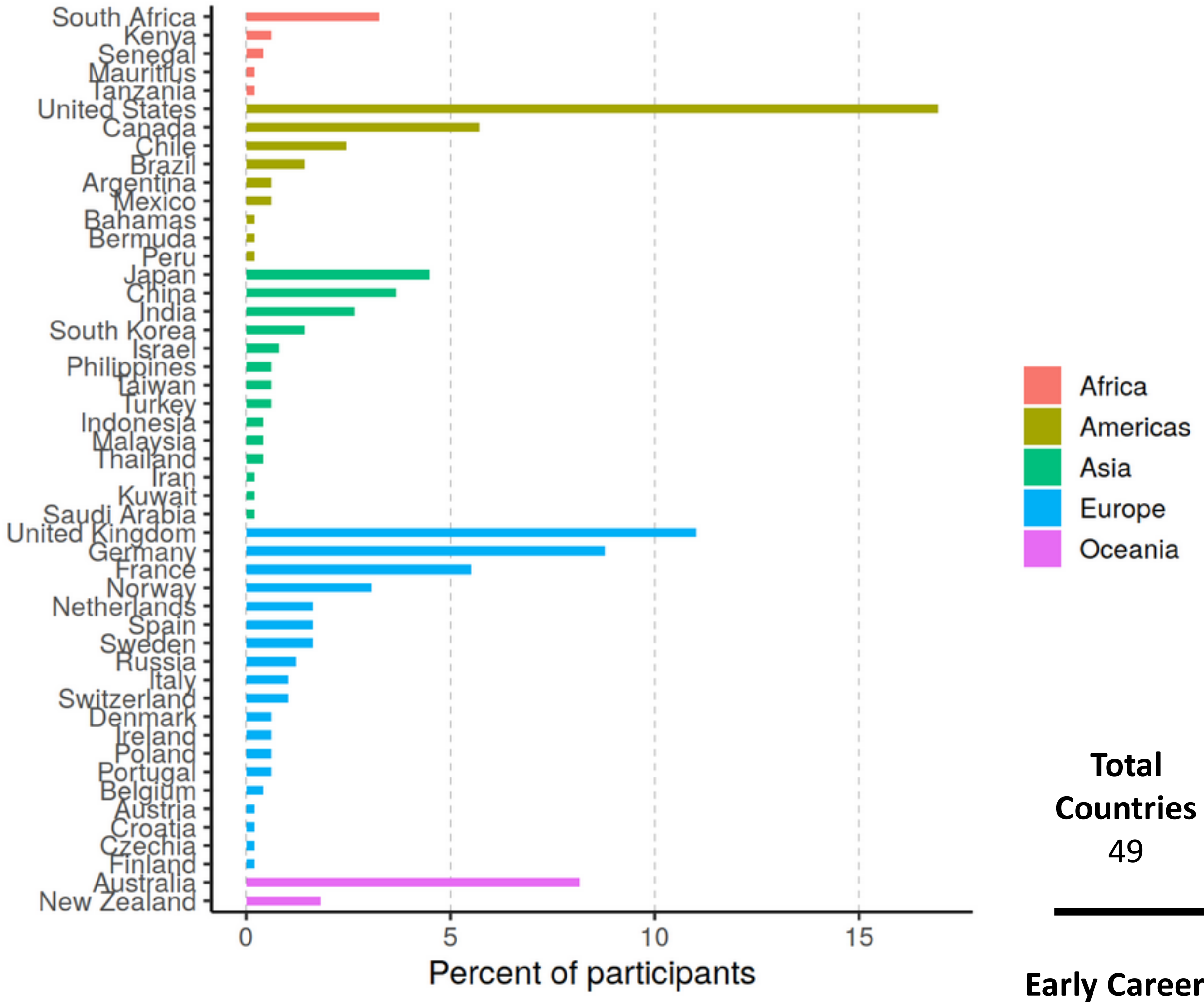
- The IIOE-2 meeting scheduled 22-26 March 2020 in Goa, India was cancelled.
- The ISC initiative scheduled in 27-28 March 2020 in Paris, France was cancelled.
- The Ocean conference scheduled in 2-6June, 2020 in Lisbon, Portugal was cancelled.
- The IOC session scheduled 30 June- 3 July 2020 in Paris, France was cancelled.

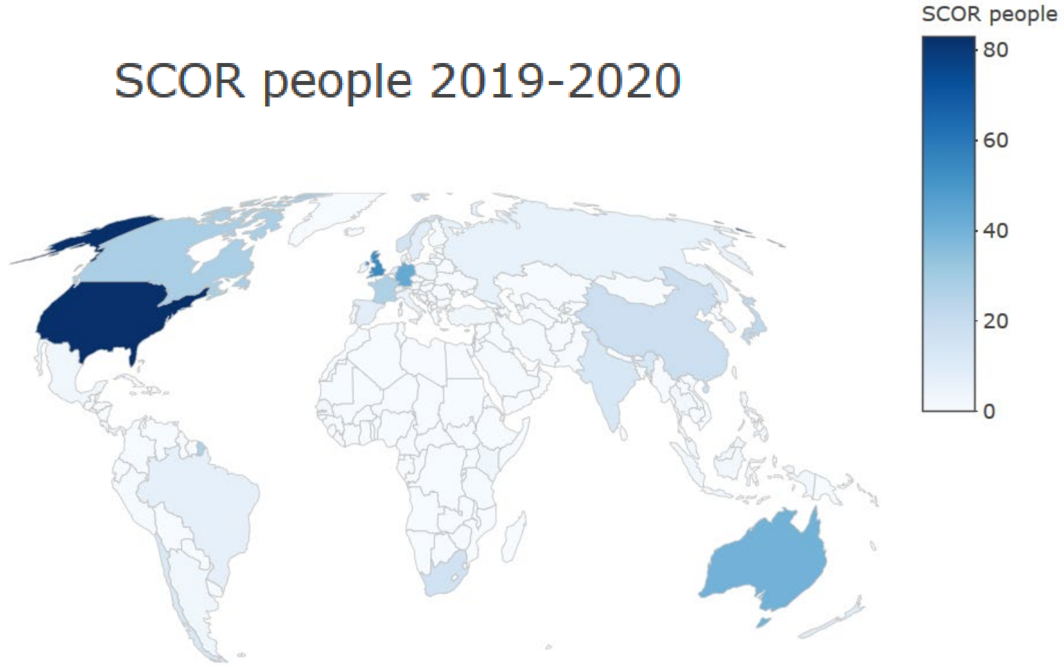
Participated in part of the virtual SCAR conference 3-7 July 2020.



# Report from SCOR Executive Director – Patricia Miloslavich

# SCOR scientific community

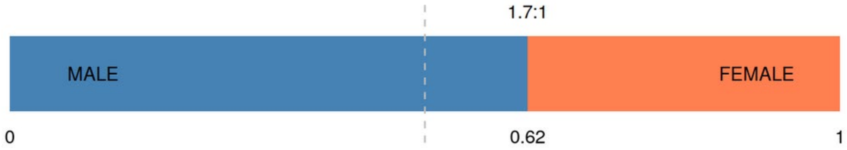



**Total Countries** 49

**F** 38%

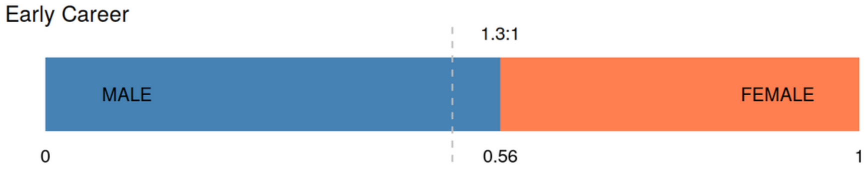
**M** 62%




**Early Careers Countries** 19

**F** 44%

**M** 56%



# October 2019-2020: Working Group meetings



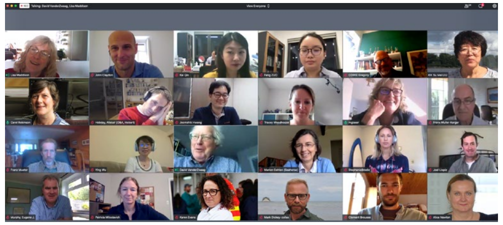




| # | Working Group | Meeting |
|---|---|---|
| 143 | **$N_2O$ & $CH_4$ measurements** | Ocean Sciences, San Diego, USA – February 2020 |
| 145 | **MARCHEMSPEC** | Ocean Sciences, San Diego, USA – February 2020 |
| 148 | **IQuOD** | Brest, France – October 2019 |
| 150 | **TOMCAT** | Planned: Summer School 2021 |
| 151 | **FeMIP** | Ocean Sciences, San Diego, USA – February 2020 |
| 152 | **ECV-Ice** | Planned: Australia 2020 – postponed 2021 |
| 153 | **FLOTSAM** | Planned: Japan 2020 – postponed to 2021 |
| 154 | **P-OBS** | Virtual: September 2020 |
| 155 | **EBUS** | Virtual: June 2020 |
| 156 | **Chlorophyll fluorescence** | Ocean Sciences, San Diego, USA – February 2020 |
| 157 | **MetaZooGene** | Ocean Sciences, San Diego, USA – February 2020 |
| 158 | **C-GRASS** | Virtual: September 2020 |
| 159 | **DeepSeaDecade** | Aveiro, Portugal – January 2020 |

# October 2019-2020: Project activities

IMBeR SSC

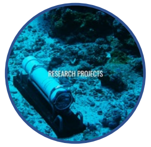


GEOTRACES DMC


SOLAS SSC

| Project | Meeting | SSC renovations / other |
|---|---|---|
| **RESEARCH PROJECTS** | | |
| **GEOTRACES** | SSC and DMC: virtually – September 2020 | Co-chair Andie Bowie stepping down in December 2020 |
| **SOLAS** | SSC: virtually – October 2020 | Chair Lisa Miller stepping down in December, Minhan Dai and Cliff Law new co-chairs from January 2021 |
| **IMBeR** | SSC: virtually – June 2020 | Call for nominations for new SSC members – September 2020<br>The IPO moved from Norway to Canada (Dalhousie) |
| **IQOE** | WGs - virtually | Ocean Sound EOV Implementation Workshop - 2021 |
| **IIOE-2** | SSC cancelled – Core Group meets virtually | SSC and Indian Ocean Science Conference – 2021 |
| **INFRASTRUCTURAL PROJECTS** | | |
| **COBS** | Subgroup at Ocean Sciences – Feb 2020 | Transition from WG to project: proposed new ToRs and SSC |
| **GlobalHAB** | SSC: Virtually – September 2020 | Six new SSC members |
| **IOCCP** | SSC: Virtually – December 2020 | News SSC members – co-chair Masao Ishi steps down in December |
| **SOOS** | SSC: Virtually – October 2020 | Two new co-chairs and three new SSC members |
| **JCS** | 2020 meeting - cancelled | |

# SCOR contributions to science


OCEAN SCIENCES MEETING | 16–21 FEBRUARY 2020 SAN DIEGO, CA, USA
*For a resilient planet*

**Townhalls:**
IIOE-2
WG145 – chemical speciation

**WG meetings:**
WG145 – chemical speciation
WG151 – iron model intercomparison
WG 156 – chlorophyll fluorescence for primary productivity measurements
WG157 - zooplankton DNA metabarcoding

**Sessions:**
GEOTRACES
IMBeR
IOCCP
WG153 – floating litter transport and modelling
WG156 - chlorophyll fluorescence for primary productivity measurements

**Tutorials:**
IIOE-2
COBS – changing ocean biological systems
WG154 – plankton observations
WG 156 – chlorophyll fluorescence for primary productivity measurements

**RCN meeting:**
WG153 – marine debris

**Demonstrations and live conversations at SCOR booth:**
IMBER
SOLAS
GEOTRACES
IOCCP
IIOE-2
WG145 – chemical speciation
WG151 – iron model intercomparison
WG 156 – chlorophyll fluorescence for primary productivity measurements

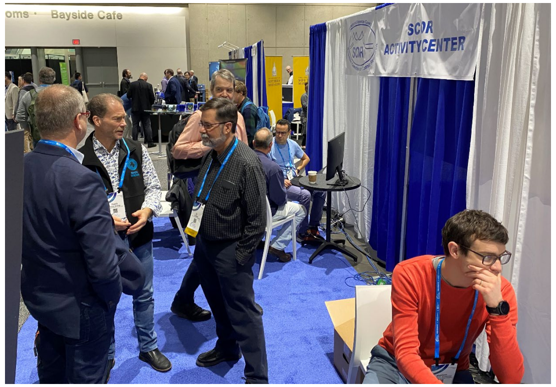
International Science Council
SCOR
Scientific Committee on Oceanic Research

**Publications 2019-2020:**

- ~30 publications
- WGs and IOCCP
- Acknowledging SCOR

https://scor-int.org/work/publications/

***SCOR booth at Ocean Sciences:*** *Live demonstrations and one-on-one training*



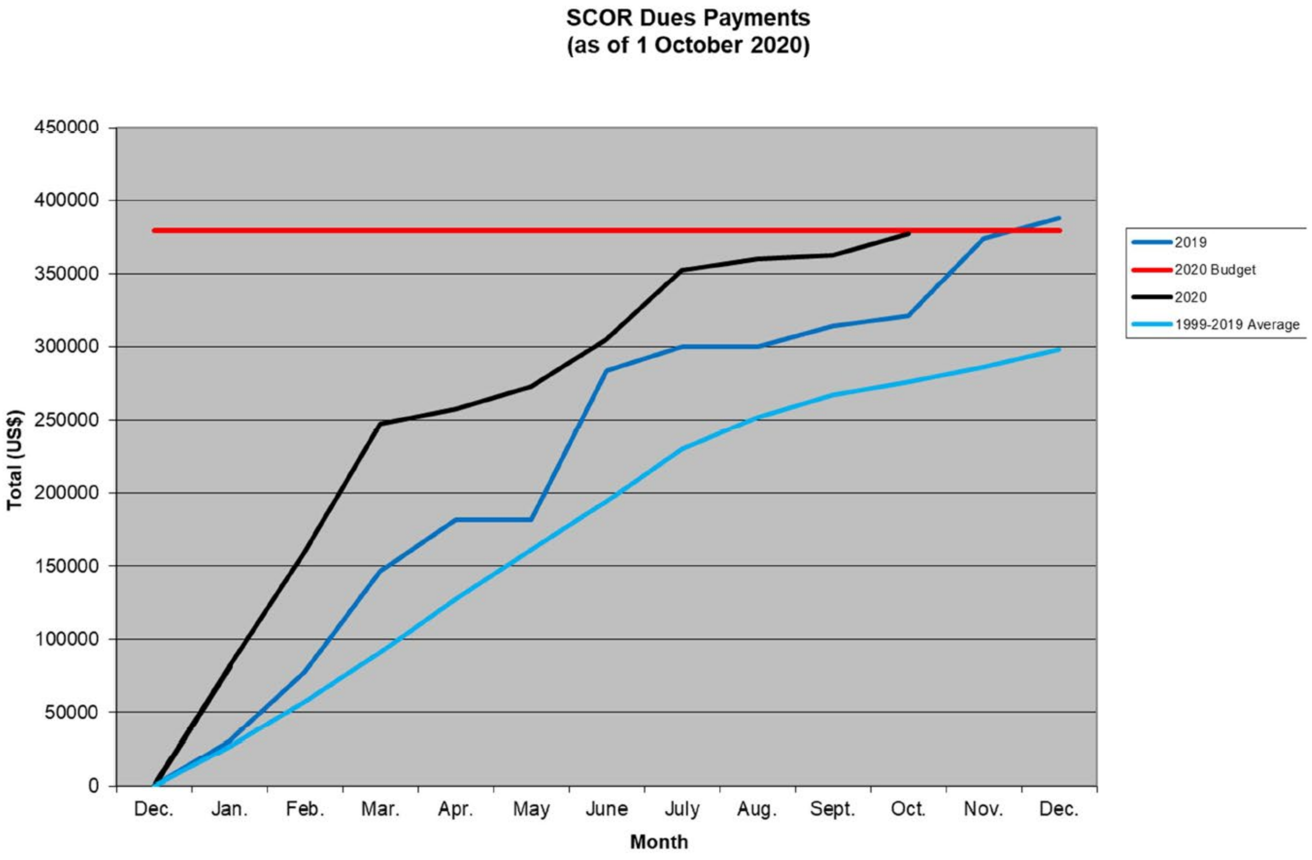
# 2020 National Committees and Nominated Members

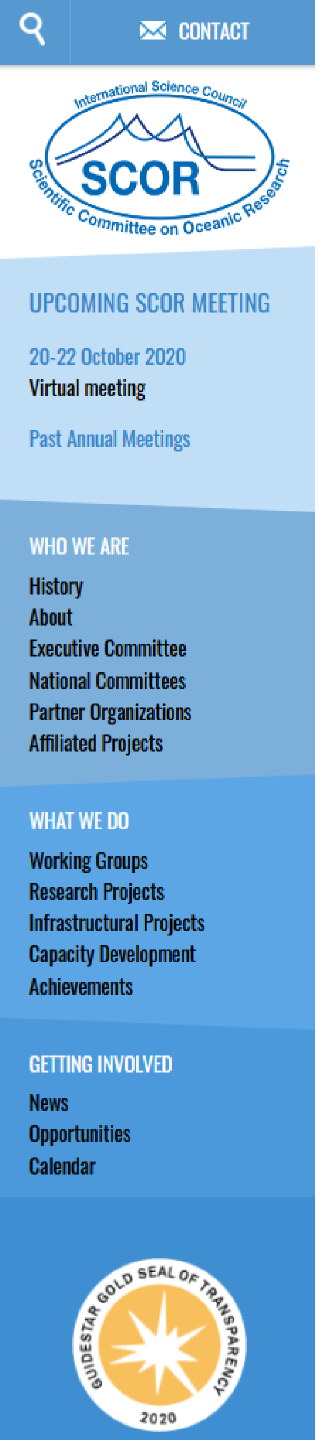
| National Committee | Updates |
| --- | --- |
| **Belgium** | J. Nihoul and Francois Ronday retired, replaced by Jan Mees, Bruno Delille and Marc Kochzius |
| **China-Beijing** | Hong Huasheng rotated off. Fangli Qiao is the new president, with Minhan Dai as vice-president and Sun Song the past-president |
| **Colombia** | New membership in SCOR. Nominated members are Francisco Arias-Isaza, Paula Cristina Sierra and Constanza Ricaurte-Villota |
| **Israel** | Two new nominated members are Steve Brenner and Amatzia Genin |
| **Japan** | Naomi Harada and Toshiyuki Hibiya have replaced Kaoru Kubokawa and Toshio Yamagata |
| **Mexico** | Elva Escobar, Mario Martinez Garcia and Clara Morán have been replaced by Carlos Robinson and Alfonso Araiza Marroquin |
| **Netherlands** | Caroline Slomp, Gerald Ganssen and Maria van Leeuwe have been replaced by G.M. (Gerald) Ganssen, Katja T.C. Peijnenburg and Lennart de Nooijer |
| **Poland** | Adam Sokolowski has been incorporated as the third nominated member |
| **Turkey** | Gülsen Avaz has replaced Bilge Tutak |
| **USA** | Daniel Costa has replaced Kevin Arrigo |

# 2020 Finances

Full report on Thursday by the Finance Committee

- Dues income from memberships is on track (96%) – these cover the costs of the Secretariat, annual SCOR meetings and some WG activities.
- SCOR depends on grant funding for large-scale research projects, ocean carbon activities, and some working groups. SCOR is currently in the third year of a three-year grant from NSF to fund these activities.
- We are in the one year ‘no cost” extension for an NSF grant on capacity building, and in the first year of a three-year grant from NSF to support capacity building in ocean sciences.
- Due to the COVID 19 situation, the 2020 budget was underspent



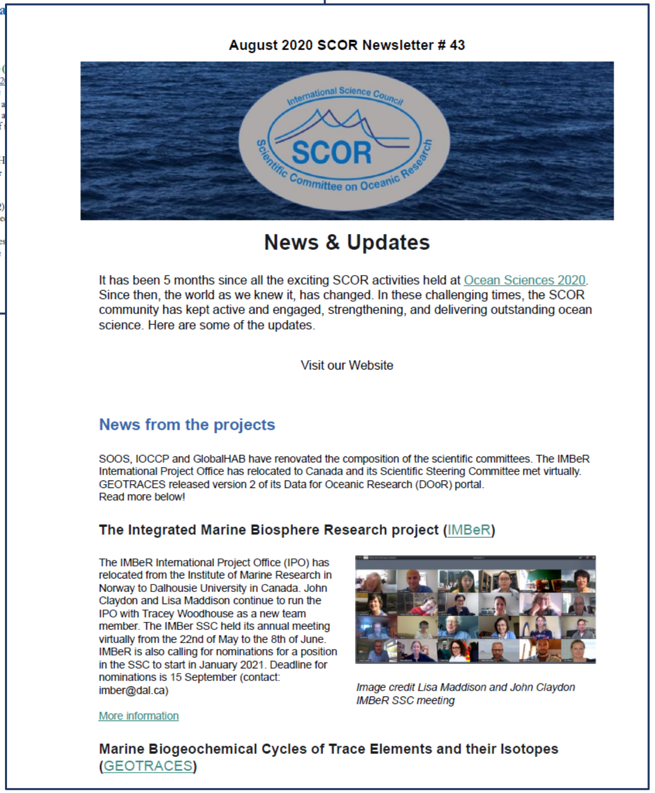



# Communication

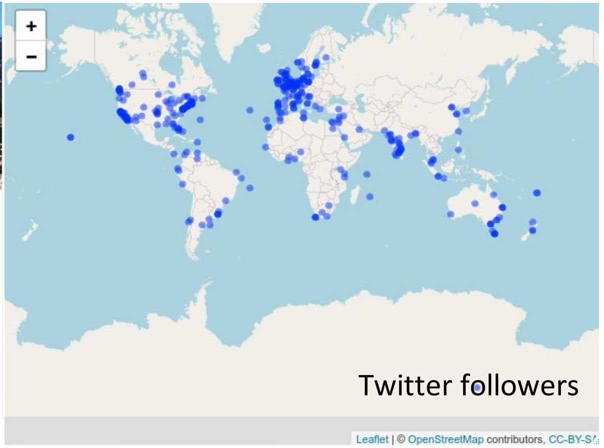
**Website:** ~1900 visits and +4500 views / month

https://scor-int.org/

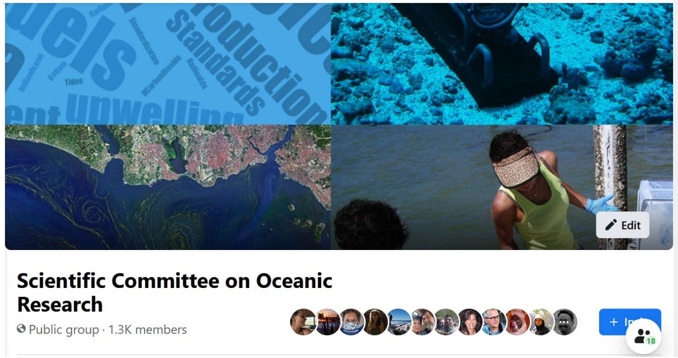
**Newsletter:** 3/year

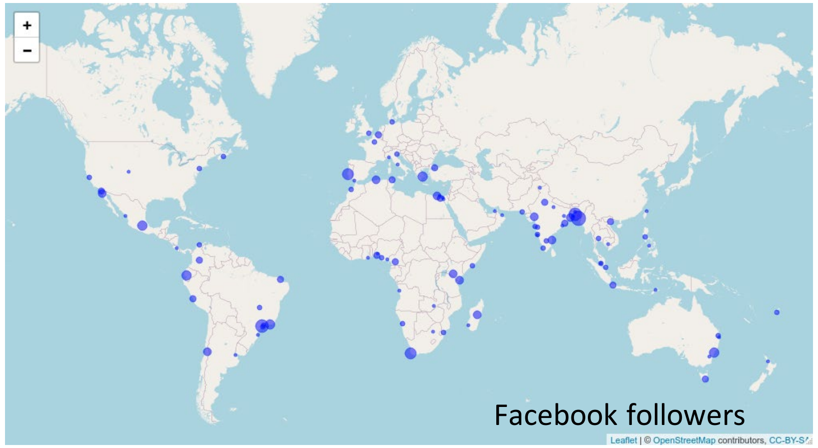




**Twitter:** ~800 followers


**Facebook group:** 1.4 K members



# Results of the 2020 election for SCOR Officers

Peter Burkill

Chair Nomination  Committee

# Background

1) Procedure is well defined in SCOR Constitution
2) Nomination Committee

   Peter Burkill (Chair & Current Past-President SCOR from UK)
   Isabelle Ansorge (South Africa)
   Xiaoxia Sun (China - Beijing)
   Lennart de Nooijer (Netherlands).

3) Call for Nominations for a new President and 3 Vice-Presidents on 19th April 2020
4) Nomination Committee meets to discuss balance on Executive
5) Slate developed with all nominations included

| *Role* | *Name* | *Country* | *Gender* | *Discipline* |
|---|---|---|---|---|
| President | Sinjae YOO | Korea | Male | Biology |
| Vice-President | Stefano ALIANI | Italy | Male | Ecosystems |
| Vice-President | Bradley MORAN | USA | Male | Biology |
| Vice-President | Jing ZHANG | Japan | Female | Chemistry |

**SCOR Executive 2020**

| *Role* | *Name* | *Country* | *Gender* | *Discipline* |
|---|---|---|---|---|
| President | Sinjae YOO | Korea | Male | Biology |
| Past President | Marie-Alexandrine SICRE | France | Female | Palaeoecology |
| Secretary | Paul MYERS | Canada | Male | Physics |
| Vice-President | Stefano ALIANI | Italy | Male | Ecosystems |
| Vice-President | Bradley MORAN | USA | Male | Biology |
| Vice-President | Jing ZHANG | Japan | Female | Chemistry |
| Co-opted | New ECS | | | |
| Co-opted | Jacqueline UKU | Kenya | Female | Biology |
| IABO | Enrique MONTES | (USA) | Male | Biology |
| IAMAS | Joyce PENNER | (USA) | Female | Atmosphere |
| IAPSO | Trevor McDONALD | (Australia) | Male | Physics |

6) SCOR Executive Director sent out the slate to all voting members

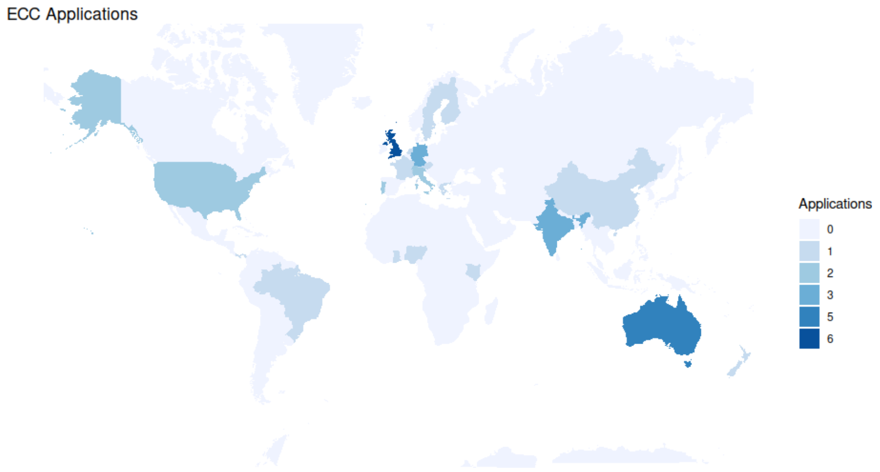
7) Only positive feedback, so this Executive is set to serve from the end of this meeting

CONGRATULATIONS TO ALL OFFICERS –

# MAY YOU ENJOY SCOR AND SERVE IT WELL!

# Results of 2020 selection of Early Career Scientist

- 39 applications received – ~34% women, 21 countries
- Each application was reviewed by three members of the EC and the reviews were ranked
- Top three candidates were interviewed by SCOR President (Sicre), Secretary (Myers) and Vice-president (Yoo) – moderated by Executive Director




**SCOR 2020-2022 ECS:**

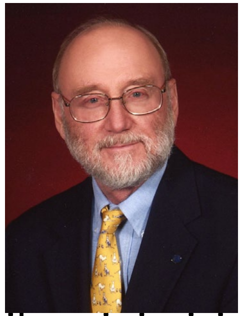
Dr. Charlotte Laufkotter, Ambizione Fellow at Bern University, Switzerland. Her area of expertise is marine biogeochemistry, in particular biological carbon cycling and plankton communities, extreme events, and marine plastic pollution

# Revision of SCOR Constitution

Peter Burkill
Chair Constitution Committee

**Background**

1) SCOR's Constitution defines how SCOR works at high level;
2) It is revised periodically to ensure it is "fit-for-purpose";
3) Constitution Committee





4) Aim: Simplify & make it logical while minimising change
5) Macro Changes:
    a) suitable for US tax purposes;
    b) order of text;
    c) Membership;
    d) Meeting nomenclature (~~Ordinary~~ & ~~Executive~~);
    e) add Appendices on Officers Election & Voting.
    f) Note all minor changes are given in the online version.
6) It was then sent to Members by Patricia for informal comment on 26th August.
7) Sent again to you by Patricia for you to vote on the amendments

**What you now need to do!**

8) Hurdle for acceptance: Need agreement of two-thirds of SCOR members & agreement by ISC.
9) Please vote electronically by replying to Patricia that you

   ACCEPT/ DO NOT ACCEPT/ABSTAIN (please delete)

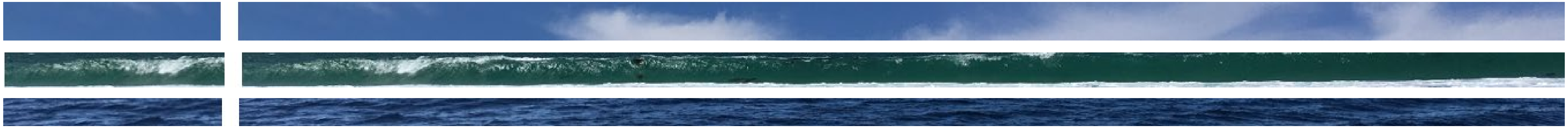
   and identify what organisation you represent***.
10) Send this to Patricia Miloslavich by email by the end of today.
11) Sinjae Yoo will announce the results tomorrow.

****Clause 22 states when a vote is taken at an annual Meeting, only one Nominated Member from each National SCOR Committee shall have a vote. One Representative Member from each Organization in Clause 4 may also vote*

# Presentation of new Working Group proposals

1. Analysing ocean turbulence observations to quantify mixing **(ATOMIX) - McDougall**
2. TRACE element SAMplers and sensORS **(TRACESAMORS) - Zhang**
3. Benthic Foraminifera as Ecological Sentinels of Marine Systems Health **(FORAM-ECO) - Sicre**
4. Elucidating THreats tO Sandy beaches: a global synthesis **(ETHOS) - Yoo**
5. Integration of international ocean acidification research at CO2 seeps **(InterSEEP) - Casacuberta**
6. Mapping climate change refugia for marine conservation **(MarCCR) - Uku**
7. Respiration in the Mesopelagic Ocean (**ReMO)**: Reconciling ecological, biogeochemical and model estimates - **Burkill**
8. Are global indicators of COastal and Nearshore benthic fish assemblage status in agreement if derived from disparate visual CENSUS techniques? **(CoNCENSUS) - Montes**
9. Developing an Observing Air-Sea Interactions Strategy **(OASIS) - Myers**
10. Atmospheric aerosol deposition as forcing factor for microbial ecology and biogeochemistry in the ocean **(AEROS) - Penner**

**Narrated presentations available at:**
**Restricted to Nominated and Executive members only**



Proposal for SCOR WG 2020

# Analysing ocean turbulence observations to quantify mixing

# **ATOMIX**

SCOR Executive Monitor

**Trevor McDougal**

# ATOMIX - Analysing ocean turbulence observations to quantify mixing

- Turbulence is key in oceanic energy budgets and transport of heat, salt, dissolved gases, and nutrients in the ocean.

- Model predictions of ocean stratification, heat and deep-water exchanges, are sensitive to the choice of mixing parameterisations and constrained by observational datasets.

- The quality of turbulence estimates is further compromised by the lack of curated and centralised information sources.

- Commercialisation of turbulence instruments has also dramatically increased the number of users collecting these observations.

- The explosion of raw data has created a need for bringing the field together, to develop raw benchmark datasets with processed turbulence estimates so that users can validate their algorithms.

# ATOMIX – Terms of Reference

1. Develop best practices for acquiring and processing turbulence observations collected from conventional and emerging autonomous platforms, which measure velocity or velocity gradients.

2. Establish an open-access database of benchmark datasets collected in diverse ocean environments via different measurement techniques. These raw datasets will be accompanied by agreed-upon "best" processed dissipation estimates to enable validating data processing algorithms irrespective of programming language.

3. Develop quality control measures and guidelines for publishing and archiving turbulence quantities computed from velocity or velocity gradients.

4. Build capacity by creating a collaborative, living wiki-platform that consolidates knowledge on processing of turbulence observations, both from existing and future technologies, as they become available.

# ATOMIX – Full members

| Name | Institution, Country | Expertise |
|---|---|---|
| Cynthia Bluteau [F, Ch,EC] | UQAR, Canada | Turbulence measurements, parameterization, point velocimeters, shear probes |
| Ilker Fer [M,Ch] | U. Bergen, Norway | Shear probe data collection and analysis, different ocean platforms |
| Peter Holtermann [M,EC] | LIBSR, Germany | Shear probe data, mainly estuaries and coastal seas |
| Arnaud LeBoyer [M,EC] | SCRIPPS, USA | Hardware/software developer, microstructure profiler, HF thermistors |
| Yueng-Djern Lenn [F, Ch,] | Bangor University, UK | Turbulence measurements in polar and shelf areas, shear probes and acoustic methods |
| Zhiyu Liu [M] | Xiamen University, China | Turbulence measurements, shear probes and acoustic methods, various regimes |
| Amelie Meyer [F,EC] | UTAS, Australia | Microstructure data from shear probes in polar waters |
| Rolf Lueck [M] | Rockland Scient., Canada | Shear probe builder and data processing, multiple platforms, ocean and lakes |
| Craig Stevens [M] | NIWA, New Sealand | Measurement small scale processes, extreme environments (ice, cavities, tidal channels) |
| Danielle Wain [F] | 7 Lake Alliance, USA | Turbulence measurements in low energy environments, temp. microstructure, acoustic |

**Ch:** Co-chair; **EC:** Early Career Scientist; **F:** female; **M:** male

Proposal for SCOR WG 2020

# TRACE element SAMplers and sensORS
# **TRACEAMORS**

SCOR Executive Monitor

**Jing Zhang**

# TRACEAMORS – Terms of Reference

**ToR1.** To critically **evaluate key analytical issues** with currently employed methodologies (samplers and sensors) to establish whether they can be improved, supplemented or eventually replaced.

**ToR2.** To **define the requirements for measurement conditions and ideal analytical properties** of sensors and sampling devices; depending on the context of analysis in different ocean regimes (concentration, pressure…) and the provenance, fate, distribution and biochemical functions of trace elements.

**ToR3.** To **provide recommendations for controlled inter-comparison** of remote **samplers** and potential in situ **sensors** on various deployed platforms.

**ToR4.** To review published results and identify individuals and communities **working on all aspects of trace metal sensors in industry, medicine and other environmental fields** (3D printing, nanotechnologies, ligands), **to generate a critical review of promising technologies** for automated remote marine biogeochemical measurements.

**ToR5.** To recommend approaches for future analytical development and deployment of different types of trace metal sensors and samplers (including ongoing GEOTRACES transects and process studies), to **identify target zones** (with the help of modellers) **and techniques** suited to extreme environments (e.g. deep sea, sub-zero temperatures).

**ToR6.** To **develop capacity and disseminate information** resulting from the WG outcome in the form of (i) Website (hosted at the University of Plymouth) to share results, reports (Ocean best practices, IOC), tutorials and software, (ii) open access journal special issue (e.g. Limnology and Oceanography-Methods) (iii) platform for partnership collaborative proposals to generate sustained collaboration (Capacity Building) and (iv) a final report to SCOR.

# TRACEAMORS – Membership

## Full members

| Name | Institution, Country | Expertise |
|---|---|---|
| Simon Ussher [M, Ch] | University Plymouth, UK | Flow injection techniques (FIA), fluorescence and chemiluminescence detection |
| Agathe Laes-Huon [F,Ch] | IFREMER, France | Nutrients, trace metal analysis and deep sea automated analysers |
| Maxime Grand [M,EC] | Moss Landing ML, USA | Application of Flow injection techniques and microfluidics to chemical oceanography |
| Andrew Bowie [M] | UTAS, Australia | Chemical oceanographer and analytical chemist |
| Maija Iris Heller [F] | PUCV, Chile | Trace metal, analysis and speciation in seawater |
| Susanne Fietz [F] | Stellenbosch U., SAfrica | Biogeochemist, focusing on links between phytoplankton and trace metals |
| Mariko Hatta [F] | JAMSTEC, Japan / U. Hawaii, USA | Chemical oceanographer for shipboard flow injection analysis for trace metals, and analytical chemist adapting microfluidics techniques to determination of nutrients |
| Sunil Kumar [M] | NIO, India | Geochemistry & Isotope Chemistry, Nutrient Cycling & Biogeochemistry |
| Maeve Lohan [F] | U. Southampton, UK | Electrochemical methods, organic complexation, Flow injection analysis |
| Jian Ma [M] | Xiamen U., China | Expert in field nutrient and metal analysis, flow analysis and automatic instrumentation |

## Associate members

| Name | Institution, Country | Expertise |
|---|---|---|
| Joe Resing [M] | U. Washington, USA | Instrument automation and data acquisition, flow injection analysis |
| Vincent Raimbult [M] | LAAS-Toulouse, France | Nanotechnology, nanofabrication, electronic instrumentation, sensor development, microfluidics |
| Manuel Miro [M] | U. Illes Balears, Spain | Automatisation of analytical methods based on the new generations of flow analysis and 3D-printed mesofluidic platforms |
| Roberto Grilli [M] | IGE-Grenoble, France | Laser spectroscopy, Atmospheric chemistry, Ice core sciences, Trace gas analysis, Isotope geochemistry |
| Geng Leng [M] | UEST, China | Development of analytical techniques including microextraction, spectrophotometry chemiluminescence, atomic fluorescence, gas and liquid chromatography. |
| | | |
| | | |
| | | |
| | | |

**Full members:**

**Ch:** Co-chair;

**EC:** Early Career Scientist (1/10);

**F:** female (5/10);

**M:** male (5/10)

**Associate members:**

**EC** (0/5); **F:** (0/5); **M:** (5/5)

**Positions left to make strategic recruitment of international experts engineers, analysts, chemists, modellers when funded.**

Proposal for SCOR WG 2020

# Benthic Foraminifera as Ecological Sentinels of Marine Systems Health
# **FORAM-ECO**

SCOR Executive Monitor

**Marie Alexandrine Sicre**

# FORAM-ECO – Terms of Reference

1. Assess state-of-the-art methodologies to characterize organic matter in marine sediments and disentangle between natural and anthropogenic sources

2. Expand the benthic foraminiferal species assignment to distinct ecological categories as a function of organic matter gradients.

3. Assess the applicability of existing foraminiferal diversity indices [H’ and Exp(H’bc)], sensitivity indices (TSI-med, FSI and Foram-AMBI) and the multi-metric index NQIf against different types of pressures.

4. Apply benthic foraminifera as a tool to assess pre-industrial conditions recorded in sediment archives in order to understand if current environmental settings have potentially degraded or recovered.

5. Evaluate the correspondence of taxonomic inventories between morphology- and molecular-based analysis. This will contribute to design a molecular-based foraminiferal biotic index.

**FORAM-ECO – Full members** **Ch:** 2 Co-chair; 1**EC:** Early Career Scientist;5**F:** female; 5**M:** male

| Name | Institution, Country | Expertise |
|---|---|---|
| Michael Martínez-Colón [M, Ch, EC] | Florida A&M U., USA | Geochemistry, Earth-/Marine Sciences, foraminiferal ecology-/ paleoecology |
| Vincent Bouchet [M, Ch] | U. Lille, France | Biology, ecology, biotic indices, foraminifera, and macrofauna |
| Orit Hyams-Kaphzan [F,Ch] | GSI, Israel | Marine ecology and paleoecology, Environmental Sciences, foraminifera |
| Silvia Spezzaferri [F] | U. Fribourgh, Switzerland | Taxonomy, ecology, bioindicators, benthic foraminifera |
| Guillem Mateu-Vicens [M] | U. Balearic Is., Spain | Biology, foraminiferal ecology/paleoecology, carbonate sedimentology, isotope geochemistry |
| Magali Schweizer [F] | U. Angers, France | DNA barcoding, phylogeography, trophic strategies, exotic species, foraminifera |
| Akira Tsuimoto [M] | Shimane U., Japan | Earth-/Marine Sciences, radiochemistry, sediment chronology |
| Virginia Martins [F] | U. Aveiro, Portugal | Pollution, ecological bioindicators, Earth Science, transitional environments |
| Tristan Cordier [M, EC] | U. Geneva, Switzerland | Metabarcoding, molecular biotic indices, geneticist, foraminifera |
| Irina Polovodova [F] | U. Gothenburg, Sweden | Earth-/Marine Sciences, marine pollution, paleoecology/ ecology |

Elucidating THreats tO Sandy beaches: a global synthesis
**ETHOS**

SCOR Executive Monitor
**Sinjae Yoo**

# ETHOS – Rationale and Goals

Rationale

- Sandy beaches are globally distributed ecosystems that underpin a diversity of locally and regionally important ecosystem services.
- Yet, despite their ecological significance, the ecological functions of sandy beaches are underappreciated.

Goals

1. develop a comprehensive catalogue of threats to the ecosystem function of sandy beaches and the scales at which they act,
2. compile existing knowledge of stressor impacts to sandy beaches and the methods used to assess them, and
3. integrate this information to develop a framework for progressing our global understanding of how sandy beaches respond to multiple stressors, at a range of spatial and temporal scales, and across a diversity of environmental and socio-economic settings.

# ETHOS – Terms of Reference and Deliverables

**ToR**

1. To identify key threats to the ecological function of sandy beaches, and classify these according to a) their spatial and temporal scale and b) their provision of acute or chronic perturbations.
2. To effectively disseminate knowledge gained through WG actions to a diversity of stakeholders, globally.
3. To carry out a broad survey to identify and assess the efficacy of methodologies that have been applied to study ecological impacts of stressors to sandy beaches
4. To develop a standardized protocol for assessing threats to sandy beaches, that can be applied globally as well as at regional scales
5. To identify and harmonize research directions of global-to-local relevance

**Deliverables**

1. One open access publication
2. One protocol detailing methodologies
3. One best practices manual
4. One open access publication with links to protocol and best practice manual

# Integration of international ocean acidification research at $CO_2$ seeps

SCOR Executive Monitor
**Núria Casacuberta**

- **Ocean acidification (OA)** is caused by the uptake of anthropogenic carbon dioxide ($CO_2$) and its effects on ocean chemistry are well understood. *But…* the effects of OA on marine communities, species interactions, food web structure, and on ecosystem services are poorly known.
- Over the past 10 years, the study of shallow marine $CO_2$ seeps has emerged as a powerful tool to address this knowledge gap, to assess effects of OA on coastal ecosystems. *But…* this research community remains fragmented internationally, with a lack of capacity to study $CO_2$ seep systems in developing nations.
- This WG will coordinate interdisciplinary international studies using natural gradients in seawater $pCO_2$ worldwide to: (i) analyze current data available; (ii) plan in situ observations; (iii) agree a set of standard techniques for work in seeps; and (iv) establish a foundation for long-term capacity building.

# InterSEEP – Terms of Reference and Deliverables

**ToR 1:** To create an **open-access data** resource based on research made at $CO_2$ seep sites globally.
→ Open-access resource of temporal-space data variability

**ToR 2:** Build, based on the observations made in the $CO_2$ seeps, on an **emerging synthesis of the impacts of carbon chemistry variability on marine ecosystems** and the goods and services they provide. → Synthesis paper to be published in a peer-reviewed journal.

**ToR 3:** To produce a **peer-reviewed perspectives article on future seep research**, identifying what kind of research is needed and in which locations. Emphasis will be given to a) benthic and pelagic diversity, abundance and biomass; b) sea food quality; and c) resilience of coastal habitats to ocean acidification and temperature increases. → peer-reviewed perspectives article on future seep research with conceptual models of key future global experiments.

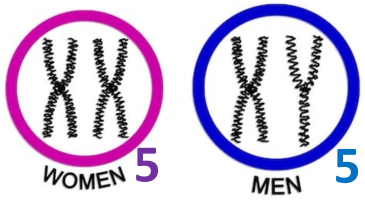
**ToR 4:** To share knowledge and transfer skills for surveys and experiments, laboratory analysis and data management, in order to **build capacity in developing countries**.

**ToR 5:** To develop a document of internationally agreed **best practices** for data acquisition, standardized output formats and archiving for surveys and experiments that harness the advantages of $CO_2$ seep research and outreach.

→ Road test the draft of the Best Practices Handbook during the Capacity Building activity in 2021.

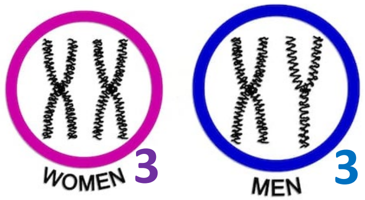
# InterSEEP – Full members

| Name | Institution, Country |
| --- | --- |
| Cristina Linares [F] | U. Barcelona, Spain |
| Jason Hall-Spencer [M,Ch] | U. Plymouth, UK |
| Katharina Fabricius [F] | AIMS, Australia |
| Haruko Kurihara [F] | U. Ryukyus, Japan |
| Rafael Bermúdez [M, Ch] | GMaRE, Ecuador |
| Ricardo Metalpa [M] | IRD, France |
| Salvatrice Vizzini [F] | U. Palermo, Italy |
| Sam Rastrick [M] | IMR, Norway |
| Sylvain Agostini [M] | U. Tsukuba, Japan |
| Vanessa Yepes-Narvaez [F] | INVEMAR, Colombia |




# Associate members

| Name | Institution, Country |
| --- | --- |
| Christopher Cornwall[M] | Victoria Wellington U., New Zealand |
| Derek Manzello [M] | NOAA, USA |
| Marco Milazzo [M] | U. Palermo, Italy |
| Lucia Porzio [F, EC] | SZ Anton Dohrn, Italy |
| Yu-Shih Lin [F] | N. Sun Yatsen U., China |
| Melissa Chierici [F] | IMR, Norway |



Mapping climate change refugia for marine conservation
**MarCCR**

SCOR Executive Monitor
**Jacqueline Uku**

# MarCCR – Terms of Reference

1. Objective 1 (O1) - Develop a conceptual framework for defining and identifying marine CCR at different spatiotemporal scales and for multiple drivers.

2. Objective 2 (O2) – Develop empirical approaches to identify marine CCR at different scales, and quantify how their different physicochemical- biological properties are linked.

3. Objective 3 (O3) – Produce global CCR maps at relatively coarse scales applicable for broad scale transboundary planning.

4. Objective 4 (O4) - Produce high-resolution maps for several regional and local case studies in different regions and marine ecosystems, that can be applicable at local to regional scales.

5. Objective 5 (O5) – Produce materials for conservation and planning practitioners to use CCR identification tools and maps to inform real-life planning applications.

6. Objective 6 (O6) – Create opportunities for training and learn-by-doing for early-career and developing country researchers.

# MarCCR – Full members

| Full Members<br>Name, Institution, County | Associate Members<br>Name, Institution, County |
|---|---|
| Gil RilovIOLR, Haifa, Israel [M, Ch] | Mary O'Connor, UBC, Canada [F] |
| Ana Queirós PML, UK [F,Ch, EC] | Larry Crowder, Stanford U., USA [M] |
| Amanda Bates, MUN, Canada [F] | Nicolas Moity, CDFG, Ecuador [M, EC] |
| Elena Gissi, U. Luav Venice, Italy[F] | Bernardo Broitman, U. Adolfo Ibañez, Chile[M] |
| Brian Helmuth, Northeastern U., USA[M] | Anthony Richardson, U. Queensland, Australia[M] |
| Fernando Lima, U. Porto, Portugal[M, EC] | J. García Molinos, U. Hokkaido, Japan[M, EC] |
| Yunwei Dong, Ocean U., China [M] | David Schoeman, U. Sunshine Coast, Aust.[M] |
| Michael Burrows, SAMS, UK [M] | Nguyen Hoang Tri, UNESCO, Vietnam [M] |
| Catriona Hurd, UTAS, Australia [F] | Laura Antao, U. Helsinki, Finland [F, EC] |
| Catarina Frazao S., U. Lisbon, Portugal [F, EC] | Greg Asner, Arizona State U., USA [M] |

**Ch:** Co-chair; **EC:** Early Career Scientist; **F:** female; **M:** male

Proposal for SCOR WG 2020

# Respiration in the Mesopelagic Ocean
# **REMO**

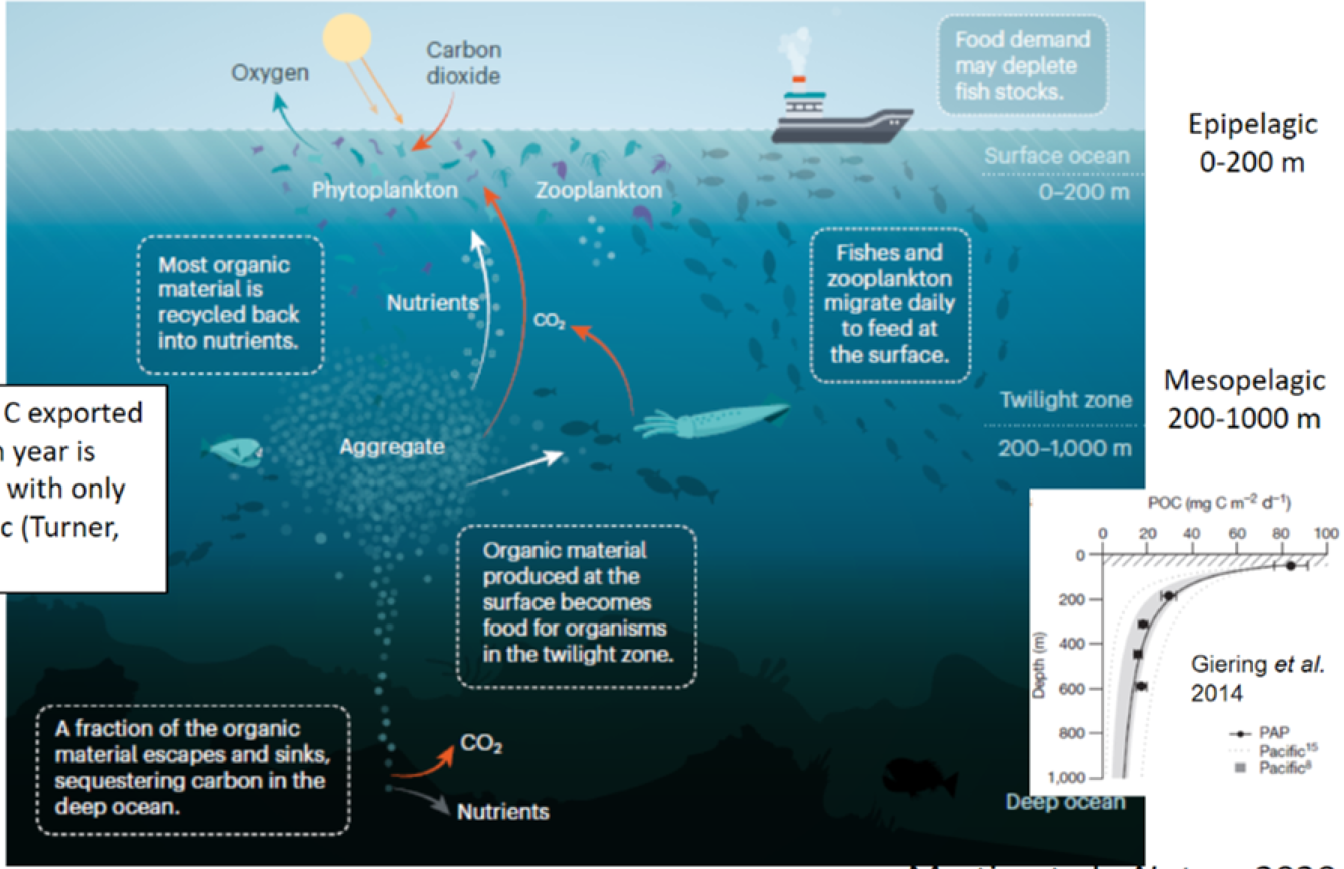
SCOR Executive Monitor
**Peter Burkill**

# Respiration in the Mesopelagic Ocean (ReMO)

Proposal for a SCOR WG 2020

- Consumption of oxygen – drives deoxygenation
- Production of carbon dioxide – affects atmospheric $CO_2$
- Remineralization of particulate and dissolved organic material – mediates ocean storage of C

90% of the >10 billion tons of C exported from the epipelagic zone each year is processed in the mesopelagic with only 10% reaching the bathypelagic (Turner, 2015)




Epipelagic 0-200 m

Mesopelagic 200-1000 m

Giering *et al.* 2014

Martin et al., *Nature* 2020

# ReMO – Aim

*"To reconcile ecological, biogeochemical and model estimates of mesopelagic respiration to improve projections of the decline of oxygen in the world's oceans. "*

# Terms of Reference

1. Identify, quantify and prioritise gaps in our knowledge, and prepare an action plan to reduce these gaps by reviewing available information on mesopelagic respiration

2. Develop a global dataset of mesopelagic respiration estimates, derived from the range of ecological and biogeochemical techniques available, in order to create a resource for validation of biogeochemical models including Earth System Models used for climate projection

3. Produce a new synthesis of open ocean mesopelagic respiration

4. Produce a best practice manual of techniques and approaches to determine mesopelagic respiration, and make recommendations as to which is the most appropriate method or combination of methods for a particular application, including best practice on how to reconcile approaches across time and space scales

5. Build capacity, share knowledge and transfer technical skills, particularly to scientists in developing nations

# ReMO – Full members

| Name | Institution, Country | Expertise |
|---|---|---|
| Carol Robinson [F, Ch] | U. East Anglia, UK | Microbial oxygen consumption and carbon dioxide production |
| Iris Kriest [F,Ch] | GEOMAR, Germany | Global biogeochemical models |
| Gerhard Herndl [M] | U. Vienna, Austria & NIOZ, The Netherlands | Single cell respiration (fluorescing redox dyes linking to phylogeny), in situ microbial activity, pressure effects, metaproteomics and metagenomics |
| Natalia Osma [F, EC] | U. Concepción, Chile | Electron transport system activity and enzyme kinetic models |
| Javier Arístegui [M, Ch] | U. Las Palmas, Spain | Microbial oxygen consumption and growth efficiency, ETS activity, box models |
| Matthieu Bressac [M, EC] | UTAS, Australia | Oxygen consumption of particle attached bacteria |
| Ying Wu [F] | East China N. U., China | Geochemical cycles, oxygen consumption and dissolved organic matter degradation |
| Hyung Jeek Kim [M, EC] | KIOST, Korea | Sinking particle flux derived from sediment traps |
| Morten Iversen [M] | AWI, Germany | Aggregate-associated microbial respiration, organic matter export and turnover using traps and in situ optics in profiles and on moorings |
| Jack Middelburg [M] | Utrecht U., The Netherlands | Biogeochemistry, organic geochemistry, stable isotopes, modelling, degradation kinetics |

**Ch:** Co-chair; **EC:** Early Career Scientist (3/10); **F:** female (4/10); **M:** male (6/10)

Are global indicators of COastal and Nearshore benthic fish assemblage status in agreement if derived from disparate visual CENSUS techniques?

**CoNCENSUS**

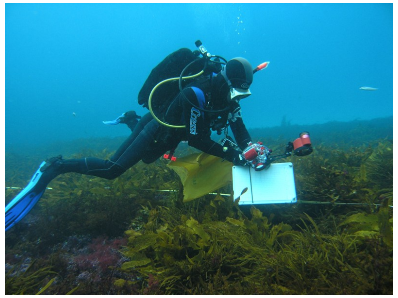
SCOR Executive Monitor

**Enrique Montes**

# CoNCENSUS – Terms of Reference

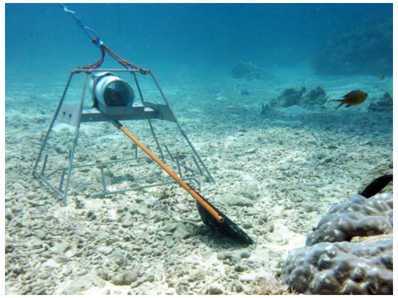
1. ToR 1: Determine the extent to which data obtained from different methods (UVC, DOV and BRUVs) and sampling approaches can be used in conjunction to measure and report on the status of coastal and nearshore benthic fish assemblages at a global scale.

Underwater visual census (UVC)



DOV: diver-operated stereo-video

Baited Remote Underwater Video Station (BRUVs)



2. ToR 2: Endorse and, where necessary, publish best practice guidelines for ethics, survey design, sampling techniques, data analysis and archival, and agree on a common base level of data and metadata collection required to enable data to be comparable, useful for reporting on key indicators and reusable in the future.

3. ToR 3: Develop data schema and vocabularies relevant to the visual census techniques, establish and implement data management protocols aligned with FAIR and open-access principles, and establish infrastructure and workflows for open-access data to be published on OBIS and dedicated web-based platforms.

# CoNCENSUS – Terms of Reference (Cont.)

4. ToR 4: Determine priority areas and methods for engagement, capacity development and research to enhance coverage and strengthen the global network by carrying out a gap analysis using various data sources and peer-reviewed literature.

5. ToR 5: Establish a global community of practice willing to employ the agreed minimum methods in programmes and to share data through the agreed workflow and web-based platforms.

# CoNCENSUS – Full members

| Name | Institution, Country | Expertise |
|---|---|---|
| Anthony Bernard [M, Ch] | SAIAB, South Africa | Marine ecology and conservation, stereo-BRUVs |
| Rick Stuart-Smith [M,Ch] | UTAS, Australia | UVC, Reef Life Survey, global indicators |
| Rene Abesamis [M] | Silliman U., Philippines | Coral reed ecology and conservation |
| Emily Darlin [F] | WCS, USA | Coral Reefs, Conservation, Climate Refuges, Social-Ecological Systems |
| **Jordan Goetze [M,EC]** | **DBCA, Australia** | **Field surveys with Stereo-BRUVs/DOVs, UVC; Global FinPrint, Global Archive** |
| Aaron MacNeil [M] | Dalhousie U., Canada | Bayesian data analysis, reef ecology, fisheries |
| Eva Maire [F] | Lancaster U., UK | Socio-ecology, conservation, functional ecology |
| **Ana C. Mazzuco [F, EC]** | **UFES, Brazil** | **Biodiversity data management and marine ecology** |
| C. Pattengill-Semmens [F] | REEF, USA | Marine biology, citizen science, education |
| Melita Samoilys [F] | CORDIO East Africa, Kenya | Coral reef ecology, management and fisheries |

**Ch:** Co-chair; **EC:** Early Career Scientist; **F:** female; **M:** male

# CoNCENSUS – Associate members

| Name | Institution, Country | Expertise |
|---|---|---|
| Rusty Brainard [M] | KAUST, Saudi Arabia | Coral Reef Ecosystems, Climate Change, Ocean Acidification, Fisheries, Biodiversity |
| Pascale Chabanet [F] | IRD, France | Coral reef ecology, extensive field experience with UVC and video for fish census |
| Emmet Duffy [M] | Smithsonian, USA | Marine ecology and Biodiversity, Co-lead on C-GRASS SCOR working group |
| Reiji Masuda [M] | Kyoto U., Japan | Subtidal fish ecology, fish behaviour, UVC long term-monitoring |
| Peter Mitchel [M] | CEFAS, UK | Marine ecologist, specialising in mapping benthic habitats and fish assemblages. |
| David Obura [M] | CORDIO, Kenya | Coral reef resilience, biogeography, management and policy |
| A. Perez-Matus [M] | PUCC, Chile | Fish and kelp ecology. Field experience in UVC and BRUVS |
| Fernanda Rolim [F] | UESP, Brazil | Marine ecology and management |
| Peter Walsh [M] | UTAS, Australia | Marine and terrestrial biodiversity data management and information systems |

**Ch:** Co-chair; **EC:** Early Career Scientist; **F:** female; **M:** male

5 female, 5 male, 2 ECS. 6 continents. Multiple developing countries participating in full and associate member list.

# Developing an Observing Air-Sea Interactions Strategy
# **OASIS**

SCOR Executive Monitor

**Paul Myers**

# OASIS – Developing an Observing Air-Sea Interactions Strategy - Terms of Reference

1. ToR 1. Harmonize the recommendations from the OceanObs'19 CWPs into a unified Observing Air-Sea Iteraction Strategy (OASIS) by identifying and ranking overlaps and resolving apparent contradictions, focusing on global air-sea exchanges of heat, moisture, momentum, important greenhouse gasses, biogenic trace gasses, and the multidisciplinary boundary layer variables associated with these air-sea exchanges.
2. ToR 2. Produce a capacity building strategy that enables developing nations (including least developed nations and island nations) to actively participate in and benefit from local-to-global air-sea interaction observations. This will involve a training strategy, as well as identification of opportunities for leveraging contributions by new partners.
3. ToR 3. Develop and assess network designs that optimize air-sea interaction observations, following the Framework for Ocean Observations, in coordination with OceanPredict, and other working groups focused on optimizing network design.
4. ToR 4. Develop a strategy for air-sea interaction process studies to address knowledge gaps; to improve model and satellite representation of Essential Ocean Variables (EOVs), Essential Climate Variables (ECVs), and Essential Biological Variables (EBVs) associated with air-sea interaction processes; and to develop parameterizations to relate variables that are difficult to measure with variables that can be broadly observed.
5. ToR 5. Develop a strategy for assessing interoperability of surface observing platforms. This will include intercomparisons of EOV, ECV, and EBVs observed from different platforms; development of best practices; and development of procedures to increase Technical Readiness Levels and expand technology solutions.
6. ToR 6. Build community and capacity for using, operating, and developing air-sea interaction observational platforms that allow collaborative partnerships with existing national and international air-sea interaction working groups and observational coordination groups.

# OASIS – Full members

| Name | Institution, Country | Expertise |
|---|---|---|
| Meghan Cronin [F, Ch] | NOAA, USA | Heat, momentum, moisture fluxes; Operating longterm surface observing platforms; emerging technologies; Optimizing observing systems (TPOS2020, OOPC) |
| Sebastiaan Swart [M,Ch] | U. Gothenburg, Sweden | Heat, momentum and CO2 fluxes; Mixed layer physics; Operating autonomous surface platforms; Southern Ocean fluxes (SOFLUX) |
| Nadia Pinardi [F] | U. Bologna, Italy | Numerical ocean forecasting systems, surface air-sea fluxes in the Mediterranean Sea for coupling with atmospheric forecasts |
| R. Venkatesan [M] | NIO, India | Physics, Operational met, Capacity Building |
| Phil Browne [M,EC] | ECMWF, UK | Operational, Coupled DA |
| Warren Joubert [M, EC] | SAWS, South Africa | BGC, Capacity Building, Operational |
| Ute Schuster [F] | U. Exeter, UK | Ocean carbon cycle variability and biogeochemical drivers; operating long-term observational platforms |
| Christa Marandino [F] | GEOMAR, Germany | Climate-relevant trace gas air-sea exchange and surface ocean cycling, short-lived biogenic trace gases (e.g. DMS), SOLAS |
| Shuangling Chen [F, EC] | SIO, China | BGC, satellite estimation of air-sea CO2 flux |
| Clarissa Anderson [F] | Scripps IO, USA | Biological oceanography, integrated ocean observing, stakeholder capacity building |

**Ch:** Co-chair; **EC:** Early Career Scientist (3); **F:** female (6); **M:** male (4) – 4 Continents, 2 duplicate countries

# Atmospheric aerosol deposition as forcing factor for microbial ecology and biogeochemistry in the ocean
# **AEROS**

SCOR Executive Monitor
**Joyce Penner**

# Atmospheric aerosol deposition as forcing factor for microbial ecology and biogeochemistry in the ocean

## AEROS - Justification

- Mineral dust, sea spray, combustion black carbon rich and volcano ash particles are among the major global primary aerosols. Their role in climate forcing, e.g. by reducing albedo, or as nuclei for cloud condensation, is well recognized.
- Aerosols are constantly deposited into the ocean, where they release nutrients and toxins that can significantly influence microbial physiology, diversity and ecology. Aerosols can also increase the density of particles (ballasting), enhancing aggregation and absorbing organic matter, thereby influencing the carbon export into the deep sea.
- The impact of atmospheric deposition on biogeochemical cycles, and the response of the marine microbial community depend on the trophic status of the system and on the aerosol sources and deposition rates.
- This WG will: 1) Develop a database of the chemical composition of different aerosol types and their deposition rates to better identify knowledge gaps, and better constrain data for different ocean basins, 2) Establish a best practice booklet on sampling strategies and experiments with aerosols in order to improve the comparability of data, 3) Summarize data on the effects of aerosols on the microbial ecology and biogeochemistry of the ocean and 4) Use the expertise of participants of the WG to move beyond the current focus on specific types of aerosols, and attempt a more holistic approach to understand the effects of aerosols on the microbial ecology and biogeochemistry in the ocean.

# AEROS – Products and deliverables

1. A database with information on aerosol impact on ocean processes (ToR1), e.g. the BCO DMO (Biological and Chemical Oceanography Data Management Office) in the USA.

2. An open access best practices eBook (ToR2), e.g. an L&O eBook or SCOR booklet on sampling, experiments and specific analyses. This will include solids and soluble fractions analyses as well as microorganisms.

3. A review paper on the effects of aerosols on marine microbial ecology and biogeochemistry and their combined impact for the future ocean (ToR3 and ToR4) along with guidelines for future needs.

4. Attempt to come up with a global assessment of the combined role of the effect of different aerosols (ToR 5). If this is not possible, e.g. due to the lack of comprehensive data, we will strive to define the knowledge gaps needed to be overcome in order to allow for such an assessment.

# 10-minute BREAK

# Discussion of new Working Group proposals

# Wrap up for the day