



***Proceedings of the 2022 Annual Meeting of the
Scientific Committee on Oceanic Research
48th SCOR Annual Meeting, Volume 58, 2022***



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SUMMARY

This proceeding summarizes the discussions during the 48th SCOR Annual Meeting held in hybrid format from Busan, Korea, between the 4-6 of October of 2022. This proceeding also provides the links for all the background information for the meeting, including the proposals for new working groups, the reports from current SCOR working groups, projects, capacity development activities, and the reports of affiliated and partner organizations all of which were traditionally included in the SCOR Annual meeting background book until 2019. All of these can also be accessed online through the SCOR website at: <https://scor-int.org/events/scor-2022-annual-meeting/>.

The SCOR 2022 Annual Meeting was attended by 78 participants from 31 countries representing all continents. Of these, 22 participants from 11 countries attended on-site. Thirty-five Nominated members from 21 SCOR National Committees and the three affiliated bodies to the Executive Committee (IABO, IAPSO, IAMAS) attended the meeting. Within the framework of the SCOR 2022 Annual Meeting, a joint symposium on "Developing better capacity for Early Career Ocean Professionals (ECOPs)" was organized by SCOR, the North Pacific Marine Science Organization (PICES) and KIOST. In this joint session, members of the three organizations presented scientific highlights and discussed opportunities for ECOPs to be engaged within the UN Ocean Decade, SCOR and PICES.

All SCOR Working Groups, research, infrastructural, and affiliated projects, along with the affiliated and partner organizations reported on their activities. Some of the main highlights of the SCOR 2022 Annual Meeting include: (1) the renovation of some members of the SCOR Executive Committee through elections and recruitment of a new early career co-opted member, (2) the approval of two new Working Groups (WGs), (3) the high productivity of SCOR working group and project activities, and (4) SCOR's contribution to the UN Ocean Conference and to the UN Decade of Ocean Science for Sustainable Development.

With regards to the renovation of the SCOR Executive Committee members, Peter Croot (UK/Ireland) was elected Secretary of SCOR (2022-2026) to replace Paul Myers (Canada), Ilka Peeken (Germany) was elected Vice-President (2022-2024) to replace Jing Zhang (Japan), and Wee Cheah (Malaysia) was appointed as the early career co-opted member (2022-2024) to replace Charlotte Laufkoetter (Switzerland).

The two new WGs proposals approved were: (1) SCOR WG 166, Developing resources for the study of Methylated Sulfur compound cycling PROCesses in the ocean (DMS-PRO) and (2) SCOR WG 167, Reducing Uncertainty in Soluble aerosol Trace Element Deposition (RUSTED). DMS-PRO will establish oceanographic multidisciplinary collaboration focused on the oceanic biogeochemical sulfur cycle and will be co-chaired by Martí Galí (Spain) and Daniela del Valle (Argentina). RUSTED will focus on assuring the quality of trace element solubility data from aerosol leaches and improving the handling of aeolian soluble iron in Earth System models and will be co-chaired by Rachel Shelley (UK), Douglas Hamilton (USA), and Morgane Perron (France).

The SCOR community continued to make significant progress in the last year despite the challenges and the SCOR Working Groups and large-scale projects altogether organized more than 120 virtual meetings throughout the year with some of the Working Groups and projects being able to meet in person again. The SCOR community also made remarkable scientific progress publishing almost 1000 scientific papers between 2021 and 2022.

SCOR continued to support capacity development activities by extending support to the visiting scholars approved for travel in 2020 and 2021, and approving three new scholars to travel in 2022.

In 2022 SCOR also made an Exceptional Call for Early Career Scholars and Fellows and eight applicants were selected. SCOR has continued to approve funding applications from conference organizers to support travel for scientists from developing countries to attend these conferences and previous commitments acquired in 2020 and 2021 were honored by SCOR as the conferences were rescheduled.

The 2023 SCOR meeting is scheduled for 17-19 of October 2023 in Guayaquil, Ecuador, hosted by the Instituto Oceanográfico y Antártico de la Armada del Ecuador (INOCAR). The 2024 SCOR annual meeting will be hosted by the China SCOR Committee who will also celebrate 50 years of its establishment.

Narrated presentations reporting on SCOR project and working group activities and progress in 2022 can also be found in the SCOR YouTube channel.

<https://www.youtube.com/channel/UCv-dZLizFYDOC2UTweiWj0Q/videos>

LOGISTICS OF THE SCOR 2022 VIRTUAL MEETING

The SCOR 2022 Annual Meeting was the first SCOR annual meeting to be held in a hybrid format in the aftermath of the COVID-19 global pandemic and still subject to some travel restrictions. In this new hybrid modality, participation was either in person, through remote connection, or by sending a recording. This required significant preparation and scheduling along with special logistics to make the timing for each of the presentations as reasonable as possible within the presenters time zone if connecting remotely. The sessions went throughout three days. On the first day, the agenda topics included the reports from the SCOR President and from the Executive Director, the report by the Ad Hoc 2021 Finance Committee, the results of the SCOR officer's elections, the presentation and discussion of new SCOR working group (WG) proposals, and the presentations by the affiliated organizations IABO, IAPSO and IAMAS. On the second day, the agenda topics included the reporting of all current SCOR working groups and research projects. These were scheduled in groups according to the time zones of the presenters with allocated blocks for those presenting from the Americas, those presenting from Asia and Australia, those presenting on-site, those that sent recordings, and those presenting from the UK and Europe. On the third day, the agenda topics included the reports from affiliated projects, partner organizations, SCOR capacity development activities, and setting the venues for the next SCOR annual meetings.

In preparation for the hybrid meeting, the logistics were organized as follows:

All written reports and documents were available in advance at the SCOR website (<https://scor-int.org/events/scor-2022-annual-meeting/>) along with the summary slides of each of the presentations, either remote or on-site.

The content of the summary slides of each presenter included a synthesis of within 4-5 slides with the main highlights of the year, and the required actions for a maximum of an 8-10-minute intervention and 3-4-minute for discussion and questions. The summary slides for the new WGs included the Terms of Reference, membership and a summary of the reviews/recommendations by the national SCOR committees and affiliated organizations.

All the summary slides for each session were compiled by the SCOR Executive Director and these were projected from the master computer at the meeting room to avoid for multiple sharing screens.

All participants had to register for the meeting and this gave an indication of how many people would be either in person or connecting for each of the days, helping to plan the connection platform (e.g., Zoom). The meeting was chaired by Sinjae Yoo, the SCOR President, and the notes were taken by Paul Myers, the SCOR Secretary.

1. INTRODUCTION

1.1. Opening remarks and arrangements

Sinjae Yoo, the SCOR President opened the annual meeting and welcomed the participants (on-site and online) to Busan. He provided an overview of the agenda and logistics of the meeting. No further additions to the agenda were suggested except for the inclusion of time for a presentation of the new project BioGeoScapes requested by Alessandro Tagliabue from the UK National Committee and member of the GEOTRACES Scientific Steering Committee (SSC). The agenda along with all written reports, documents and narrated presentations from WGs, projects and affiliated organizations were available at the SCOR website (<https://scor-int.org/events/scor-2022-annual-meeting/>) to be reviewed before the meeting. During this hybrid meeting, there were 8-10-minute presentations by Working Groups, projects and partner organizations representatives showcasing

the main highlights and the required actions. When a representative was not participating in the meeting, the updates were provided by the appointed liaison Executive Committee member.

The new WG proposals were available on the SCOR website (see link above) and each was presented by a member of the SCOR Executive Committee who also presented the summary of the reviews and recommendations provided by the SCOR National Committees. Yoo thanked the Executive Director for organizing the virtual meeting.

In Memoriam

SCOR pays tribute to the life and contributions of eight members of the oceanographic community who passed away in the last year:

Philip Roy Pugh, UK († 24 November 2021)

Philip Roy Pugh was Emeritus Professor at the National Oceanography Center (NOC) in the UK. He was a full member of SCOR Working Group #87 on Fine-Scale Distribution of Gelatinous Planktonic Animals established in 1986. During his incredible career, and even after his retirement in 2004, most of Phil's work was on siphonophores, a group of cnidarians. Phil described a quarter of all known siphonophores (43 new species), more than anyone who has ever lived. His reviews and taxonomic syntheses were extremely important as they brought order to several confused siphonophore families, stimulating further discovery. During his long career, Phil took part in over 50 research expeditions and published more than 100 papers and reports, becoming the world authority on siphonophores (a title he retains to this day).

Raymond Pollard, UK († 14 December 2021)

Raymond Pollard was a physical oceanographer affiliated to the National Oceanography Center (NOC) in the UK and a member of the Scientific Steering Committee of the Integrated Marine Biosphere Research (IMBeR) program from 2004-2006. He led the formation of the James Rennell Centre for Ocean Circulation in 1989 to deliver the World Ocean Circulation Experiment (WOCE), which integrated observations and ocean modelling. This ultimately led to the Institute of Oceanographic Sciences (IOS) moving to the then newly built Southampton Oceanography Centre in 1995, which would later become the National Oceanography Centre.

Raymond led numerous major seagoing expeditions, some of which include the Crozet Islands and in the Southern Ocean and Southwest Indian Ocean. Raymond was also an innovator, creating new measurement techniques and playing a crucial role in the development and use of towed undulating CTDs. He was also an early user of Acoustic Doppler Current Profilers (ADCPs) and he played a critical role in bringing scientific computing onboard ships – most notably on the RRS Discovery – to process the vast quantities of data quickly and to adaptively adjust sampling to what was developing in the ocean.

Robie Macdonald, Canada († 13 February 2022)

Robie was a Senior Research Scientist with Fisheries and Oceans Canada, Institute of Ocean Science and adjunct professor at the University of Manitoba's Centre for Earth Observation Science. Robie was actively involved in the Canadian SCOR National Committee (CNC-SCOR) for over a decade, beginning in 2002. He was the Canadian Chair from 2009-2012. Rob also played a significant role in shaping the present form of the Canadian National Committee, broadening its membership across the country, and including more university academics on the committee. His great intellect, multidisciplinary expertise, and ability to make connections and see the 'big picture' meant that over his long career Robie conducted, spearheaded, and published ground-breaking research in areas such as marine geochemistry, oceanography, and contaminant sciences. His contributions to the

work of the Arctic Monitoring and Assessment Programme (AMAP) covered a range of issues: contaminants including mercury and POPs, climate change, Arctic Ocean acidification and the melting of the Arctic cryosphere. He conceived and led the first AMAP assessment addressing the impacts of Arctic climate change on contaminant pathways.

Viktor Akulichev, Russia († 27 February 2022)

Viktor Akulichev was an Academician of the Russian Academy of Sciences, Professor, and Doctor of Physical and Mathematical Sciences. He was a Russian Nominated Member for SCOR and Vice President of the Executive Committee of SCOR from 2004-2008. He was also an associated member of Working Group #96 on Acoustic Monitoring of the World Ocean established in 1991. For many years, Viktor Akulichev was the director of the Pacific Oceanological Institute of the Russian Academy of Sciences. He created a well-known scientific school on ocean acoustics and hydrophysics in the Far East, and he headed the Department of Hydrophysics at the Far Eastern State University. In 2008, he was elected President of the Russian Acoustic Society. He was a full member of the American Acoustic Society (since 1989), a member of the Russian National Committee on Theoretical and Applied Mechanics, a member of the Interdepartmental National Oceanographic Commission of the Russian Federation.

Timothy (Tim) Parsons, Canada († 11 April 2022)

Tim was a retired professor from the University of British Columbia in Canada. He was the chair of Working Group #24 on Estimation of Primary Production under Special Conditions established in 1964 and jointly sponsored by SCOR and the International Biological Program (IBP). He was also the Vice-chair of Working Group #85 on Experimental Ecosystems established in 1986, as well as an Ex-officio member of the SCOR Executive Committee from 1976 to 1982 as President of the International Association for Biological Oceanography (IABO). He became a Fellow of the Royal Society of Canada in 1979 and an Officer of the Order of Canada in 2005. In 2001, he became the first and only Canadian to receive The Japan Prize (Japan's equivalent of the Nobel Prize) for his work in biological and fisheries oceanography. In 2005, the Dept. of Fisheries and Oceans established a medal in his name, the Timothy R. Parsons Award, which is awarded annually to an outstanding scientist in ocean sciences.

Jordi Garcia-Orellana, Spain († 5 July 2022)

Jordi was a professor at the Department of Physics of the Autonomous University of Barcelona in Spain. He served as member of the GEOTRACES Scientific Steering Committee from 2011 to 2016. Jordi's research focused on using radionuclides to study the oceans, leading research on the biological carbon pump and on dating of sediment cores to assess marine pollution, and on assessing the accumulation and distribution of radionuclides in Naturally Occurring Radioactive Material (NORM) industries. For the last two decades, he was a driving force on the research on submarine groundwater discharge in coastal areas using radon and radium isotopes. At the University, he taught both at the undergraduate and graduate levels and had numerous management roles.

Myriam Sibuet, France († 26 July 2022)

Myriam was a deep-sea researcher and a pioneering woman in science. She led numerous cruises and led the deep-sea lab at IFREMER for years. Myriam was a member of the Scientific Steering Committee of the Census of Marine Life, a decadal program affiliated to SCOR between 2000 and 2010. She was also a full member of Working Group #76 on Ecology of the Deep-Sea Floor established in 1983. Myriam was a meticulous echinoderm taxonomist and deep-sea ecologist. With

the discovery of cold seeps on continental margins in the late 80s, her career had a turning point as she focused on topics such as chemosynthesis, biodiversity, ecology, and other processes in these rare and heterogenous ecosystems. Myriam was always pushing for methodological improvements and technological innovations from beam trawl to submersibles. Myriam first dived in a submersible in 1976 during a technical test of Cyana, and she later contributed to the specifications of the submersible Nautille and the ROV Victor 6000. Myriam has been instrumental for the development of deep-sea science, in France and beyond. She was an example who marked us with her curiosity, her dynamism, her team spirit, and her humanity.

David Pugh, UK († 1 August 2022)

David Pugh was an Emeritus Fellow at the National Oceanography Center (NOC) in the UK. In 1984, David became Head of Oceanography, Hydrology and Meteorology for the UK Natural Environment Research Council (NERC). Part of that work involved serving as Secretary to the UK Government Inter-Agency Committee on Marine Science and Technology (IACMST) from the early 1990s until 2003. David spent considerable time working on international aspects of oceanography, including leading the UK delegation to the Intergovernmental Oceanographic Commission (IOC) Assemblies, and becoming the Chairman of IOC in 2003-2007. He contributed much to the planning of IOC's 50th anniversary in 2010 and, linked to this, co-edited the book "Troubled Waters", which identifies the challenges facing international marine science and IOC's position within the UN system. The book explained how governments use science to establish ocean policies in issues such as marine pollution, exploitation, and hazards. SCOR, through former Executive Director Liz Gross led the book chapter on non-governmental organizations.

Michio Aoyama, Japan († 5 September 2022)

Michio Aoyama was a Visiting Professor at the University of Tsukuba since 2019 and before that a Professor at the Institute of Environment Radioactivity at Fukushima University. Michio contributed extensively to a variety of activities across marine biogeochemistry and radioactivity. He was a full member of SCOR WG #146 on Radioactivity in the Ocean which revisited progress 50 years after the first SCOR WG was established in 1959 on this topic. He was the co-chair of SCOR WG #147 working on the comparability of global oceanic nutrient data (COMPONUT) harmonizing global oceanic nutrients observations and data, and a member of the Scientific Steering Group of the International Carbon Coordination Project (IOCCP) from 2013 to 2018 focusing on Nutrients Essential Ocean Variables for achieving global consensus on obtaining comparable and accurate nutrients data. His inexhaustible energy in organizing large international workshops, several global inter-comparison exercises and eventually successful lobbying for development, production, distribution and use of nutrients Reference Materials, changed our ability to understand the geochemistry of deep oceanic waters in relation to carbon and dissolved nutrients.

A minute of silence was observed.

1.2. Report of the President of SCOR

Sinjaee Yoo informed of his activities for SCOR since the 2021 SCOR Annual Meeting held virtually in October 2021. Due to the pandemic, most meetings were held on-line during the first half of the year. Yoo gave a keynote speech on SCOR's activities to support blue economy at the 3rd Research Symposium on "Aquatic Research for Prosperity of the Nation" held in November 2021 at the Ocean University of Sri Lanka. Sri Lanka had an intention to join SCOR, but Sri Lanka's joining was delayed due to its economic crisis. In December 2021, Yoo gave a talk introducing SCOR's scientific activities at the Pohang University of Science and Technology, Korea. In June 2022, the 55th Executive Assembly of IOC was held in Paris. Yoo attended this meeting held offline after two years' break. In 2021, Yoo reported that SCOR was participating in the proclamation of an International Year of Basic

Sciences for Sustainable Development (IYBSSD) as a member of its SSC. IYBSSD was inaugurated successfully in July 2022 to be continued for a year.

See document: https://scor-int.org/wp-content/uploads/2022/09/Report_President.pdf

1.3 Report of SCOR Executive Director

The SCOR Executive Director (SCOR ED), Patricia Miloslavich reported on the current condition of SCOR and on her activities for SCOR since the 2021 Annual Meeting.

Miloslavich reported that the SCOR community currently has around 630 active members involved in WGs and project Scientific Steering Committees (SSC) representing 59 countries and five continents, with the USA, the UK, Germany, and Australia, having the largest number of involved researchers followed by France, Canada, and China. Around 43% are female scientists and 57% are male scientists. Nominated members were renovated in Brazil, Canada, Chile, Finland, Israel, and the UK SCOR National Committees. Portugal joined SCOR as a new member in 2022.

Several members of the SCOR community received international recognition for their work. Marie A. Sicre (France) received the Emile Girardeau 2022 of the Académie de Marine; Frank Muller-Karger (USA) received the 2021 William T. Pecora Award, Vanessa Hatje (Brazil) was awarded the 2022 Paul Gast Lecturer, and Lynne Shannon (South Africa) received the 2022 Gilchrist Memorial Award.

Miloslavich summarized the meetings held by the SCOR WGs and projects, which were mostly held online. In summary, 12 of the 19 WGs met this year, organizing 62 online meetings and 7 in person meetings. Of these, 7 meeting reported the participation of early career scientists adding to more than 100 early careers across all the meetings. All projects held their SSC meetings as well as their technical group meetings and the GlobalHAB, GEOTRACES, and SOLAS SSC were able to meet in person this year. Miloslavich attended all the project's SSC online meetings and provided secretarial support to the review panels for SOLAS and IMBeR, and for the SOOS new Science and Implementation Plan (SIP) which were completed in 2022. Miloslavich reported on some SSC renovations or IPO changes taking place in the projects GEOTRACES, IMBeR, IQOE, IIOE-2, GlobalHAB, SOOS, and the JCS. Overall, the SCOR WGs produced 32 scientific publications in 2021-2022, and the projects reported altogether more than 900 publications in this period.

The SCOR Executive Director has continued to make efforts to increase the visibility of SCOR through social media, significantly increasing the number of followers for Twitter and Facebook, producing online Newsletters, and frequently updating the News section on the website. This year, SCOR produced two videos (long and short version), a SCOR flyer, and a SCOR photo gallery of the community in action. These resources can be accessed through the SCOR website under "Publications" (<https://scor-int.org/work/publications/>). SCOR has also a collection in the platform AquaDocs to upload and give further visibility to its documents (e.g. annual proceedings). The SCOR Secretariat has also been very active at international meetings, participating and or giving presentations about SCOR at the 2nd International Science Council (ISC) assembly (October 2021), opening the Blue Economy Conference (November 2021), at the OceanKAN sponsors meeting (December 2021), to the WIOMSA secretariat (December 2021), at the China SCOR Annual meeting (December 2021), at the 2022 POGO Annual Meeting (January 2022), a virtual booth with videos at the Ocean Science meeting (February 2022), at the Elgin High School Illinois (February 2022), meeting with PICES Executive on SCOR-PICES collaboration (March 2022), at the Southern Ocean Decade webinar (April 2022), at the National Institute of Oceanography (NIO) in Pakistan and to the Karadeniz Technical University (Turkey) (June 2022), presented at the Incheon International Ocean Forum (IIOF2022) in Korea (July 2022), met with World Ocean Summit representatives (August 2022), at the MER Community Summit held in Bilbao, Spain (September 2022), at PICES meeting

events (October 2022) and at 9th Future Ocean Scientists Workshop held in Busan, Korea (October 2022).

With regards to policy, the SCOR Secretariat participated at the IOC Executive Council EC55 providing Statements for Agenda items 3.5.2 on the status of IOCINDIO, and 4.1. on the UN Decade of Ocean Science for Sustainable Development. SCOR also provided a statement at the plenary session of the UN Ocean Conference held in Lisbon, Portugal (June-July 2022) as well as co-organized two side events and was invited to dialogue with the President of the UN General Assembly, Abdulla Shahid. Additionally, SCOR signed an MOU with ICES on scientific collaboration.

Miloslavich also reported on SCOR activities endorsed by the UN Ocean Decade. WG 162 OASIS and GEOTRACES were an endorsed project and an endorsed contribution respectively. WG 159 DeepSeaDecade is a contributor to the endorsed program Challenger 150, the IOCCP is a contributor to five endorsed programs related to ocean observations, oxygen and acidification. SOOS contributed to the Southern Ocean Action Plan for the Decade which is an endorsed activity, and the IMBeR ClimEco 7 is an endorsed activity. WG 157 MetaZooGene is an endorsed action of the endorsed project marine Life 2030, and IMBeR and SOLAS are contributing to the endorsed project Ocean Negative Carbon Emissions (ONCE). SCOR WG 153 FLOTSAM on floating litter is working together with GOOS, Copernicus and other organisations towards developing a global observing system for debris (IMDOS) to be proposed as a UN Ocean Decade program, and the IIOE-2 is seeking endorsement.

With regards to finances, Miloslavich reported that dues income from memberships was on ~85%. The membership fees 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 on a 'no cost' extension for an NSF three-year grant and on the first year of another three-year grant to fund these scientific activities. SCOR provided the final report for an NSF three-year grant to support capacity development activities and is currently on the second year of another three-year grant to support capacity development in ocean sciences. The 2021 audit found no issues and financial statement disclosures are "neutral, consistent, and clear" and "in accordance with accounting principles generally accepted in the USA". Due to the COVID 19 situation, the 2022 budget was underspent.

Other activities of the SCOR Executive Director included (1) co-authoring several publications (e.g., Marine Invertebrates, in *The Living Planet: The state of the World's Wildlife*; Developing capacity for ocean science and technology, in *Blue Economy - An Ocean Science Perspective*, contributed to the Southern Ocean Action Plan for the Decade, and two journal publications in 2021 in *Marine Policy* and in *Ocean & Coastal Management*), (2) to be in advisory boards, committees or reviewer for the NASEM/ACAL project *Connections to Sustain Science in Latin America*, supported by the Lounsbery Foundation; for the 1st Interim Report of the Nautilus project, and for the *Planning an Ocean Sound Decade*, supported by the Lounsbery Foundation and coordinated by the Consortium for Ocean Leadership. Miloslavich was also selected as an interviewee for the MARIPOLDATA project about the *Politics of Marine Biodiversity Data: Global and National Policies and Practices of Monitoring the Oceans*, an ERC project led by Dr. Alice Vadrot, University of Vienna. She also gave an interview to MONGABAY LATAM (Peru) on occasion of the World Environment Day.

In addition to activities related to SCOR organization, administration and finances, project and WG management, communication, outreach, and other community services, Miloslavich regularly has communication with Ed Urban on SCOR administration and finances.

Full report: https://scor-int.org/wp-content/uploads/2022/09/SCOR_ED_report_2022.pdf

1.4 Results of the 2022 Election for SCOR Officers and selection of the Early Career Scientist

Marie Alexandrine Sicre chair of the Nominating Committee presented the process and outcomes of the 2022 elections for SCOR Officers. The SCOR President and all three Vice-President positions were open for nominations for the 2022 elections. The Nominating Committee composed by Past-President Marie Alexandrine Sicre (France), Samuel Mafwila (Namibia), Constanza Ricaurte Villota (Colombia) and Peter Burkill (UK) reviewed the nominations, prepared a final slate of candidates, and confirmed their availability to serve in the SCOR Executive Committee. The slate of candidates was sent to all nominated members for their comment and/or approval. Miloslavich received approval responses from Canada, Germany, Ireland, Israel, Korea, New Zealand, Poland, Switzerland, UK, and the USA in advance to the annual meeting. Australia, Chile, China, Colombia, Finland, Italy, Japan, and Portugal approved the slate at the annual meeting.

The newly elected positions were: (1) Ilka Peeken (Germany) as a new SCOR Vice-President replacing Jing Zhang (Japan), and (2) Peter Croot (Ireland) as the new Secretary replacing Paul Myers (Canada).

With regards to the selection of the Early Career Scientist as a co-opted member to the SCOR Executive, Patricia Miloslavich informed that 29 applications from 22 countries to the position of Early Career Scientist (ECS) to the SCOR Executive Committee were received (38% women and 62% men). Each applicant was reviewed by three members of the EC and the reviews were ranked. The top four candidates (from Canada, Spain, South Africa, and Malaysia) were interviewed by SCOR President (Yoo), Secretary (Myers) and Past-President (Sicre), moderated by the SCOR Executive Director (Patricia Miloslavich). The selected applicant was Dr. Wee Cheah (Malaysia) currently working at the Institute of Ocean and Earth Sciences (IOES), University of Malaya, Kuala Lumpur. His research focuses on changes in the atmosphere and ocean, and how these changes are regulating the marine ecosystems. His research involves a combination of tools from field observations, satellite remote sensing to numerical modelling. The SCOR EC welcomed Wee Cheah and acknowledged Charlotte Laufkoetter, the former Early Career Scientist to the SCOR EC for her contributions and service to the SCOR Executive Committee.

The final composition of the 2022-2024 SCOR Executive Committee is:

President, Sinjae Yoo (Korea)

Secretary, Peter Croot (Ireland)

Past President, Marie Alexandrine Sicre (France)

Vice-Presidents Ilka Peeken (Germany), Bradley Moran (USA), Stefano Aliani (Italy)

Ex-Officio Members: IABO-Enrique Montes (USA), IAMAS-Joyce Penner (USA), IAPSO-Trevor McDougall (Australia)

Co-Opted Members: Wee Cheah (Malaysia), Jacqueline Uku (Kenya)

See nomination and selection process at: https://scor-int.org/wp-content/uploads/2022/03/2022-Call-for-Nominations-for-SCOR-Officers_rev.pdf

Bio of the SCOR Executive Committee 2022-2024 at: <https://scor-int.org/scor/about/officers/>

1.5 Report from the ad hoc Finance Committee

The Finance Committee (FC) reviews the administration of SCOR finances during the previous fiscal year and the current year and will propose a budget for 2023 activities and dues for 2024. Members of the 2022 Finance Committee (approved by the Executive Committee through email consultation on the 15th of July 2022) were Peter Croot (Ireland), Fátima Abrantes (Portugal), Brett Molony

(Australia), and Heidi Petersson (Finland). The documents reviewed by the committee were (1) the SCOR 2021 auditor's report (late delivery by the auditors), (2) the final vs actual 2021 budget, (3) financial reports and charts from the Secretariat, (4) the 2022 revised budget and draft of 2023 budget. Their tasks were to: (1) Retrospectively check year 2021 including the audit, (2) check the current 2022 budget and suggested revisions, (3) check projected budgets for 2023 and 2024 for affordability and realism.

The FC met online twice before the annual meeting to analyse and discuss the documents with the SCOR Executive Director Patricia Miloslavich and the SCOR financial consultant Ed Urban. Molony, on behalf of the FC explained there was a significant increase in cash balance at the end of 2021 due to underspending. The 2022 planned budget was on target to receive the majority of dues by the end of 2022 (except for the fees from the Russian Academy of Sciences due to the economic sanctions to Russia for the situation in Ukraine). The WG underspending was substantial in 2020-22 due to the pandemic and the move to online meetings. The FC also noted the increased costs of travel and that some WGs will likely meet face to face every other year. The FC recommended that the FC continues to meet virtually in the future prior to the SCOR annual meeting rather than in person at the annual meeting. Specific recommendations regarding the SCOR finances were: (1) to accept the 2021 audited SCOR budget and the 2021 revised budget, (2) that from 2024 dues incrementally increase by 3%, noting there has not been any increase in dues for several years, and (3) that the cash situation for 2022 allows for at least 2 new WGs to begin in 2023 (financial situation indicates it is highly likely to be able to fund 2 additional WGs in 2024).

Colombia and Chile noted that an increase in 3% in the membership fees starting in 2025 could represent a problem for them as developing countries, especially due to the added costs of paying in US currency. Japan expressed that they had had discussions regarding their membership and were considering changing to a lower category. To a question regarding how the shortfall from Russia due to the sanctions affected the future, Molony clarified that the 2023 budget had already been projected without this contribution.

Yoo thanked Molony and the rest of the FC. The auditor's report and the report and recommendations of the FC were accepted. The 3% increase for the 2024 membership will be noted on the SCOR website.

2. WORKING GROUPS

2.1. New Working Group proposals

The SCOR EC monitors for the proposed new WGs made a 12–15-minute presentation of the proposals summarizing the proposal and the recommendations from the reviews followed by 3-5 minutes for questions. Yoo explained the selection process: After each new WG presentation, there will time for a few questions, and after all the proposals have been presented, we will look at the rankings to see if there is a clear separation in the weightings. The target is to select 2 good proposals and have the agreement from the nominated members.

2.1.1. Towards best practices for Measuring and Archiving Stable Isotopes in Seawater (MASIS)

Seawater stable isotopic composition and the carbon isotopic composition of dissolved inorganic carbon are essential ocean tracers that have been widely measured since the 1960s. They are particularly important to measure well in times of wide-spread changes in the hydrological cycle, the

bio-geochemical cycles, as well as the anthropogenic carbon penetration and induced acidification of the oceans, because they serve as a fingerprint of these ongoing changes in the ocean. However, substantial issues of data collection, quality control, and compilation exist: common reference materials in seawater are not widely available, analysis methods have strongly diversified, and intercomparison exercises are lacking, to the extent that large differences exist between different data sets. These differences currently prohibit the community from making full use of the potential of stable isotopes to identify climatic changes.

This working group is dedicated to remedy the current issues of data collection, quality control, and compilation of stable isotopes in seawater. First, we will assess the validation stage of the available stable isotopic datasets, as well as corresponding metadata and where and how they are communicated. This effort will lead to a report of best practices from sample collection to measurement and quality control. Second, we will review methods for adjustment of biases in archives and reassess these biases. Third, we will work towards complementing existing databases, with particular effort on missing surface ocean sampling data, either discrete or continuous. In parallel with the aforementioned tasks/efforts, the working group will promote and carry intercomparison exercises, and will actively carry out capacity-building.

Jing Zhang summarized the proposal, as well as the comments from the SCOR National Committees and affiliated organizations. In general, most of the reviews considered this proposal timely considering that the study of the isotopes of hydrogen and oxygen of the water and carbon of the DIC, will allow less uncertainty about the changes that the ocean and its communities have experienced, as well as their relationship with environmental changes associated or not with climate change. Since currently, the data collection, analysis, and interpretation procedures are not uniform, comparisons and complementary analyses are challenging to interpret. However, there was the argument that while there is a long-standing use of stable isotopes to study various ocean processes, and proper attention to calibration and QC/QA protocols is important, the extent of data quality issues and lacking reference materials argued in this proposal did not rise to the extent to justify a SCOR WG. Also, while the background science was very important, the work plan was somewhat weak and missing international links and partnerships.

Some reviewers considered the ToRs to be focused and achievable, and thought it was particularly realistic to acknowledge that the WG would not be updating databases or producing data products, themselves, but rather providing guidelines to database managers. However, other reviewers argued that it was difficult to understand the sequence of the terms of reference as presented and that the proposal would benefit from clarifying how much the different ToRs overlapped each other and how much time was needed between completing one and proceeding to the next one when one depends on the other. For ToR 3 (year 2), experimental and field and lab work is required, and it was not clear where the fundings for this action would come from as SCOR does not support experimental work. If co-funding is envisaged, it should be mentioned. Some reviewers also noted that in general the ToRs were too ambitious, and that adding an intercomparison cruise within the next 2 years could be unrealistic. The reviewers also noted that the proposal needed a timeline of activities and deliverables and that how results will be presented are better articulated, beyond being presented at large international conferences and in publications.

With regards to membership, while the full composition of the WG considering full and associate members was gender balanced, the reviewers noted that the full members only had 30% of women. The under-representation of South America, Africa and Oceania is also something to be improved.

Some other comments were how would this working group overlap/complement the OCB working group on C isotopes and how it relates to other international bodies. The reviewers recommended that the WG involves the international database community more explicitly (e.g. since the reference

material and methods are currently set up in many laboratories worldwide it can be anticipated that this initiative could engage more groups), and advertise/engage via the GEOTRACES, IMBER and SOLAS communities. A final comment was the hope that some feedback may be made from numerical modelling of stable isotopes.

The reviews by national SCOR committees before the meeting yielded eight “must fund”, seven “may fund”, and five “do not fund”. The proposal was not selected for funding.

Full proposal at: <https://scor-int.org/wp-content/uploads/2022/05/MASIS-SCOR-WG-stableisotopes-10052022-V3.pdf>

2.1.2. Developing resources for the study of Methylated Sulphur compound cycling PROCesses in the ocean (DMS-PRO)

Organic methylated sulphur compounds (MSCs) play key roles in planktonic food webs as important carbon and sulphur substrates and as infochemicals that facilitate biological interactions. In addition, the oceanic emission of biogenic volatile MSCs (dimethylsulfide and methanethiol) to the atmosphere acts as a source of aerosols, which impact cloud formation and properties, and hence climate. Understanding the role of MSCs in the Earth system requires accurate rate measurements to capture the rapid biotic and abiotic cycling processes responsible for the turnover of MSCs in the surface ocean. However, we currently lack both standardized protocols for the analytical determination, and a quality-controlled database for process rate measurements of MSCs. Therefore, the DMS-PRO SCOR working group proposes to address these knowledge gaps by compiling a comprehensive, open-access database of quality-controlled, existing and future MSC cycling rates; and publishing standardized operating practices on analytical procedures involved in the determination of MSCs rates. The overarching goal of this proposal is to stimulate research on the oceanic MSCs cycle, building capacity, and sharing knowledge and skills with the oceanographic and Earth system science communities. The resulting work will actively engage diverse perspectives which will critically expand our current understanding of MSCs and our ability to predict their roles in a future changing ocean.

Marie Alexandrine Sicre summarized the proposal, as well as all the review comments. Most of the reviews assigned a must fund to this proposal. In general, most of the reviews considered this proposal timely and the terms of reference appropriate and achievable in the timeframe. The reviewers pointed out that the membership was not well balanced and suggested moving Damodar Shenoy (India) from Associate Member to Full Member. This would respond to SCOR’s policy of only funding travel for the full members (while there is an exception to this policy for the years 2022 and 2023 due to COVID restrictions in travel, it is quite possible that the policy will be reinstated in 2024). The reviewers also suggested the inclusion of a member from an African country and, given the topic of the WG, to bring some additional expertise on phytoplankton biology and physiology noting that phytoplankton invest around ~5% of their carbon fixation into DMSP synthesis. The inclusion of a sulphur modelling person was also suggested.

The reviews by national SCOR committees before the meeting yielded 15 “must fund”, four “may fund”, and two “do not fund”. The group was selected for funding with Ilka Peeken as the liaison to the SCOR Executive Committee.

Full proposal at: https://scor-int.org/wp-content/uploads/2022/05/DMS-PRO_SCOR_WG_Proposal_2022.pdf

2.1.3. Foraminifera in Extreme and Rapidly Changing Environments (FIERCE)

The information contained in foraminifera shells is essential in understanding Earth's past climate system. Yet, most foraminiferal proxies (indicators of, for example, temperature, productivity, chemistry) and calibration efforts have focused on tropical-subtropical planktic species that live primarily in the sunlit ocean. FIERCE aims to provide a robust synthesis of research methods to improve our understanding of the biology and ecology of planktic foraminifera living in more extreme and rapidly changing environments such as oxygen minimum zones, the ice-ocean interface, high-latitude, and 'deeper' habitats (below the mixed layer). Without this, foraminiferal proxies in these environments are anecdotal, limiting past reconstructions and future climate change projections. Moving forward requires a multi-disciplinary, international effort, incorporating state-of-the-art research methods and input from across the ocean sciences. FIERCE WG members will test and fine-tune state-of-the-art research methods for studying FIERCE species at an international workshop in Peru and with WG members in the Norwegian Arctic. The resulting best practice 'standard operating procedures' (SOPs) for studying FIERCE species will be published in an open access, online platform. The SOPs will be broadly applicable to all planktic species and many benthic foraminifera, which expands the outcomes of this project well beyond FIERCE species. Furthermore, by focusing on foraminifera from understudied habitats, we will close a critical research gap and extend foraminifera utility in the fossil record beyond the ocean's sunlit mixed layer. Given the interdisciplinary and international nature of our vision, a SCOR working group is the best and most practical choice to achieve the proposed goals.

Jacqueline Uku summarized the proposal, as well as all the review comments. In general, the reviewers found the topic to be timely because planktic foraminifers are an extremely important component of the pelagic marine environments that accounts for a large part of biogenic carbonate production and fluxes, thus playing a role in the global biogeochemical cycles. The proposed work also aims to provide a useful tool to help understand the implications of current global change and its resulting environmental processes.

However, some reviewers found that the topic as presented did not represent an advance in oceanographic understanding, as it was mostly focused on improving methodologies and making information available. They argued that the impact of the working group will depend on the uptake and use of the deliverables and outputs which is not clearly addressed in the proposal.

The following major points were discussed:

The proposal makes a clear case for why the study of FIERCE species has been comparatively anecdotal and lagged behind the study of species from more stable climatologies, but it was unclear how FIERCE would integrate its proposed development of SOPs with any current standards within the "non-FIERCE" areas of research, or if these SOPs also don't exist already, why it is only now and for FIERCE that SOPs are being proposed for this field of research.

Details around the collection and processing of samples were a bit unclear and left doubt as to the extent to which these objectives were achievable within the scope of a SCOR WG workshops. It might be something worth clarifying since the samples required for SOPs and standardized methods are at the heart of the proposal. It would also be good to have more clarity on where the open access materials, including videos, are going to be uploaded and hence ensure their long-term availability. A detailed list of locations of "Extreme and Rapidly Changing Environments" would be useful as well as more information about specific depth of foraminifera to be studied. The proposal refers to these deep waters as "beyond the mixed layer", leaving a very large range of depths which may include several thousand meters.

Regarding the budget, it was not clear how the activities not supported by SCOR would be funded. For example, whose travel is covered to the Peruvian workshop and from which funds. If the workshop is also aimed at early career scientists/students how is their participation ensured (travel scholarships?). The opportunity to apply/participate in an activity taking place in the Arctic is not clearly explained in the workplan. The target audience for the proposal for a global sustainable ocean observation program on forums was not identified, and it would help to know who was targeted at this level (funding agency, UN etc). The proposal cites work that would be done in the Benguela and Namibian OMZ's but the team does not include anyone from these countries as full or associate members. There is need to take up this opportunity and demonstrate how the partnership with Namibia Research Discovery camps envisioned particularly considering the inclusion of members from this region.

Finally, most of the members were experts on foraminifera, however it would be useful if there were members that are experts on the environment that affect foraminifera, i.e. the environment that FIERCE is aiming to describe.

The reviews by national SCOR committees before the meeting yielded 8 “must fund”, 5 “may fund”, and 9 “do not fund”. The proposal was not selected for funding.

Full proposal at: https://scor-int.org/wp-content/uploads/2022/05/FIERCE_SCOR_WPG_FINAL-with-appendix.pdf

2.1.4. Reducing Uncertainty in Soluble aerosol Trace Element Deposition (RUSTED)

The availability of iron and other trace elements (TEs) is central in controlling biological activity and CO₂ sequestration in many ocean regions. Atmospheric deposition provides an external source of TEs to the ocean, but most fluxes are currently poorly understood. To predict how ocean ecosystems respond to changes in soluble TE fluxes, it is vital that models represent and reproduce current TE distributions. This Working Group proposes to bring together a diverse group of experts from the ocean biogeochemistry and modelling communities to focus on assuring the quality of TE solubility data from aerosol leaches and improving the handling of soluble iron in Earth System models. This will be facilitated through the creation of a new, comprehensive database of atmospheric TE measurements taken across the world's oceans, allowing easier evaluation and calibration of global models than is currently possible. This WG is important and timely as the transfer of micronutrients and pollution across the air-sea interface is a current research priority of large international programmes such as SOLAS and GEOTRACES. Furthermore, this WG addresses many challenges laid out in the UN Decade of Ocean Science for Sustainable Development. Capacity building is at the heart of this proposal; the database will be open-access and a proposed workshop-seminar series will be held in India with the aim of widening participation and creating a strong, global network of scientists working at the air-sea interface. A SCOR Working Group is the only practical way to achieve the aims detailed in this proposal.

Charlotte Laufkoetter summarized the proposal, as well as all the review comments. In general, most of the reviews considered this proposal timely and the terms of reference appropriate and achievable in the timeframe. While most of the reviews were very positive, some noted that the WG would benefit greatly from the inclusion of an ocean modeller and/or an ecosystem scientist among its members. Another issue that was noted was the potential overlap with activities carried out by GEOTRACES and how will the WG link both to GEOTRACES and SOLAS. A final recommendation was

that the SOP's should be submitted to the Ocean Best Practices (OBO) platform to make them easily available and transparent in their development.

Given the importance that SCOR gives to geographic balance and the inclusion of developing countries in the full membership, it was suggested to exchange of an associate member from a developing country (e.g. South Africa or Taiwan) with a full member from a developed country (e.g. North America or Europe) to make sure members from developed countries have secured funding to attend the WG meetings.

The reviews by national SCOR committees before the meeting yielded 10 “must fund”, ten “may fund”, and two “do not fund”. The proposal was selected for funding with Dr. Marie Alexandrine Sicre as the liaison person to the SCOR Executive Committee.

Full proposal at: https://scor-int.org/wp-content/uploads/2022/05/SCOR-WG-proposal-2022_RUSTED.pdf

2.1.5. DEveloping Repositories for carbon FLUX quantification: Th-234 as a case study (DEPOFLUX)

The 234Th-238U radioactive pair has been extensively used to evaluate carbon fluxes in the upper ocean, the fluxes of other elements as well as other parameters such as the efficiency of the carbon exported from the surface ocean through the Biological Pump. Since the 70's, a large number of vertical profiles of 234Th have been collected using a variety of sampling instruments and analytical strategies that have changed along years.

An extensive global oceanic data set of 234Th measurements, including all the 234Th data in the published literature as well as non-published data up to 2019, was compiled by Ceballos-Romero et al. and published in open access in PANGAEA repository and discussed in Ceballos-Romero (2022) <https://doi.pangaea.de/10.1594/PANGAEA.918125?format=html#download>.

The amount of 234Th data collected can be used to address key questions on carbon export on a basin or global scale. To achieve this, it requires us to have an extensive dataset that brings together all available observations in a robust, consistent, and accessible manner. We aim to make the 234Th dataset a growing data compilation, open to the participation and improvements by the whole thorium community, updated yearly and used in as many applications as possible, broadening its scope and including estimations of Particulate Organic Carbon (POC) export fluxes, among others. And most important, we would like to use this thorium repository as a seed to grow a wider repository of carbon flux estimates in the ocean.

This will be the first coordinated effort to generate a global, standardized, and comprehensive repository of all existing 234Th data in the ocean. DEPOFLUX main goals are i) the creation of a web repository to host an updated compilation of 234Th data and metadata, from the first 234Th measurements, up to present and into the future. This repository would be user friendly, CQ checked, accessible, easy to upload/download, visible to the community and will serve as a focal point for the thorium community, modellers and flux evaluation experts ii) The development of the first approach to a forthcoming integrated harmonized repository of carbon flux results including variables, data and metadata from the different techniques that provide, direct or indirectly, measurements of the carbon flux in the ocean, such as sediment traps, particle imaging (e.g. underwater cameras) or gliders.

Brad Moran summarized the proposal, as well as all the review comments. In general, while the overall theme of the proposal of reducing uncertainty in ocean C flux measurements is a priority for the community, most reviews expressed concern with the need for a 234Th data base alone when

the community is truly focused on C flux measurements. There was also a concern that a very similar, if not identical, large, and comprehensive data base on ^{234}Th was recently compiled and published in 2022 (lead author is WG co-chair Ceballos-Romero), and perhaps it was too soon to be trying to update it. Although the data can potentially be used to estimate carbon flux, which is important for the climate system, the ambiguity in carbon fluxes derived from Th-^{234} measurements significantly limits their use in carbon cycling research.

There was a general consensus that a SCOR WG could be appropriate for this project, however the proposal was found to be lacking support in several important ways, i.e., lack of perceived need, limited intellectual focus on just ^{234}Th , and very importantly, the lack of diversity and geographic representation with no developing countries represented (there is just one person from China). If the team truly wants to enhance uptake of Th-^{234} methods in developing countries, they need representatives from such places who do research that could benefit from implementing these methods.

Some specific recommendations from the reviewers were:

The proposal presents only one concrete goal (to establish an independent, dedicated Th-^{234} database), which seems inappropriate for a SCOR working group. The other stated goals are too vague and poorly developed to generate confidence that they'd be accomplished in the short timeframe of the working group. The TORs appropriate for a SCOR working group might be # 5, 6, 7, and 9, and a reworked proposal focused on those kinds of activities might be worth resubmitting. The proposal requires more clarity as it was hard to separate what has already been done from what will be done going forward. In the summary, for example, the recently published 'extensive global oceanic data set of ^{234}Th ' is mentioned, but two paragraphs later it is contradicted by the sentence that this work will be the 'first coordinated effort' to generate such a data set. The reviewers believed that the big innovation here is to merge the ^{234}Th data with other measures of C flux, and to integrate all of this into a user-friendly web-based platform. This is a worthy goal, however a SCOR working group may not be the most appropriate for this, particularly since SCOR funding does not support computer / IT costs.

Previous efforts to compile ^{234}Th data are mentioned, but there is no mention of the limitations of these existing data bases. It would be good to articulate what is the challenge to be addressed. As noted above the focus on creating a web-repository is, perhaps, not best placed for a SCOR WG, unless additional resources can be secured to support the needed IT work. On the other hand, SCOR funding is useful to support some of the discussions outlined in the proposals around best practices for data collection / interpretation and devising a structure for a future data portal. In the proposed timeline of activities, it seems that some of the later activities would be more useful earlier in the program. For example, the discussions around QC, inclusion of new variables etc. designed for the 2nd meeting seem important prior to beginning the data update, which is planned to begin right at the beginning of the WG activities. Several of the proposed timeline entries are somewhat repetitive or vague, making difficult to follow a logical progression of proposed activities. The proposal would also benefit from a discussion of the outcomes from SCOR WG 116 to provide the background and justification for additional SCOR funding to keep the work on this topic going.

The reviews by national SCOR committees before the meeting yielded one "must fund", nine "may fund", and 12 "do not fund". The group was not funded.

Full proposal at: https://scor-int.org/wp-content/uploads/2022/05/WG_Proposal_DEPOFLUX.pdf

2.1.6. DYNamic Approaches for assessing Marine biota responses to fluctuating Oceans (DYNAMO)

Environmental fluctuations and their predictability play a fundamental role in determining diversity of species, communities, and assemblages in the ocean. Yet, fluctuations of the environment are often labelled as noise or ignored with the risk that effects of environmental change on organisms are mis-estimated. The DYNAMO (DYNamic Approaches for assessing Marine biota responses to fluctuating Ocean) will bring together a diverse community of scientists to advance research in fluctuating environments and provide standards for empirical research which will develop new actions for the effective management of marine ecosystems. Specifically, DYNAMO will quantify to what extent fluctuations of environmental drivers (i.e., temperature, oxygen, pH) and their predictability shape the marine benthic communities (i) physiology and (ii) ecological interactions. DYNAMO will (iii) be able to provide guidelines for appropriate ‘mimicry’ of environmental variability in controlled laboratory experiments and (iv) implement realistic models to account for organismal variation in fluctuating environments. Additionally, DYNAMO will (v) develop a set of new indicators to capture the ecologically relevant environmental variability and provide guidance on environmental data retrieval, analysis, and storage. Lastly, DYNAMO will (vi) ensure outreach with society, policymakers, and science communicators to produce peer-reviewed and media outputs to disclose the role of environmental fluctuations in shaping marine life and ecosystem services under changing ocean. By providing concrete evidence produced by qualified experts, DYNAMO will accelerate the transition towards problem-oriented and interdisciplinary science needed to build a new narrative for the ocean.

Enrique Montes summarized the proposal, as well as all the review comments. In general, the reviewers found the topic of ocean change magnified by anthropogenic drivers to be timely as climate change should increase variability and likelihood for extreme events, so understanding the impact of fluctuations and allowing for better predictability of ocean environments is important. However, the reviewers noted that there were aspects of the ToRs and the related working plan and deliverables that were vague, which somewhat obscured the feasibility of the proposal. For ToR1, it is not really stated which the gaps are that require novel approaches, or what these new types of measurements could entail. In a similar manner, for ToR2, it is not stated which the main technical challenges are, or what issues the novel experimental designs would solve. While it is understandable that these ToRs are related to the magnitude and predictability of fluctuations (and perhaps focus on scales, degrees of control etc.), the current ‘measuring challenges’ and ‘technical challenges’ are not described clearly in the working plan, nor are the theoretical advancements necessary. In addition, ToR3 would focus on ecosystem performance, whereas the described reviews seem to hone in on ecophysiology and individual responses scaled up to populations/communities. Both physiology and species interactions are highlighted in the summary, but the latter is not described to a sufficient degree in the proposal (antagonistic interactions? mutualistic?). For ToR 3 and 4, it is not clear what ‘creating a dedicated session’ refers to. Work on benthic systems and interactions is welcome, but it is not evident in the proposal what types of organisms, communities, habitats, or interactions, would be included. In addition, the proposal should formulate better how to distinguish evolutionary from compensatory responses to environmental fluctuations.

The reviews by national SCOR committees before the meeting yielded five “must fund”, eight “may fund”, and seven “do not fund”. The group was not funded.

Full proposal at: https://scor-int.org/wp-content/uploads/2022/05/Scor-WG-Proposal_V2022_DYNAMO_final.pdf

2.1.7. Impact of biotoxins on marine apex predators in Upwelling Systems (ToxMAP)

Unusual vertebrate mortality events may result from changes to the marine environment and those associated with harmful algae blooms (HABs) are increasing. Algal blooms can be exacerbated by human activity such as eutrophication and rising water temperatures linked to climate change. The ecosystem and public health threats posed by HABs are well recognised in some parts of the globe. For example, within the California upwelling system along the west coast of North America, the diatom genus *Pseudo-nitzschia* is known to impact fish, bird and marine mammal health, and result in shellfish fishery closures to protect human health. Although HABs are documented in eastern boundary upwelling systems in the Southern Hemisphere (e.g. Benguela, Humboldt), trophic effects in these systems are largely undocumented. In recent years there have been several unexplained mortality events affecting marine life across the Benguela Upwelling Ecosystem indicative of toxicosis via the biotoxin domoic acid (DA). Initial testing has identified DA in seals from South Africa (Gridley, unpublished data). This working group will establish connections between expert biotoxin scientists from regions where the effects are well understood, and those in the Southern Hemisphere where the impacts of biotoxin exposure are relatively unknown and only recently emerging. Expected outputs include knowledge transfer, training in optimal sampling and detection methodology, and collaboration on globally relevant scientific research articles. We will generate preparedness for toxic events affecting wildlife, aquaculture, and fisheries considering the climatic changes which are predicted to increase HAB occurrence and frequency across the globe.

Stefano Aliani summarized the proposal, as well as all the review comments. In general, many of the reviews considered this proposal timely considering that climate change has increased the occurrence of harmful algal blooms (HABs) throughout the world and that very few places, especially in the southern hemisphere, are equipped to respond to HAB events appropriately (e.g. the recent significant die off of Cape fur seals off the southern African coast where there was limited expertise to assess the situation and to respond appropriately). However, most of the reviews considered that the proposal needed further work before it can be supported as a SCOR Working Group. Some of the major points noted by the reviewers were the need to expand scope to be global, not just focused on a particular region (i.e. beyond Africa) and including other upwelling systems; to better describe the rationale for the need of international coordination as is characteristic a SCOR Working Group (i.e. provide the global perspective); to articulate the role of citizen science and provide details of the training; to expand membership to scientists from other upwelling areas and include members of well-established groups like GlobalHAB (SCOR/IOC) and of ICES, who provides regular advice especially with regards to human intoxication risks. The inclusion of members with expertise in remote sensing, in *Pseudo-nitzschia* taxonomy, and in eco/environmental toxicology was also suggested. Early career members should also be included and identified as such.

The reviews by national SCOR committees before the meeting yielded five “must fund”, nine “may fund”, and seven “do not fund”. The group was not funded.

Full proposal at: https://scor-int.org/wp-content/uploads/2022/05/ToxMAP-SCOR-WG-2022-Proposal_Gridley-et-al_Final.pdf

After the presentations of the seven new WGs, Patricia Miloslavich showed the rankings based on the reviews with DMS-PRO and RUSTED having the highest ranks. The nominated members agreed to fund these two proposals as new SCOR working groups.

2.2. Current Working Groups

A designated member of each working group or its liaison to the Executive Committee presented an update on working group activities and progress and made recommendations on actions to be taken.

The synthesis slides with the reports of the current SCOR WGs, as well as the Large-Scale Research and Infrastructural Projects as presented during Day 2 of the annual meeting can be found at the following link:

<https://scor-int.org/events/scor-2022-annual-meeting/>

2.2.1. WG 143 on Dissolved N₂O and CH₄ measurements: Working towards a global network of ocean time series measurements of N₂O and CH₄

Jing Zhang, liaison of WG 143 to the SCOR Executive Committee presented the progress of the group on behalf of Sam Wilson. In the past 12 months WG 143 has been working on the Standard Operating Protocols (SOP) for dissolved methane and nitrous oxide measurements. Draft documents have been posted on a publicly available website (<https://web.whoi.edu/methane-workshop/sops/>) for the community to comment on. They are now working with the OCB program to convert the word documents into reader-friendly pdfs that have consistent formatting. Completion of the SOP document has taken longer than originally timetabled. This is because the lead author, Sam Wilson, moved from the USA to UK and has been extremely busy. The coauthors have been very supportive, and the final editing has resumed. They requested to continue as a SCOR WG until the SOPs have been completed and this request was approved. Since the WG was established in 2013, it is expected that the WG will be disbanded in 2023.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/CH4-NO2-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG143-N2O-2022.pptx>

2.2.2. WG 145 on Chemical Speciation Modelling in Seawater to Meet 21st Century Needs (MARCHEMSPEC)

Simon Clegg presented the update for this group. WG145 is working towards the first release of freely available software for chemical speciation calculations, including uncertainty estimates, in late 2022. Full documentation of the chemical speciation models is in the process of publication: papers on artificial seawater and Tris buffers are published; a paper on the seawater electrolyte has been submitted for publication and a paper on the GEOTRACES core elements is in preparation. WG145 will have fulfilled its terms of reference with this first software release and will then be disbanded. To maintain a respected international affiliation for further development of the software and the model parameters, it has been proposed that the IAPWS/SCOR/IAPSO Joint Committee on the Properties of Seawater (JCS) establish a new Taskgroup on chemical speciation. JCS, SCOR and IAPSO have approved this proposal: a decision from IAPWS is expected this autumn.

SCOR endorsed the plan that WG145 continues as a task team under the umbrella of the Joint Committee on Seawater (JCS) as this will provide a continuing home for topics related to marine chemical speciation building on the work of WG145. Following on the recommendations derived from discussions between WG145 and IAPSO regarding the development of a permanent JCS web page separate from the TEOS-10 web page, SCOR approved that the 2023 budget of \$5K assigned to the JCS to support travel of the chair or other to the meetings may be used, if required, towards supporting the development of the website. Paul Myers also suggested that the CNC is contacted for further support since the website will most likely be hosted at the University of British Columbia.

Given that the group has found a long-term home at the JCS, the SCOR Executive Committee recommended that the WG is disbanded on 31 of December 2022 with the request that any products coming beyond this date and developed as WG145 include a full acknowledgement to SCOR and the SCOR NSF award. These include (but would not be limited to) the release of the software and the paper describing the trace element part of the software (no. 4 in the series) that are scheduled to come soon in late 2022 or early 2023.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/MARCHEMSPEC-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG145-MARCHEMSPEC-2022.pptx>

2.2.3. WG 148 on International Quality Controlled Ocean Database: Subsurface temperature profiles (IQuOD)

Paul Myers, liaison of WG 148 to the SCOR Executive Committee presented the updates on behalf of this group. Due to the pandemic, WG 148 only held virtual meetings. The paper describing work on benchmarking automatic quality control checks has been revised and is currently undergoing additional revisions following further comments from co-authors. In the past year, activity in the task team focussed on detecting duplicate profiles has increased. This collaboration has begun by understanding methods that are in use in different institutions.

Next year, the primary focus of IQuOD will be the publication of the paper describing benchmarking of automatic quality control checks. Once published, its recommendations for optimum sets of quality control checks will be applied to the World Ocean Database (WOD) to generate a new version of the IQuOD dataset. It is expected that other work will include developing training data and techniques for machine learning to improve quality control of data further, and continuation of the collaboration on detection of duplicate profiles. The WG is planning an in-person IQuOD meeting will next year. A one-year extension of the group was approved.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/IQuOD-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG148-IQuOD-2022.pdf>

2.2.4. WG 150 on Translation of Optical Measurements into particle Content, Aggregation & Transfer (TOMCAT)

Sarah Giering presented the updates of this group. Members of WG 150 TOMCAT are planning to host a 1-week summer school in Cape Town, South Africa. The summer school was originally planned for October 2020 but was postponed first to 2022 due to COVID-19 and now to 2023 due to the lack of volunteers to organize the course. The focus of the school is capacity building, so the teaching material will be accessible and hands-on with a focus on optical instruments that are affordable (< US\$ 2,000). The anticipated number of students is 20. SCOR has already kindly approved US\$ 5,000 for travel support of developing country scientist to attend the summer school. The WG requests that this travel support is carried over to 2023.

A one year extension of the group was approved to complete the summer school.

Full report: <https://scor-int.org/wp-content/uploads/2022/08/TOMCAT-2022.pdf>

Presentation: https://scor-int.org/wp-content/uploads/2022/12/WG150-TOMCAT_2022.pptx

2.2.5. WG 151: Iron Model Intercomparison Project (FeMIP)

Alessandro Tagliabue presented the updates of this group. The WG had no in person meetings and work has progressed offline. The WG reports to have fully completed their objectives 1-3, partially completion of Objective 4, and the work to complete objective 4 is underway completing the goals set by the WG. The WG requests approval to use the remaining funds for a writing workshop. The request was granted, expecting that the workshop and publication will take place in 2023 after which the group should be disbanded.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/FEMIP-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG151-FeMIP-2022.pptx>

2.2.6. WG 152 on Measuring Essential Climate Variables in Sea Ice (ECV-Ice)

Daiki Nomura presented the updates for this group. WG 152 members carried out a sea ice inter-comparison experiments for air-sea ice CO₂ flux and sea ice primary production in Cambridge Bay at the Canadian High Arctic Research Station (CHARS), May 2022. Based on the information obtained during ECV-Ice inter-comparison activities, the WG will start to create a guide of best practices hosted on the ECV-Ice website as a living document. The first entry will be the Miller et al. (2015) methodological review from SCOR WG 140, and the results of additional methods evaluations and intercalibrations will be added, as they become available. The Inter comparison experiment in the Cambridge Bay was the final ECV-Ice activity. A one-year extension of the group was approved to complete the products derived from the intercomparison experiment.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/ECV-Ice-2022.pdf.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG152-ECV-Ice-2022.pptx>

Video: <https://youtu.be/dOgXRHVXro>

2.2.7. WG 153 on Floating Litter and its Oceanic Transport Analysis and Modelling (FLOTSAM)

Stefano Aliani presented the updates of this group. The original WG 153 FLOTSAM group has grown to become a wide global network and ECOPs are an important part. ECOPs actively participate to WG works and designed and executed a virtual workshop on “The Future of Ocean Plastics: Designing Diverse Collaboration Frameworks”. The new efforts of FLOTSAM are toward the creation of an Integrated Marine Debris Observing System (IMDOS). IMDOS is based upon the FLOTSAM framework to dynamically integrate shoreline and at-sea in situ observations, remote sensing and numerical modelling (Maximenko et al., 2019). The idea has been thoroughly discussed with relevant people and organizations such as TGML, GEO Blue Planet, GOOS, UNEP, and IOCCG being clear that an observing system dedicated to plastic pollution does not exist yet.

FLOTSAM network of experts has the potential to grow and become the leading reference to the global program dedicated to Marine Litter observation that is so much needed. In the last year, the IMDOS interim Steering Committee was defined involving FLOTSAM people. IMDOS has been officially presented at UN Ocean Conference in Lisbon and the Interim Steering Committee is going to meet in the next months to plan future activities. The FLOTSAM leadership group asks SCOR to consider supporting the development of the IMDOS program. A possible practical contribution could be to allow the use of remaining FLOTSAM funds to support the participation of selected people to IMDOS planning events in 2022-23. The request to use the remaining SCOR funds to support FLOTSAM members to IMDOS planning events in 2023 was approved.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/FLOTSAM-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG153-FLOTSAM-2022.pptx>

2.2.8. WG 154 on Integration of Plankton-Observing Sensor Systems to Existing Global Sampling Programs (P-OBS)

Emmanuel Boss presented the updates for this group through a recording. WG 154 finalized, submitted, and published a manuscript focusing on the plankton measurements that have been and could be done on moorings such as those of OceanSITES and the data infrastructure that is needed to exploit them to the fullest. The manuscript includes, beyond a detailed account of available commercial sensors, a description of two polar mooring systems that have pioneered the use of such observations. A workshop for early career scientists funded by NSF (SCOR supported travel for two participants from developing countries) and including international participation focused on how to install, maintain, and analyse data from flowthrough systems instrumented with optical sensors (one of the focuses of our P-OBS report regarding GO-SHIP) took place the first week of August 2022. P-OBS has completed its terms of reference and deliverables and was disbanded.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/P-OBS-2022.pdf>

Video: <https://youtu.be/VJcgoYCCS5k>

2.2.9. WG 155 on Eastern boundary upwelling systems (EBUS): diversity, coupled dynamics and sensitivity to climate change

Ivonne Montes presented the updates of the group. WG 155 has held virtual meetings and several discussions by e-mail over the last months to make progress on the review article and in the modelling paper. Five of the WG members were involved in the organization of the EBUS conference that took place in September 2022 in Lima, Peru (<https://www.ebus-lima2022.com/>). The conference provided an opportunity to meet and see what new information could be incorporated into the two papers. The Summer School in Dakar in planning since 2019 and continuously postponed has been cancelled along with a meeting of the WG associated with this event. The EBUS conference was the major contribution from the WG. During the Conference, the WG held an in-person meeting to review pending tasks and set a strict timeline to achieve the TORS by mid-2023. Marie Alexandrine Sicre, the liaison of this group to the Executive Committee, expressed her concerns that some ToRs have not been met since the WG was approved in January 2018. The SCOR Executive decided that funding will be held until acceptance of the synthesis paper (ToR 1). While the most pressing issue for SCOR is the achievement of the paper the WG committed to finalize already two years ago, SCOR would also like to see an enhanced content of the WG website (ToR2).

Full report: <https://scor-int.org/wp-content/uploads/2022/07/EBUS-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG155-EBUS-2022.pptx>

2.2.10. WG 156 on Active Chlorophyll fluorescence for autonomous measurements of global marine primary productivity

Sinjaee Yoo as liaison to the Executive Committee presented the updates for this group. WG 156 has largely focused the past year towards completion of the “Best Practice” document – a key deliverable for many of our terms of reference – intended as a new central resource for existing and new ocean-based users of active chlorophyll fluorometry. A soft launch was held through a Town Hall event at ASLO Ocean Sciences 2022, and final edits are underway for a final community consult. Field work has begun to resume after lengthy delays and challenges from the global pandemic, where activities have centred on evaluating further improved practices in accurate retrieval of active chlorophyll fluorescence-based primary productivity across diverse environmental gradients. A

major new review article was published to synthesise how further developments in our field are transforming capacity to use active chlorophyll fluorescence as a measure of ocean health and productivity over space and time. The WG will begin planning an in-person meeting for 2023 to reconnect on key activities. In addition, it is anticipated some WG representatives (Oxborough, Schuback) will attend Ocean Optics XXV (Vietnam) in October 2022, in part to advance discussions of aligning active fluorometry measurements to remote sensing (and other optical) platforms. A one-year extension for the group was approved to complete their products.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/Chlorophyll-2022.pdf>

Presentation: not provided

2.2.11. WG 157: Toward a new global view of marine zooplankton biodiversity based on DNA metabarcoding and reference DNA sequence databases (MetaZooGene)

Junha Hirai presented the updates on behalf of this group. WG 157 members organized a special issue the ICES (International Council for the Exploration of the Sea) Journal of Marine Science entitled, Patterns of biodiversity of marine zooplankton based on molecular analysis, was organized (https://academic.oup.com/icesjms/pages/themed_sets). The WG members chaired a session at the 2022 Ocean Sciences Meeting, Zooplankton diversity through space and time, with significant participation of early career scientists and WG members as co-authors. MetaZooGene was endorsed as a new UN Ocean Decade Action (No.102.2) linked to Marine Life 2030 (<https://marinelife2030.org/>). An announcement is posted on the MetaZooGene website (<https://metazoogene.org/ocean-decade-action>).

WG157 members have organized and will convene a special MetaZooGene Symposium, New insights into biodiversity, biogeography, ecology, and evolution of marine zooplankton based on molecular approaches, in association with the ICES Annual Science Conference (Hybrid; Dublin, Ireland; September 23, 2022). The program currently includes 26 presentations, of which 14 are by Early Career Scientists (ECS), and 16 include WG157 members as co-authors (see: <https://metazoogene.org/planned/symposium2022>).

The recommendation was to continue to support the group as planned. The group has gone beyond deliverables and represents a good example how to engage with ML2030 and UN Decade. The WG has also been impressively productive in capacity development, with large number of early career scientists involved and successful in securing additional money to provide awards for students to attend conference.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/MetaZooGene-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG157-MetaZooGene-2022.pptx>

Video: <https://youtu.be/sXouqscYM4w>

2.2.12. WG 158: Coordinated Global Research Assessment of Seagrass System (C-GRASS)

Stefano Aliani, the liaison of this group to the Executive Committee presented the updates for this group. Over the last year WG 158 has made significant progress on several goals: (1) Synthesized data from around the world, including curation and QAQC of the global SeagrassNet database, toward a comparison of remotely sensed versus in situ monitoring of changes in seagrass density, the first MS from which should be submitted in 2022; (2) Worked with the Global Ocean Observing System toward formalization of the seagrass Essential Ocean Variable specifications and Darwin-

Core-based data schema; (3) Worked with the World Seagrass Association toward incorporation of C-GRASS themes into the renovated WSA website to appear in 2022. A major activity this year was the first in-person C-GRASS workshop held in association with the bi-annual International Seagrass Biology Workshop in Annapolis, MD, USA, on 13-14 August 2022. The WG hosted approximately 10 members of the C-GRASS working group at the workshop, along with several associates, to advance these continuing goals, develop additional MSs, and to discuss proposals for extending C-GRASS themes and collaborations beyond the scope of the SCOR working group. The recommendation was to continue to support the group as planned.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/C-GRASS-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG158-C-GRASS-2022.pptx>

2.2.13. WG 159: Roadmap for a Standardised Global Approach to Deep-Sea Biology for the Decade of Ocean Science for Sustainable Development (DeepSeaDecade)

Ana Hilario presented the updates for this group. WG 159 is part of the steering committee of the Challenger 150 programme endorsed by the UN Decade. The operationalization of this Programme 150 has taken time but is essential to achieving TORs 2 and 5 as well as aspects of the other TORs. The WG is confident that they can deliver to the original time schedule plus covid extension. The WG is planning to meet in September/October 2022 to focus on capacity development plans. The WG is seeking funding to support a core programme team (programme manager, programme support officer, comms and fund-raising officer, data standards and management support officer, capacity building officer, support for the 10 ERCs who co-coordinate the regional scientific working groups) and to support the development of further technical working groups dealing with standardisation. The WG aims to have regional working group meetings every 3 months.

The WG would like to approach SCOR to continue support for the working group which directs the Challenger 150 programme and recognize Challenger 150 as a SCOR endorsed programme (like GEOTRACES). This will enable the working group to continue to direct the programme and make further gains around TORs 2 and 5.

A discussion with SCOR was initiated regarding the process for Challenger 150 becoming affiliated to SCOR. The group also requested to use their SCOR funds to support a capacity development workshop. The terms of this support will have to be discussed further.

The recommendation was to continue to support the group as planned.

Full report: <https://scor-int.org/wp-content/uploads/2022/08/DeepSeaDecade-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG159-DeepSeaDecade-2022.pptx>

2.2.14. WG 160: Analysing ocean turbulence observations to quantify mixing (ATOMIX)

Cynthia Bluteau presented the updates for this group. Over the last 12 months, WG 160 has met as a full committee in December 2021 and again face to face in June 2022 at Boston (USA), with subgroups meeting on a more regular basis to fulfil their terms of reference. The WG produced an operational Wiki along with some of the benchmark datasets which are available on the wiki now. The Wiki includes flow charts for processing epsilon from shear probes, velocity profilers and velocity point measurements, and remains a work in progress as the WG tests the benchmark datasets. The WG achieved agreement on the format and key NetCDF variable names for the benchmark datasets that will serve the community by allowing them to test their algorithms and learn about common issues with processing turbulence data. The WG did some testing of the

benchmark datasets and results of this ongoing exercise are guiding refinements in the best practice flow charts and NetCDF benchmark format, which result in modifications to the wiki.

COVID impacted the ability to meet in person and placed additional professional burdens on many working group members. Consequently, although the wiki and benchmark datasets are currently live, they have not yet engaged the community for independent benchmark dataset testing or feedback on the wiki. Nonetheless, the WG introduced ATOMIX at the Asia Oceania Geoscience Society (AOGS) Meeting 2021, a Townhall discussion at AGU Ocean Sciences 2022, and the Gordon Research Conference on Ocean Mixing, 2022. The WG has also used these opportunities to advertise the mailing list for the ATOMIX newsletter. Planning has also begun for the capacity-building workshop that they plan to host next year alongside the 2023 AOGS meeting.

Trevor McDougall, liaison of this group to the SCOR EC noted that the WG had done well getting through COVID and recommended the WG is allowed to continue to access its funds for next year.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/ATOMIX-2022-1.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG160-ATOMIX-2022.pptx>

2.2.15. WG 161: Respiration in the Mesopelagic Ocean (ReMO): Reconciling ecological, biogeochemical and model estimates

Carol Robinson presented the updates for this group. WG 161 has started an internal seminar series among the members. There have been three presentations, and four more are planned this year.

The seminars are recorded, and potentially to be made available to the wider community through their website and YouTube. The WG launched a ReMO mentoring scheme. Four early career mentees (from Mexico, India, China and France) were chosen from applicants to the open call. They gave presentations to the WG, and are now paired with WG mentors and are working on collaborative objectives which include progressing data interpretation, learning and setting up the facilities for a new analytical method and progressing a fellowship proposal. The WG aims to open another call for mentees before the end of 2022.

The WG plans to hold a combined annual meeting, training course and methods intercomparison workshop in Las Palmas de Gran Canaria in May next year. The training course will be open to early career researchers from developing and developed nations and focus on hands-on experience with methods used to measure and model mesopelagic respiration. During the training course, a series of online learning materials including recorded lectures, method demonstrations and data analysis and modelling exercises will be produced. During the intercomparison workshop, WG members will compare methods which estimate mesopelagic respiration and prepare the results for publication. Charlotte Laufkoetter, liaison of this group to the SCOR EC recommended the WG is allowed to continue to access its funds for next year.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/ReMO-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG161-ReMO-2022.pptx>

2.2.16. WG 162: Developing an Observing Air-Sea Interactions Strategy (OASIS)

Paul Myers, liaison of OASIS to the SCOR Executive Committee presented the updates for this group. WG 162 was endorsed as a UN Ocean Decade Programme in June 2021. During the last year, OASIS has facilitated several UN Ocean Decade Laboratory events via virtual presentation, poster, and discussions sessions. OASIS has held regular meetings as telecons in the form of (1) weekly to bi-weekly SCOR WG #162 co-chair + COL (Consortium for Ocean Leadership) staff meetings; (2) monthly SCOR WG #162 meetings, several of which have been open to the full OASIS community

(approximately 50 attendees); (3) OASIS Theme Team meetings occurring regularly (approximately 1-2 monthly) that progress the 5 core themes of OASIS, (4) approximately quarterly newsletters distributed to a broad mailing. The WG published the 10-year OASIS strategy in a paper in ICES Journal of Marine Science (in press), established a website (www.airseaobs.org) and completed reports as part of the UN Decade Laboratories. The WG activities have been presented at several international meetings including the UN Ocean Conference in Lisbon, June 2022.

Several conferences and meeting opportunities are planned for the year ahead, including: (1) the SOLAS Conference in Cape Town in September which will include a side event aimed at the SCOR WG and OASIS engaging with the local flux community in South Africa and other 'Global South' participants to see how to engage these communities into OASIS activities and themes, and (2) an OASIS session at AGU Fall 2022 Science Meeting. WG 162 continues to seek the right opportunity to meet in person and is contemplating how this is done to minimize the WG's carbon footprint and whether this would be help alongside another meeting in the future. Paul Myers recommended the WG is allowed to continue to access its funds for next year.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/OASIS-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG162-OASIS-2022.pptx>

2.2.17. WG 163: Coupling of ocean-ice-atmosphere processes: from sea-Ice biogeochemistry to aerosols and Clouds (Clce2Clouds)

Nadja Steiner presented the updates for this group. Following the approval of WG 163, Clce2Clouds, the community got to work quickly. To ensure a smooth spin-up despite the remaining pandemic-related travel restrictions, all members posted a short presentation of their research interests in Clce2Clouds for the group to watch. This allowed the group to take the first steps and efficiently move forward on the TORs. To address the development and refinement of conceptual models for key chemical compounds in the coupled ocean-ice-snow-atmosphere system, three sub-working group (a) sulphur cycle, (b) nitrogen cycle and (c) primary aerosol) have been set up. The groups meet regularly online and are working toward drafting bi-polar and seasonal conceptual schematics on relevant processes. These schematics will inform the basis of conceptual models of known and constrained processes and point toward knowledge gaps to inform future research. Approximately equal representations of atmospheric and ocean biogeochemical experts ensure that both sides of the ice/snow interfaces are represented adequately. Clce2Clouds held a day of sessions at the CATCH Open Science Workshop and is looking forward to a first hybrid meeting connected to the SOLAS Open Science conference (Sept. 2022, South Africa). An open discussion session on differences in ocean-ice-snow-atmosphere processes in the Arctic and Antarctic is also planned for the SOLAS Open Science Conference. Paul Myers, the liaison of this WG to the SCOR Executive Committee recommended the WG is allowed to continue to access its funds for next year.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/Clce2Clouds-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG163-Clce2Clouds-2022.pptx>

2.2.18. WG 164: CoNCENSUS: Advancing standardisation of COastal and Nearshore demersal fish visual CENSUS techniques

Enrique Montes, liaison of CoNCENSUS to the SCOR Executive Committee presented the updates for this group. Over the last year, WG 164 CoNCENSUS has focussed on introducing the team, and finalising the different Terms of Reference (ToR) and work plans; initiating capacity development and engaging with the broader underwater visual census community; developing an interactive shared workspace; and sourcing additional funding to allow increased participation by the full working

group and to recruit early career scientists, in the form of postdocs and PhD students, to assist with the WG activities. The WG kick-off meeting was held on-line in May and provided a great opportunity for the WG members to meet for the first time and discuss the details of the ToRs. Leads and teams for each ToR were appointed during the meeting and these groups are now in the process of developing detailed work plans and starting the required work. Consensus has secured funding for one PhD student, a postdoc, and a research assistant to join the WG. One funding proposal is currently under review to provide co-funding to support the CoNCENSUS objectives. The WG has made some good initial progress with the proposed capacity development plans and engaging with key role players in the global community of practice. Enrique Montes recommended the WG is allowed to continue to access its funds for next year.

Full report: <https://scor-int.org/wp-content/uploads/2022/08/CoNCENSUS-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG164-CoNCENSUS-2022.pptx>

2.2.19. WG 165: Mixotrophy in the Oceans – Novel Experimental designs and Tools for a new trophic paradigm (MixONET)

Aditee Mitra presented the updates for this group. WG 165 MixONET started activities in January 2022. The MixONET launch WG meeting was held in silico (February 2022); this was the first opportunity for the WG members to e-meet each other. The second hybrid meeting (June 2022) was held in-person in Baiona (Galicia, Spain) and via Zoom. The WG is currently working on establishing a meta-database of databases to aid delivery to ToR1, for ToRs 2 and 3, reviews of extant guides and manuals are ongoing with a view to identify gaps. Since the inception of this WG, they have published an article in the IOC-UNESCO Harmful Algae Newsletter #70; a poster introducing the group has been presented at a conference. Their next meeting is planned in September 2022 (online) along with and an in-person/hybrid meeting at either the Association for the Sciences of Limnology and Oceanography (ASLO) in Mallorca or International Society Of Protistologists (ISOP) in Vienna in 2023. There were a few renovations of membership in the WG with some members resigning due to personal circumstances and new members approved by SCOR. Charlotte Laufkoetter, the liaison of this WG to the SCOR Executive Committee recommended the WG is allowed to continue to access its funds for next year.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/MIXONET-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WG165-MixONET-2022.pptx>

3. LARGE-SCALE OCEAN RESEARCH PROJECTS

SCOR currently sponsors five large-scale research projects; four of them are co-sponsored by other organizations. Each project has its own scientific steering committee (SSC) to manage the project. SCOR and other co-sponsors are responsible to oversee the projects, which they do primarily through responsibility for the project SSC memberships and terms of reference, although sponsors also oversee the results of the projects' activities. Each of the projects has an assigned liaison person to the SCOR Executive Committee. Any proposed changes in membership or terms of reference are considered by the SCOR Executive Committee, in partnership with other co-sponsors, throughout the year. The SCOR Secretariat oversees the use of grant funds provided to the projects through SCOR. SCOR uses solely grant funds for IMBER, SOLAS, and GEOTRACES, but is providing SCOR support for IQOE and IIOE-2 until they are self-supporting.

3.1. GEOTRACES

Karen Casciotti presented the updates for GEOTRACES and acknowledged SCOR's and NSF's support to the program. Despite the COVID-19 pandemic, GEOTRACES launched its third Intermediate Data Product in November 2021. The IDP2021 represents a significant expansion in data available compared to the previous version released in 2017. The product contains now hydrographic and marine geochemical data from 77 cruises and 3191 stations. The IDP2021 consists of a digital data package for bulk data download and an eGEOTRACES Atlas for visualization. The GEOTRACES field programme has continued to progress successfully with 4 cruises completed in the last year including 2 new section cruises from Germany and India and 2 process studies from Australia and The Netherlands. Three new compliant data sets have been endorsed. The SSC and all the technical subgroups met virtually in this period and plan to have their first in person meeting in late September 2022. During the reporting period, 534 new peer-reviewed papers were published, including the publication of one special issue. Some of the questions addressed to Karen Casciotti were related to the Western Indian Ocean region which seems to be data poor and what were the suggestions for getting information from this region. Casciotti pointed out the need to have interest and capacity for cruises in that region and that a recent French cruise in the region was still to have its data processed. Another concern was if there was advanced model work to support the GEOTRACES mission to which Casciotti indicated that effectively, there were modellers within the community looking at processes and developing models for many trace metals. It was noted that one of the GEOTRACES successes is having standards and that these approaches might be valuable for other programs. No further action was required. GEOTRACES support is provided by specific funding from NSF grants to SCOR.

Full report: https://scor-int.org/wp-content/uploads/2022/07/2022_GEOTRACES_AnnualReport.pdf

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/GEOTRACES-2022.pptx>

Report of regional activities: https://scor-int.org/wp-content/uploads/2022/07/2022_GEOTRACES_AnnualReport_Annex.pdf

3.2. Surface Ocean – Lower Atmosphere Study (SOLAS)

Minhan Dai presented the updates for SOLAS. During this reporting period, SOLAS completed a thorough report of its major achievements since 2016, and its plans for the next phase. This report was reviewed by an Ad Hoc Review Panel representing SCOR and Future Earth. The Review Panel highly regarded SOLAS's achievements during the past 5 years and the panel also made some valuable recommendations which SOLAS has been implementing in its strategy. SOLAS organised its first virtual summer school in June 2022, which hosted 62 students and involved 31 lecturers. An in-person school will be held in June 2023 on Cape Verde and the first hybrid Open Science Conference will take place on 25-29 September 2022 in Cape Town, South Africa. SOLAS and the National University of Ireland (NUI) Galway launched a new structured Research Master of Science (MSc) programme on Ocean, Atmosphere and Climate. The MSc bridges the boundaries between ocean and atmosphere and provides graduates with a broad understanding of how this coupled system works, affects, and is affected by climate and human activities. The first students will start in September 2022.

SOLAS has also engaged in COP26 and other activities of the UUNFCCC to ensure the effective transformations of science into policy and decision-making on climate and environmental health and is collaborating with three UN Ocean Decade programmes and co-organised four Ocean Decade events. Minhan Dai also noted that the lectures from the virtual Summer School should be available on the web soon (if not already there). No further action was required. SOLAS support is provided by specific funding from NSF grants to SCOR.

Full report: https://scor-int.org/wp-content/uploads/2022/07/SOLAS-Report-to-SCOR-2021-2022_final.pdf

Presentation: https://scor-int.org/wp-content/uploads/2022/12/SOLAS_2022.pptx

3.3. Integrated Marine Biosphere Research (IMBeR)

Fang Zuo presented the updates for IMBeR. Over the past year, the Integrated Marine Biosphere Research project (IMBeR) published 96 papers, making significant progress in understanding, and predicting the marine environment, and proposing future research directions. The 'Southern Ocean Action Plan 2021-2030' also a contribution to the UN Decade of Ocean Science for Sustainable Development 2021-2030 (UNDOS), was co-authored by Integrating Climate and Ecosystem Dynamics in the Southern Ocean (ICED; an IMBeR Regional Programme) and developed through a stakeholder-oriented process. A paper led by Eugene Murphy outlined how lessons from the COVID-19 pandemic can inform a risk-based approach to developing plans for mitigating and adapting to ocean change. IMBeR's Interdisciplinary Marine Early Career Network (IMECaN) proposed blinded review in scientific publishing to help reduce biases that negatively affect under-represented and minority scientists. Three special issues were published: 'Solving Complex Ocean Challenges Through Interdisciplinary Research: Advances from Early Career Marine Scientists'; 'The Second International Indian Ocean Expedition (IIOE-2): New Exploration in a Poorly Understood Ocean Basin (volume 4)'; and 'Marine Ecosystem Assessment for the Southern Ocean: Meeting the Challenge for Conserving Earth Ecosystems in the Long Term'. IMBeR also held three large events which were endorsed by UNDOS and collectively convened more than 1000 participants from over 80 countries. These were the IMBIZO6 Conference – 'Marine Biosphere Research: Buoyant Solutions for Ocean Sustainability', the IMBeR West Pacific Symposium – 'Changing West Pacific Ocean: Science and Sustainability', and the ClimEco7 Summer School – 'Interdisciplinary Ocean Science for Sustainable Development'. Diana Ruiz Pino (France) was approved as chair to replace Carol Robinson. The SSC met virtually. Stefano Aliani, liaison of IMBeR to the SCOR EC and co-chair of the IMBeR mid-term review noted that IMBeR is well-organized and well-managed and has provided excellent results. He also noted that IMBeR has a forward-looking approach – which is excellent. No further action was required. IMBeR support is provided by specific funding from NSF grants to SCOR.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/IMBeR-annual-report-to-SCOR-2021-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/IMBeR-2022.pptx>

3.4. International Quiet Ocean Experiment (IQOE)

Steve Simpson presented the updates for the IQOE. IQOE work has proceeded without pause during the COVID travel restrictions and has been productive through Zoom meetings, but they are beginning to plan some in-person meetings later in 2022. The membership of the IQOE SC was renewed, with Steve Simpson (UK) and Peter Tyack (USA) as co-chairs, and other new members from the Netherlands, Norway, Namibia/South Africa, Canada, Australia, Iceland, Germany, and the USA. The SC met virtually in June 2022 and will be working in the coming months to follow up on topics from the low-cost hydrophone meeting, additional analysis of changes in ocean sound from the COVID pandemic, reviewing IQOE working group activities, and potentially forming a WG to help establish a global hydrophone system. The implementation plan for the Ocean Sound EOVS is being reviewed by the IQOE Science Committee before releasing it to the ocean acoustics community for comment by the end of August. A new book edited by C. Erbe and J. Thomas, entitled Exploring Animal Behavior Through Sound: (Volume 1) is scheduled to be published on 23 August 2022 by Springer Nature. The Lounsbery Foundation contributed funding to make the book open access. The Global Library of Underwater Biological Sounds (GLUBS), a project of the IQOE WG on Acoustic

Measurement of Ocean Biodiversity Hotspots had a workshop in Berlin on July in conjunction with the Aquatic Noise 2022 Meeting to broaden the GLUBS community and to advance planning for the activities mentioned in the previous bullet point. The SC will meet again virtually in a few months, and in person in late 2022 or early 2023. Uku recommended to continue to support 2023 activities (SSC meeting) with unused 2021 approved funds. It was also recommended to strengthen the links with the Animal Telemetry Network (ATN).

Full report: <https://scor-int.org/wp-content/uploads/2022/08/IQOE-Newsletter-9-1-1.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/IQOE-2022.pptx>

Ocean Sound Workshop Report: <https://scor-int.org/wp-content/uploads/2022/08/Ocean-Sound-Workshop-Report.pdf>

3.5 Second International Indian Ocean Expedition (IIOE-2)

Marie Alexandrine Sicre presented the updates for the IIOE-2. The goal of IIOE-2 is to advance our understanding of the Indian Ocean and its role in the Earth System to enable informed decisions in support of sustainable development and the well-being of humankind. Delivery of IIOE-2 occurs through national activities which are coordinated by a Core Group comprising the Co-Chairs, who represent the sponsors, and 3 Working Groups (WG1 Science & Research; WG2 Data & Information Management & WG3 Operational Coordination). They interact with each other. After the end of functions of the Project Office in Perth, the Office in Hyderabad deals with day-to-day issues within IIOE-2.

The International Indian Ocean Science Conference 2022 (IIOSC 2022) was held virtually between 14-18 of March, with Hermann Bange and Raleigh Hood as members of the Organizing Committee. The conference was followed by the fifth meeting of the Steering Committee of IIOE-2 (SC5) which was also organized virtually during March 21-22, 2022 by the IIOE-2 Project Office at the Indian National Center for Ocean Information Services (INCOIS), Hyderabad. The SC5 meeting was held in conjunction with the integrated meetings of IOGOOS, IORP, SIBER, IRF, IIOE-2, and IOCINDIO. The meeting was co-chaired by Dr. Vladimir Ryabinin (IOC), Marie-Alexandrine Sicre (SCOR) and Srinivas Kumar (INCOIS), co-chairs of the Steering Committee of the IIOE-2. A full agenda and links to the background documents, including the presentations can be found at: <https://iioe-2.incois.gov.in/IIOE-2/SC5.jsp>.

The inability to have in person meetings has had a significant negative impact on IIOE-2 activities. They plan to have the next joint meeting of IIOE-2/IORP/SIBER/IRF/IndOOS in person in Perth, Australia from 6 to 10, February 2023 along with the IIOSC-2023 conference. Progress for each of the IIOE-2 WGs is presented in the report. The IIOE-2 requests that SCOR agrees to allocate \$15k to underpin T&S at the IIOSC-2023 conference in Perth, Australia, that should take place in person after two years of on-line meetings. It was suggested that India's GEOTRACES national group and IIOE-2 discussed on how to engage better and maybe frame the contribution of India's GEOTRACES under the IIOE-2 umbrella. Sicre also noted that discussions about funding, and links to the UN Decade would be further discussed at the Perth meeting in 2023. Sicre recommended to continue to support for 2022 activities at the approved budget.

Full report: <https://scor-int.org/wp-content/uploads/2022/09/IIOE-2-annual-report-2022-to-SCOR-VFF.pdf>

4. INFRASTRUCTURAL PROJECTS

4.1. The Southern Ocean Observing System (SOOS)

SOOS is co-sponsored by SCOR and SCAR, the Scientific Committee on Antarctic Research. Alyce Hancock presented the updates for SOOS. The new SOOS Science and Implementation Plan 2021-2025 was approved in early 2022 by SCOR and SCAR after completing the review process. There has been some renovation in the IPO based at the University of Tasmania with two new officers replacing the former Science and Communication Officer, and Data Officer. SOOS continued to partner with polar organizations to make data more findable and accessible. The SOOSmap data portal has been undergoing continuing development and version 2 will be released in 2022. DueSouth, which SOOS developed to help researchers find future opportunities, has been further developed in partnership with the European Polar Board and is now part of Polardex. SOOS had a lead role in the organization of a side-event at the 26th United Nations Climate Change conference (COP26), in Glasgow, UK in October 2021. SOOS established a new Task Team on Polar Technologies aimed to develop a polar technologies group focused on addressing challenges and exploiting synergies in technology targeted at Southern Ocean and Antarctic marine research. SOOS continued active publication of science papers and reports in 2021-2022. SOOS core sponsorship for the IPO is provided by a partnership between the Institute for Marine and Antarctic Studies, University of Tasmania (IMAS/UTAS), Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Tasmanian State Government Department of State Growth. Discussion for the ongoing sponsorship and hosting of the SOOS International Project Office in Hobart progressed significantly through 2021 and an agreement is expected in mid-2022. Alyce noted that SOOS has a YouTube channel and that the first SOOS science symposium will take place in Hobart in August 2023, inviting the SCOR community to submit abstracts. SOOS is also engaging with GEOTRACES, Bio-ARGO floats and animal telemetry.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/2021AnnualReport-SOOS.pdf>

Narrated presentation: <https://youtu.be/yMEIdKWz5bo>

4.2. International Ocean Carbon Coordination Project (IOCCP)

The IOCCP is co-sponsored by SCOR and the IOC. Maciej Telszewski presented the updates for the IOCCP. The IOCCP is involved in several activities aimed at transforming the existing, mostly research-funded pilot activities into an integrated operational global ocean carbon observing system. Their current focus includes contribution to policy and decision makers through close collaboration with G7-FSOI (Future of the Seas and Oceans Initiative) or providing input to interventions at the UNFCCC COP26, involvement in endorsed programmes of the UN Ocean Decade, as well as leadership at the more technical level, working to increase the observing system's readiness level for becoming operational. Throughout 2021, the IOCCP managed to further strengthen or initiate several close collaborations for the benefit of establishing global coordination of IMDOS and sustained observations of Marine Plastics Debris as a new EOVS and helped organize the "Integrating Marine Litter Monitoring to Inform Action" Official Side Event to the 2022 UN Ocean Conference. The SSG met in hybrid mode in November 2021 and will meet in November 2022. A question was raised regarding IOCCP resources for taking the responsibility of an extra Essential Ocean Variable (EOV) on plastics and if there was such expertise in the SSC. Telszewski informed about funding from the EuroSeas project to develop this EOVS. IOCCP funding is provided by specific funding from an NSF grant to SCOR.

Full report: https://scor-int.org/wp-content/uploads/2022/07/IOCCP-2022_SCOR-Report_Final.pdf

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/IOCCP-2022.pptx>

4.3. Changing Ocean Biological Systems (COBS)

Phil Boyd presented the updates for COBS. COBS activities in 2021-2022 focused on three key areas. First, to facilitate discussions within the scientific community on multiple driver research by organizing a session at the Ocean Sciences 2022 conference, as well as by building a collaboration with IMBeR to examine the socio-economic aspects of multi-driver change in ocean systems. Second, to develop new or improved training materials and opportunities around our online bank of resources (meddle-scor149.org), including developing slide decks for educators, and offering online in an in-person workshop. Finally, COBS members played pivotal roles in preparing high-level documents informing policy, such as the Multiple Ocean Stressors: A Scientific Summary for Policy Makers (UNESCO-IOC (2022)) and the chapter section on multiple stressors in the 2022 IPCC WG2 AR6 Chapter 3 on ocean systems.

In the coming year, COBS will continue to offer workshops aimed at Early Career Researchers (ECRs) and expand this focus to better reach scientists from developing countries by expanding our national advocate network and improving the coordination and crosstalk within this network. We will also coordinate with members of research-active communities (such as coral reef researchers) to discuss multiple driver experimental design in the context of these specific systems. COBS will strengthen the collaboration with IMBeR on multiple drivers and changing socio-economic systems. Potential for shared activities include publications, workshops within the IMBeR summer school or open sciences meeting, or a jointly run seminar with the IMBeR ECR network. Finally, COBS will re-invigorate several projects on surveys and high-level peer reviewed publications that were put on hold during the pandemic. In this project, trainees that went through the training process are now taking leadership roles and doing training themselves. The project aims to have National Advocates for the future, and trying to move into regions with less experience (e.g. Latin America), to expand teaching materials, for example. Colombia and Chile that had representatives at the meeting indicated their interest in engaging with COBS. COBS is also working on links with IMBeR and there are five task teams working across the project, whose work will be integrated and published. Funding to COBS is provided from NSF specifically for the group through SCOR, no action was required.

Full report: https://scor-int.org/wp-content/uploads/2022/07/COBS_2022-Annual-SCOR-Report_final_20-July.pdf

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/COBS-2022.pptx>

4.4. GlobalHAB

GlobalHAB is co-sponsored by SCOR and the IOC. From June to November 2021, GlobalHAB organized an online monthly series of open seminars and discussions to address the challenge of predicting HABs. The topics were size-based models, acclimation models, model validation, and machine learning. The webinars provided the basis for the in-person Marine Workshop on Modelling and prediction of harmful algal blooms, from event response to multi-decadal projections conducted in May 2022 in Glasgow, UK. The GlobalHAB modelling workshop was aimed at increasing awareness of the range of modelling and observational tools that are in our community toolbox, and help scientists and technologists develop creative approaches to meeting the needs of coastal communities, governments, and industry worldwide. A mini symposium on automated in situ observations of plankton, will be hosted at Kristineberg Marine Research Station, Sweden, in August 2022. The aim of the symposium is to bring together experts on, and users of, automated in situ imaging systems to present methods, recent results and to share experiences. A comparison of

results when analysing plankton communities quantitatively will also be conducted. Early career scientists are particularly encouraged to attend the symposium and a special follow-on workshop on data processing and report/article writing.

GlobalHAB published the "Best Practice Guidelines for the Study of HABs and Climate Change" which is available at: <https://unesdoc.unesco.org/ark:/48223/pf0000380344>. The guidelines are intended to communicate standardized strategies, tools, and protocols to assist researchers studying how climate change drivers may increase or decrease future HAB prevalence in aquatic ecosystems. The IOC-UNESCO publication on multiple ocean stressors also has a section on HABs. After completing the 2022 activities, SCOR still has a balance in past funds from GlobalHAB to support some activities in 2023.

Full report: https://scor-int.org/wp-content/uploads/2022/07/GlobalHAB-Progress-Report2022_to-SCOR-2022-07-24_submitted.pdf

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/GlobalHAB-2022-1.pptx>

4.5. Joint Committee on Seawater (JCS) (IAPWS/SCOR/IAPSO)

The JCS is co-sponsored by SCOR, the International Association for the Properties of Water and Steam (IAPWS), and the International Association for the Physical Sciences of the Oceans (IAPSO). Trevor McDougall, the JCS liaison to the SCOR EC presented the updates for this group. JCS held two virtual meetings over the past year, during which members caught up on each other's activities for the past several years, including progress on several different projects that began since the last full meeting. A highlight was the development and approval of a new Chemical Speciation task group in JCS, to carry on the work started in SCOR WG 145. Discussions have also begun on the development of a new website specifically for JCS, separate from the existing TEOS-10 website which continues to serve software and pedagogical material related to the TEOS-10 standard. Following on the recommendations derived from discussions between WG145 and IAPSO regarding the development of a permanent JCS web page separate from the TEOS-10 web page, SCOR approved that the 2023 budget of \$5K assigned to the JCS to support travel of the chair or other to the meetings may be used, if required, towards supporting the development of the website. Paul Myers also suggested that the CNC is contacted for further support since the website will most likely be hosted at the University of British Columbia. A question was raised about if there was a python toolbox – github link to which the response was that it was for about 80 programs but not for all 350 programs. Another question referred to when the model does a significant upgrade, noting that recent paper comments that all models are using conservative temperature. Trevor McDougall recommends continuing SCOR support for JCS activities as approved in the 2022 budget.

Full report: https://scor-int.org/wp-content/uploads/2022/07/JCS-Report_20220631.pdf

Presentation: https://scor-int.org/wp-content/uploads/2022/12/JCS_2022.pptx

5. AFFILIATED PROJECTS AND NON-GOVERNMENTAL ORGANIZATIONS

5.1. International Ocean Colour Coordinating Group (IOCCG)

The IOCCG is sponsored by a NASA grant managed by SCOR. Raisha Lovindeer presented the updates for the IOCCG through a recorded presentation. Shubha Sathyendranath (UK) was appointed as the new chair of IOCCG to replace Cara Wilson (USA). The 26th IOCCG Committee meeting took place in a hybrid format in June 2022 hosted by the European Space Agency at their ESA-ESRIN facilities

(Frascati, Italy). Agenda topics included a review of all current IOCCG working groups and task forces, as well as updates from the 12 participating space agencies. Participants engaged in several discussions including the establishment of IOCCG working groups on ocean colour system vicarious calibration, ocean colour hyperspectral missions and carbon-from-space. Other discussions included seasonal biases in ocean colour, requests for full resolution OCR data over coastal waters, generating water quality products from high resolution satellites and establishing an efficient international database of match-up data points.

From the IOCCG Protocol Series, one protocol is available on the IOCCG website for comment (Aquatic Primary Productivity Field Protocols for Satellite Validation and Model Synthesis), another is in draft stage (Measurement Protocol of Absorption by Chromophoric Dissolved Organic Matter) and another is already available through the IOCCG website (Particulate Organic Carbon Sampling and Measurement Protocols: Consensus Towards Future Ocean Color Missions, volume 6.0).

The 2022 edition of the advanced IOCCG Summer Lecture Series (SLS) covering topics at the frontier of ocean optics and ocean colour science took place in July 2022 at the Laboratoire d'Océanographie de Villefranche, France. The application for the Trevor Platt Memorial Scholarship delayed in 2021 due to the pandemic is now open.

IOCCG currently has two active working groups, one on benthic reflectance and the other on atmospheric correction. SCOR manages NASA grants for IOCCG.

Full report: https://scor-int.org/wp-content/uploads/2022/07/SCOR_IOCCG_Annual_report_2022.pdf

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/IOCCG-2022.pptx>

Narrated presentation: https://youtu.be/Hs_M2c1apXE

5.2. InterRidge - International, Interdisciplinary Ridge Studies

Sang-Mook Lee presented the updates for InterRidge. InterRidge which depends heavily on face-to-face meetings and gatherings has been greatly affected by travel restrictions both by air and sea. The InterRidge Office has managed to collect only 60% of the proposed budget during the last three years. Even among those countries that contribute to InterRidge, for many, the possible development of seafloor mineral resources appears to be a selling point, directly or indirectly. Sang Mook Lee, chair of InterRidge has expressed his concerns for these recent developments, and at the same time, has raised the question of whether InterRidge (which was created some thirty years ago when member countries had their own ongoing national scientific programs such as RIDGE, RIDGE2000, BRIDGE, Dorsales, InterRidge-Japan) has outlived its lifetime.

The chair suggests going back to the drawing table, to look at what has been achieved in the past decade (InterRidge Third Decadal Plan 2014-23), and review what objectives have been achieved and what have not, including an assessment of those issues that need further studies. This task can be an opportunity to come up with a new InterRidge decadal scientific plan (2024-33). This will also allow the program to change the governance of InterRidge (if necessary) to better manage the international collaboration in their effort to understand ocean basins and adjust to the new set of global circumstances, including new ways to pull together much-needed resources. The Chair intends to announce the timeline for such an effort in the next few months. It was suggested that the chairs of WG 159 (DeepSeaDecade) who are coordinating the UN Decade program Challenger 150 contact InterRidge to explore potential collaboration.

Full report: <http://interridge.org/news/>

5.3. Global Alliance of CPR Surveys (GACS)

Anthony Richardson was unable to provide an update on GACS activities due to many other commitments and requested to drop GACS for the agenda for this year. The plan is for GACS to organise a meeting in early 2023 and reinvigorate it. All the regional coordinators have been working separately supporting their surveys but not networking much together.

5.4. International Association for Biological Oceanography (IABO)

Enrique Montes presented the updates for IABO. During this reporting period, IABO activities focused on five key areas: 1) plans for the upcoming 6th WCMB meeting planned for 2023; 2) reviewing of SCOR Working Group proposals; 3) progress toward implementing the PeerJ-IABO Hub; 4) formalizing IABO's membership; and 5) selection of Carlo Heip awardee. In collaboration with PeerJ Publishing Group, a collection of selected papers from the 5th WCMB was launched. More information about the collection is available on the web. IABO has partnered with PeerJ Publishing Group to develop the PeerJ-IABO Hub, an online platform for IABO members to submit their contributions to PeerJ open access journals. This online interface seeks to drive membership growth of IABO, highlight social media feeds for the current and prospective members of the Association, promote IABO announcements (e.g. Carlo Heip Excellence Award notifications, WCMB conferences, community workshops), and collect funding in the form of tokens that can be used toward publishing fees of submissions from registered IABO members from developing and least developed nations. More information about the PeerJ-IABO partnership can be found on the web.

Furthermore, IABO is now collecting membership information to better serve its community. A 'Join IABO' tab has been added to website for people interested in joining the Association to input their affiliation information and request to become active members of IABO. The list generated by this Google Form will be used to verify membership for benefits such as travel grants, notification information about fellowships, job opportunities, international collaborations, and publishing discounts on the PeerJ-IABO Hub. Finally, IABO received four nominations to the Carlo Heip Award. The Recognition Task Group selected Prof. Pablo Penchaszadeh for the 2021 Carlo Heip Award. The award ceremony is planned to be at the 6th World Conference on Marine Biodiversity in Penang, Malaysia, during the IABO's General Assembly. The 2026 WCMB will take place in Ghent, Belgium. IABO is strongly promoting engagement with ML2030, an endorsed program under the UN Ocean Decade.

Full report: https://scor-int.org/wp-content/uploads/2022/08/IABO_Report_SCOR_2021-2022.pdf

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/IABO-2022.pptx>

5.5. International Association for the Physical Sciences of the Oceans (IAPSO)

Trevor McDougall presented the updates for IAPSO. IAPSO has the prime goal of 'promoting the study of scientific problems relating to the oceans and the interactions taking place at the sea floor, coastal, and atmospheric boundaries insofar as such research is conducted by the use of mathematics, physics, and chemistry.' IAPSO works mainly through 1) biennial scientific assemblies; 2) working groups; 3) commissions; 4) services; and 5) website information. Of special importance to IAPSO is the involvement of early career scientists as well as those from least developed countries.

The IAPSO Bureau was renewed in July 2019 during the IUGG General Assembly in Montreal, and two additional members were added in 2020 after an online election. Main activities in 2021-2022 include: (1) the Virtual Atmosphere-Cryosphere-Ocean seminar series (VACO-21), 19-23 July 2021, (2) planning for the 2023 General Assembly to take place in Berlin in 12-19 July, (3) a new IAPSO website, (4) expanded and increased visibility of the IAPSO Early Career Scientist Working Group, (5) funding a IAPSO Best Practice Study Groups, expecting to fund two every two years, (6) provided support to scientific meetings (e.g. the Second World Conference on Meteotsunamis), and (7) established a new IAPSO/IACS joint Commission on Ice-Ocean Interactions.

IAPSO maintains formal liaison with other scientific commissions and committees. These include the ISC's Scientific Committee on Oceanic Research (SCOR), and UNESCO's Intergovernmental Oceanographic Commission (IOC). For more information see <https://iapso-ocean.org/>.

Full report: <https://scor-int.org/wp-content/uploads/2022/08/IAPSO-Annual-Report-23Aug2022.pdf>

5.6. International Association for Meteorology and Atmospheric Sciences (IAMAS)

Joyce Penner presented the updates for IAMAS through a recorded presentation. The work of IAMAS Bureau this past year continued to advance the IAMAS Strategic Plan, which was adopted at the Montreal 2019 meeting. Some highlights include: (1) The IAMAS Early Career Scientist Committee, has initiated a set of monthly webinars:

<https://www.youtube.com/channel/UCacNFbyJf3O7jyukKS6BKoQ>; (2) IAMAS has received a 5013c which will allow it tax-exempt (not-for-profit) status in the U.S. They are working towards a more stable financial status so that several Bureau officers will have access to our funds; (3) IAMAS has set up several joint sessions with other Associations at the IUGG meeting in Berlin for 11-20 July 2023. In addition, many of their Commissions are organizing their own sessions, and (4) The IAMAS Bureau continues to have regular monthly meetings for planning purposes. IAMAS continues to track their performance on their Strategic Plan initiatives and are making good progress.

The next meeting of IAMAS is planned to take place together with IUGG in Berlin, Germany in July 2023. The initial planning for this meeting took place at the September 2021 IUGG Executive Meeting. Currently, it is unclear, but the local organizing team is planning on an in-person meeting. IAMAS commissions hold several high-profile conferences either alone or in conjunction with other organizations. Many meetings were postponed early in the pandemic; however several activities were organized during this year by the International Commission on the Middle Atmosphere, the International Ozone Commission, the International Radiation Commission, International Commission on Planetary Atmospheres and their Evolution, and the International Commission on Polar Meteorology.

Full report: https://scor-int.org/wp-content/uploads/2022/08/IAMAS-2022_SCOR_report.pdf

Presentation: https://scor-int.org/wp-content/uploads/2022/12/Penner_IAMAS_4_slides.pdf

Narrated presentation: <https://youtu.be/NL32o2USzpM>

6. INTERGOVERNMENTAL AND PARTNER ORGANIZATIONS

6.1. Intergovernmental Oceanographic Commission (IOC)

Marie Alexandrine Sicre presented the updates for the IOC with feedback from Henrik Enevoldsen. The IOC and SCOR have long successfully cooperated and thereby strengthened research and scientific programmes. The IOC Secretariat looks forward to sharing with SCOR its views on those proposals for new and to-be-renewed SCOR Working Groups that more closely reflect the current priorities of IOC in ocean science and support the UN Decade for Ocean Science and Sustainability. IOC co-supports with SCOR GlobalHAB, the IOCCP, and the IIOE-2, and common topics of interest are harmful algal blooms, plankton time series, coastal eutrophication, microplastics, deoxygenation, multiple stressors, and Eastern Boundary Upwelling Systems. Other IOC activities of potential interest to SCOR include research in ocean acidification, blue carbon, integrated ocean carbon, and invasive species.

Full report: https://scor-int.org/wp-content/uploads/2022/08/IOC_REPORT_SCOR_2022_003.pdf

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/IOC-2022.pptx>

6.2. North Pacific Marine Science Organization (PICES)

Sanae Chiba presented the updates for PICES. In October 2021, PICES held its annual meeting virtually for the second consecutive year, with China as the local host. The virtual meeting option resulted in the substantial reduction of the PICES carbon footprint over two years (saving 3,254 tonnes of carbon which is equivalent to 7,324 barrels of oil). PICES 2022 will be held face to face in Busan, Korea in late September 2022. The experience during the pandemic brought the benefits of an environmentally sustainable, cost-effective, and less time-consuming alternative to the traditional in-person meeting structure which led PICES to establish a new Study Group: Generating Recommendations to Encourage Environmentally- Responsible Networking (SG-GREEN) to consider how best to balance the benefits of each option.

The ICES/PICES joint programme “Sustainability of Marine Ecosystems through global knowledge networks (SmartNet) was endorsed as a UN Ocean Decade programme in 2021. SmartNet will establish a global knowledge network for ocean science by strengthening and expanding the collaboration of ICES/PICES and partner organizations. It will support and leverage ICES/PICES member countries' activities related to UNDOCS, by emphasizing areas of mutual research interest including climate change, fisheries and ecosystem-based management, social, ecological, and environmental dynamics of marine systems, coastal communities and human dimensions, and communication and capacity development. PICES hopes to explore the opportunities to further synergise the activities of SCOR and PICES through the implementation of SmartNet, particularly in the UNDOCS cross-cutting challenges such as capacity development, promotion of early career ocean professionals (ECOP). The newly established PICES Advisory Panel: AP-ECOP has been working across PICES Expert Groups and expanding the ECOP network at a global scale, for example, through the participation in the ECOP event at UN Ocean Conference held in Lisbon in July 2022. SCOR, PICES and KIOST (Korea Institute of Ocean Science and Technology) plan to hold a joint one-day ECOP Session “Towards a better capacity for ECOPs” on October 3rd in Busan, Korea, where Annual Meetings of both organizations are held back-to-back. Collaboration between PICES and SCOR is implemented through (1) Contribution of scientific expertise to the relevant international scientific projects, (2) Reciprocal representation of the SCOR and PICES Executives at annual meetings, and (3) Capacity development. Sanae Chiba, the current PICES Deputy Executive Secretary, is a member of the SCOR Capacity Development Committee since 2021.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/PICES-Report-for-SCOR-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/PICES-2022.pptx>

Narrated presentation: <https://youtu.be/4FTS6FO9LCI>

6.3. Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP WG38)

Jing Zhang, the GESAMP liaison to the SCOR EC presented the updates on behalf of the GESAMP WG 38 with slides provided by Bob Duce. During the past year GESAMP WG 38 has focused its attention on the following four areas: 1) Completion of a paper published in Nature resulting from the GESAMP WG 38 and WG 40 joint workshop on microplastics and nanoplastics in the marine-atmosphere environment; 2) Continuing development of a workshop in South Africa on the ocean management and policy implications of the air/sea exchange of nutrients; 3) Carrying out other WG activities; and 4) publishing results from the previous WG 38 workshops. The plans for WG 38 activities for 2022-2023 include (1) carrying out the workshop on the ocean management and policy implications of the air/sea exchange of chemicals at Gqeberha, South Africa in October 2022, (2) Developing several peer reviewed papers resulting from the workshop in South Africa, and (3) Developing a GESAMP Reports and Studies document on the results from the WG 38/40 workshop on the atmospheric transport of microplastics to and from the ocean. SCOR holds funds to support

the workshop in South Africa provided by SOLAS and IOC before the pandemic. Tim Jickells, Robert Duce, Melanie Bergmann, and Peter Liss (all members of WG 38) have organized a session at the American Geophysical Union Fall Meeting in December 2021 in New Orleans, LA entitled “Microplastics in the Atmosphere and Ocean”. WG38 continues to maintain contact with the International Nitrogen Initiative, and Tim Jickells has contributed to their developing nitrogen flux methods publication. SCOR is still holding some funding for GESAMP WG 38 provided by SOLAS and the IOC. Jing Zhang recommended presenting scientific information useful across policy levels in a way that highlights relationships between nutrients and biomass burning/industrial emissions across countries in the Indian Ocean.

Full report: <https://scor-int.org/wp-content/uploads/2022/07/WG-38-Annual-Report-to-SCOR-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/GESAMP-WG38-2022.pptx>

6.4. Partnership for Observation of the Global Oceans (POGO)

Lillian Krug presented the updates for POGO through a recorded presentation. SCOR and POGO co-sponsor the POGO-SCOR Visiting Fellowship programme, as well as the International Quiet Ocean Experiment (IQOE). POGO is organized in three pillars: (1) innovation in ocean observing, (2) capacity development targeted primarily at scientists from developing countries and economies in transition, and (3) outreach and advocacy aims to articulate the societal benefits of ocean observing to people at all levels – from the general public to policy makers. POGO co-organized with SCOR, the ISC and the IODE the UN Ocean Conference Side Event: Developing the capacity we need for the ocean we want which was held online in June 2022. Jointly with SCOR, the POGO-SCOR fellowship supported 2 trainees in 2021 and 6 trainees in 2022. POGO has given 1040 grants within 89 countries since 2001.

Full report: https://scor-int.org/wp-content/uploads/2022/08/POGO_Report_SCOR_2022.pdf

Narrated presentation: <https://youtu.be/rFBn3CT0dXc>

6.5. International Science Council (ISC)

Mathieu Denis presented the updates for the ISC through a recorded presentation. The ISC has continued to expand their science and policy networks and improve their communication and outreach capacity. In October 2021 the ISC had the 2nd General Assembly in which the 2022-2024 action plan was adopted along with two resolutions: to have coordinated action in favour of necessary reform of the scientific publishing industry, and to welcome the UN SG’s intention to re-establish the Scientific Advisory Board and to develop a strategy that mobilizes the expertise of members, scientific networks, and partners. Under the new ISC structure, SCOR is a “Thematic Organization” under “Affiliated Bodies” (<https://council.science/what-we-do/affiliated-bodies/>). Within ocean science, the ISC is also a co-sponsor of GOOS, the WCRP and GCOS and has an MoU with the IOC for cooperation in support of the development and implementation of the UN Ocean Decade.

The ISC has partnered with BBC StoryWorks for “Unlocking Science” to continue to reach new communities interested in science and improve public engagement. Such engagement will be critical to addressing the urgent challenge of accelerating action to reduce greenhouse gas emissions while advancing human development. A step forward towards this goal was the publication in 2021 of Unleashing Science: Delivering Missions for Sustainability, which makes a compelling case for going beyond business-as-usual approaches towards structuring, funding, and carrying out scientific research. To meet these aims, the ISC has established the Global Commission on Science Missions for Sustainability.

Full report: https://scor-int.org/wp-content/uploads/2022/07/ISC-Annual-Report_2021-web-version.pdf

Narrated presentation: https://youtu.be/I_6VXM6Ppig

6.6. Scientific Committee on Antarctic Research (SCAR)

Eoghan Griffin presented the updates for SCAR through a recorded presentation. SCOR and SCAR currently co-sponsor the Southern Ocean Observing System (SOOS). In February 2022 SCAR was enlisted by The Prince Albert II of Monaco Foundation (PA2F) as a partner along with the International Arctic Science Committee (IASC) and the Oceanographic Institute of Monaco in the Polar Initiative. The 10th SCAR Open Science Conference (www.scar2022.org) was held online from 1-10 August 2022, the second such online meeting following SCAR 2020 Online. The first hybrid format SCAR Delegates meeting took place in Goa, India from September 5-7th.

Full report: <https://scor-int.org/wp-content/uploads/2022/09/Report-of-the-Scientific-Committee-on-Antarctic-Research-to-SCOR-2022.pdf>

Narrated presentation: https://youtu.be/d_IP0nIYCcc

6.7. Future Earth – Ocean Knowledge Action Network (OceanKAN)

Anna Zivian presented the updates for Future Earth and the OceanKAN. This past year was a busy one for the Future Earth Ocean networks. SOLAS and IMBeR International Project Offices moved to new country homes. The Future Earth Coast International Project Office in Germany also completed its term, and the Ocean Knowledge Action Network enjoyed the first full year of its International Project Office in France. The year saw numerous remote, hybrid and in-person meetings in which Future Earth Ocean networks were active and was highlighted by the UN Oceans Conference in June and the launch of the new Intergovernmental Panel on Ocean Change (IPOC). The year also included a half-day innovative session at the Ocean Sciences Meeting organized by the Ocean KAN and its partners. Over the course of the year, the Ocean Knowledge Action Network welcomed 28 new partners including on-the ground partners, science networks, universities, UN Decade of Ocean Science Programs, and private sector partners (the partner in Canada is the TULA network).

Full report: <https://scor-int.org/wp-content/uploads/2022/07/Futue-Earth-and-OceanKAN-2022.pdf>

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/OceanKAN-FutureEarth-2022.pptx>

6.8. World Climate Research Program (WCRP)

Hindumathi Kulaiappan presented the updates for the WCRP. WCRP is in the process of implementing its new research strategy (WCRP Strategic Plan 2019-20282). Major elements of the Science and Implementation Plan are to strengthen support for core research, ensure engagement of the next generation of scientists and improve the diversity of WCRP leaders (across nations, regions, and disciplines), deepen our interaction with partners at national and international levels, and ensure that society has the climate knowledge that it needs for decision-making. The new WCRP structure was approved in 2021 and is currently being made fully operational.

WCRP carries most of its activities through four core projects: CLIVAR (oceans and climate), CliC (cryosphere and climate), GEWEX (water and climate), and SPARC (upper atmosphere and climate). Both CLIVAR and CliC are endorsers of the SCAR/SCOR Southern Ocean Observing System (SOOS). Of these core projects the work of CLIVAR is of relevance to SCOR.

Many CLIVAR meetings in the past 12 months were held online. CLIVAR organized the Regional Training Workshop on Observing the Coastal and Marginal Seas in the Western Indian Ocean (June

2022, Maputo, Mozambique, hybrid mode), and more hybrid activities are being prepared and expected to be organised in the second semester of 2022.

CLIVAR organized several capacity development activities such as the 3rd Summer School on Theory, Mechanisms and Hierarchical Modelling of Climate Dynamics: Tropical Oceans, ENSO and their Teleconnections (July 2022, Trieste, Italy), CLIVAR-FIO Summer School on Ocean Macroturbulence and Its Role in Earth's Climate (August 2022, Qingdao, China), and Arctic Processes in CMIP6 bootcamp (October 2022, Søminestationen, Denmark).

CLIVAR has strong connection and contribution to the UN Decade of Ocean Science for Sustainable Development (2021-2030), particularly with the Digital Twins of the Ocean (DITTO) programme; Ocean Observing Co-design programme, Ocean to Climate Seamless Forecasting System (OSF). In addition, the CLIVAR-GOOS Workshop entitled 'From global to coastal: Cultivating new solutions and partnerships for an enhanced Ocean Observing System in a decade of accelerating change' (August 2022, Trieste, Italy), was endorsed as an UN Ocean Decade Activity. SCOR noted the availability of funds to support participation of early career scientists from developing countries in the next WCRP conference.

Full report: https://scor-int.org/wp-content/uploads/2022/07/WCRP_CLIVAR_to_SCOR_2022_final_28Jul2022.pdf

Presentation: <https://scor-int.org/wp-content/uploads/2022/12/WCRP-2022.pptx>

7. CAPACITY DEVELOPMENT ACTIVITIES

7.1. SCOR Committee on Capacity Development

Patricia Miloslavich reported on SCOR's capacity development activities. The renewed SCOR Committee on Capacity Development (CCD) has been quite engaged, providing ideas and feedback, and contributing to review numerous travel support applications, and the two calls for visiting scholars (the regular and the "exceptional" calls). In addition, the committee took this year the task of reviewing the Namibian Regional Graduate Network in Oceanography (RGNO) and will provide recommendations for its continuation in the next years.

7.2. SCOR Visiting Scholars

Travel of the visiting scholars was reinitiated in mid-2022. Of the six scholars approved for travel in 2020, three either declined or were unresponsive, and the other three still have plans to make the visit either in late 2022 or early 2023 (Hailong Liu from China traveling to the Philippines, Teresa Cerveira Borges from Portugal traveling to Angola, and Hidenori Kumagai from Japan traveling to India). Of the four scholars approved for travel in 2021, only one has completed the visit (Enrique Montes from the USA traveling to Brazil), one has declined (Marina Ross from Greece), and two are pending (Julia Sigwart from Germany traveling to Malaysia, and Louise Firth from the UK traveling to South Africa). For travel in 2022, the CD committee approved three scholars approved for travel in 2022, two have completed their visit (Nubi Olobunmi from Nigeria traveling to Cape Verde, and Vyacheslav Lyubchich from the USA traveling to Brazil), and one is pending (Elva Escobar-Briones from Mexico traveling to Costa Rica).

In 2022, the SCOR Committee on Capacity Development approved an "Exceptional Call" (<https://scor-int.org/2022/05/16/exceptional-call-for-scor-project-and-working-groups-scholars/>) specifically for the SCOR community which resulted in the approval of eight candidates who will either train or receive training. The selected candidates were Amii Usese (Nigeria), Luciana Santoferara (USA), MaryMar Payne (Philippines), Micaela Trimble (Uruguay), Natalia Osma (Chile), Nina Schubak (Switzerland/UK), Saumya Silori (India), Frances Gulland (USA). These will travel in 2023.

7.3. POGO-SCOR Fellowships for Oceanographic Observations

In 2022, 29 applications (45% female and 55% male) were received from Latin American (41%), African (28%), Asian (28%) and European (3%) candidates. Applicants proposed trainings of one, two or three months in oceanographic centres in Europe (48%), North America (28%), Oceania (10%), Africa (7%), Asia (3%) and Latin America (3%). With the combined available budget from POGO and SCOR, a total of 6 candidates were selected in 2022 and 6 in 2021. As in 2021, SCOR contributed in 2022 an additional amount to support an additional candidate. The fellows will start their training between September 2022 and March 2023. Currently, due to COVID international travel restrictions, three of the fellows appointed in previous years are still completing their trainings. The 2022 fellows can be found at: <https://pogo-ocean.org/capacity-development/pogo-scor-fellowship-programme/> The POGO report with further information can be found at: https://scor-int.org/wp-content/uploads/2022/08/POGO-SCOR-Fellowships_2022-incl-20202021-fellows.pdf.

7.4. NSF Travel Support for Developing Country Scientists

During this last year, SCOR currently had two ongoing grants with NSF to support capacity development activities. The oldest of the two grants was on a No-cost-extension until July 2022 because of the delays in meetings due to COVID-19. In August 2022, the final report of this grant was submitted to NSF. Since October 2021, SCOR approved travel support for more than 30 early career scientists from developing countries to attend 16 international conferences, or summer schools taking place in 11 countries.

7.5. Research Discovery Camps at the University of Namibia

After two years of operating as an online series of “Discovery Seminars”, the Discovery Research Camp in Namibia was again held onsite in April-May 2022. Since 2016, the African-RGNO Ocean Discovery Camps was co-directed and coordinated on-site by Dr. Chibo Chikwililwa, a researcher at the University of Namibia (UNAM) who organized the courses and had the additional responsibility of locally administering the funds. Sadly, Chibo passed away on June 2021 due to complications of COVID-19, and UNAM appointed Dr. Margit Wilhelm to take the coordination of the course. Under the new scenario, an agreement (Memorandum of Understanding – MoU) was drafted between SCOR and UNAM establishing the scope of cooperation between both parties and the administrative terms. The MoU was signed for one year (2022) and its renewal (and terms of renewal) will be conditioned to the recommendations of the SCOR Committee on Capacity Development after reviewing the program. As the A-RGNO enters the last phase of funding, the SCOR Committee on Capacity Development is reviewing the program to (1) evaluate the A-RGNO’s major achievements since its implementation in 2014, (2) stimulate the A-RGNO to plan for its major activities until 2025 (conditioned to the funder’s approval of a no cost extension until then), and (3) determine whether and how we should proceed with further funding and applying for future RGNO-type programs. The review process is intended to be useful for the parties involved, both SCOR and the University of Namibia (UNAM) along with the many partners to the program, by providing the opportunity to reflect on past achievements, on limitations, and to envision future paths.

Some feedback during the discussion regarding the recommendations of the African-RGNO review by the SCOR Committee on Capacity Development included the lack of awareness in the region of this initiative (e.g. South Africa), that the reviewers recommendations may be difficult to implement, to explore other ideas within the constraints of the funding limitations, that Namibia seems to make it difficult for other African students to participate in the course, and finally that there seems to be the need for a dedicated space for future career opportunities and what tools you need to get there. It was suggested to discuss with Brian Arbic about ideas to improve the benefits to the region of these summer courses.

Full report of capacity development activities at: https://scor-int.org/wp-content/uploads/2022/08/Capacity_development_2022.pdf

Full report of POGO-SCOR Fellowship Programme: https://scor-int.org/wp-content/uploads/2022/08/POGO-SCOR-Fellowships_2022-incl-20202021-fellows.pdf

8. SCOR ORGANIZATION

8.1. Membership

Patricia Miloslavich reported on current SCOR Member Nations and Nominated Members and changes in composition of the Nominated Members since the 2021 SCOR Annual Meeting. There are currently 33 countries affiliated to SCOR. Since the 2021 SCOR Annual Meeting, the following changes in the SCOR nominated members were made:

- Brazil: Mauricio Mata and José María Domínguez stepped down, replaced by Leticia Cotrim da Cunha and José Henrique Muelbert.
- Canada: Robie Macdonald passed away.
- Chile: Patricio Carrasco and Carlos Zuñiga stepped down, replaced by Arturo Oxley Lizana and Harald Urbina Córdova.
- Finland: Jorma Kuperinen and Riitta Autio retired, replaced by Petteri Uotila and Eeva Eronen-Rasimus.
- Israel: Amatzia Genin stepped down, replaced by Sigal Abramovich.
- Portugal (new member): Fátima Abrantes, Ana Hilário, and Catarina Duarte appointed.
- UK: Rosalind (Ros) Rickey stepped down. The Committee has new Terms of Reference – e.g. inclusion of include Early Career Scientists.

Membership of the National SCOR Committees can be found at:

<https://scor-int.org/scor/committees/>

8.2. Publications Arising from SCOR Activities

Miloslavich reported that altogether, SCOR projects and working groups produced nearly 1000 publications in the 2021-2022 period. Working Groups publications acknowledging SCOR summed 32 papers in 2021-2022 with 15 in 2022. At least five of the 15 working group publications from 2022 were co-authored by early career scientists. The project's publications summed ~970 in 2021-2022, however most of these publications do not acknowledge SCOR or NSF. Proper SCOR acknowledgement when deserved is an ongoing topic that is continuously reminded to the projects and working groups. While there is no standardized definition of what a "SCOR publication" is for the different projects, we must continue to stress the need of acknowledging the sponsors as this is critical for our own funders (e.g. NSF). All WG publications are updated on the SCOR website (<https://scor-int.org/work/publications/>). Some SCOR working groups and projects have special issues or papers under development, which will appear in the next year.

9. SCOR RELATED MEETINGS

During the 2022 annual meeting, the following schedule was proposed for the next SCOR annual meetings: 2023 in Guayaquil, Ecuador hosted by the INOCAR; 2024 in China hosted by the SCOR Chinese Committee in conjunction with their 40th anniversary of joining SCOR; and 2025 in Santa Marta, Colombia hosted by the INVEMAR. The venues were confirmed by the nominated members of Ecuador, China, and Colombia. Colombia noted that October is the rainy season at Santa Marta, where the INVEMAR is located and that it might be better to move the meeting for an earlier or later date. At the 2023 SCOR annual meeting, the venue for 2026 will need to be identified.

See locations of past SCOR meetings at the SCOR website:

<https://scor-int.org/events/category/annual/>

At the end of the three-day meeting, Sinjae Yoo acknowledged all the work done by the SCOR infrastructural projects, SCOR affiliated projects, and the affiliated and the partner organizations. He thanked the presenters and the participants in the discussions noting that the SCOR community is contributing with cutting edge ocean science in many areas. He made some concluding remarks on the significant progress achieved by the SCOR community and collaborators despite the restrictions imposed by the COVID-19 situation, announced the selection of three two SCOR WGs (SCOR WG 166: DMS-PRO and SCOR WG 167: RUSTED) to start in 2023, and highlighted the contribution of SCOR to the UN Ocean Decade through several working groups and projects which have been endorsed as UN Ocean Decade projects or actions. He also welcomed Portugal as a new member country and reiterated SCOR's interest in engaging more developing countries as SCOR members. Yoo acknowledged the local support team from KIOST, especially of Moon Joongho, as well as to Patricia Miloslavich for organizing the meeting. He expressed the need of continuing to organize SCOR annual meetings in the hybrid format to maintain inclusiveness and participation from the scientists involved in the working groups and projects as well as the partners. Finally, he acknowledged the members of the Executive Committee which were stepping down, Paul Myers, Jing Zhang, and Charlotte Laufkoetter, and welcomed the new members. After these concluding remarks, Sinjae Yoo closed the 2022 SCOR Annual Meeting and invited all participants to the planned visit to KIOST.

APPENDICES

APPENDIX 1. PARTICIPANTS OF THE SCOR 2022 VIRTUAL MEETING

The SCOR 2022 Annual Meeting was attended by 78 participants from 31 countries representing all continents. Of these, 22 participants from 11 countries attended on-site. Thirty-five Nominated members from 21 SCOR National Committees and two of the three affiliated bodies to the Executive Committee (IABO, IAPSO) attended the meeting. Joyce Penner from IAMAS sent a recorded presentation.

Participants – SCOR Executive and staff

Executive Committee	Organization	Country
Bradley Moran	University of Alaska Fairbanks	USA
Charlotte Laufkoetter	Bern University	Switzerland
Enrique Montes	University of South Florida / IABO	USA
Jacqueline Uku	KEMFRI	Kenya
Jing Zhang	University of Toyama	Japan
Marie Alexandrine Sicre	LOCEAN - CNRS	France
Patricia Miloslavich	SCOR	USA
Paul Myers	University of Alberta	Canada
Sinjaee Yoo	KIOST	Korea
Stefano Aliani	ISMAR National Research Council	Italy
Trevor McDougall	University of New South Wales / IAPSO	Australia

Participants – Nominated Members

Nominated Members	Affiliation	Country
Adam Sokolowski	University of Gdansk	Poland
Alessandro Tagliabue	University of Liverpool	Korea
Ana Hilario	Universidade de Aveiro	Portugal
Bernadette Sloyan	CSIRO - Oceans and Atmosphere	Australia
Bradley Moran	University of Alaska Fairbanks	USA
Brett Molony	CSIRO - Oceans and Atmosphere	Australia
Carlos Zuniga	CONA-SHOA	Korea
Carol Arnosti	University of North Carolina-Chapel Hill	USA
Chan Joo Jang	KIOST	Korea
Constanza Ricaurte-Villota	INVEMAR	Colombia
DAI Dejun	First Institute of Oceanography	China
Daniel Costa	University of California Santa Cruz	USA
Daniel Weihs	TECHNION	Israel
Eun Young Kwon	IBS Center for Climate Physics	Korea
Fangli QIAO	First Institute of Oceanography	China
Francisco Arias-Isaza	INVEMAR	Colombia
Harald Urbina	CONA-SHOA	Chile
Heidi Pettersson	Finnish Meteorological Institute	Finland
Hibiya Toshiyuki	University of Tokyo	Japan
Hyoung Chul Shin	Korea Polar Research Institute	Korea
Ilka Peeken	Alfred Wegener Institute	Germany
Jing Zhang	University of Toyama	Japan
Juan Fierro	CONA-SHOA	Chile
Katja Peijnenburg	Naturalis Biodiversity Center	Netherlands
Kurt W Hanselmann	ETH Zurich	Switzerland
Leonor Vera	INOCAR	Ecuador
Lesley Clementson	CSIRO - Oceans and Atmosphere	Australia
Marcela Cornejo D'Ottone	Pontifical Catholic University of Valparaiso	Chile
Marie Alexandrine Sicre	LOCEAN - CNRS	France
Minhan Dai	Xiamen University	China
Naomi Harada	JAMSTEC	Japan
Paul Myers	University of Alberta	Canada
Sam Mafwila	University of Namibia	Namibia
Samina Kidwai	National Institute of Oceanography	Pakistan
Stefano Aliani	ISMAR - National Research Council	Italy
SUN Song-China	Institute of Oceanology, CAS	China

Other participants

Other participants	Country
Aditee Mitra	UK
Alyce Hancock	Australia
A. S. El-Din Mohammed Ali Dabbous	Egypt
Anna Zivian	USA
Carol Robinson	UK
Catia Domingues	Brazil
Chengcheng Gao	China
Daiki Nomura	Japan
Daniela del Valle	Argentina
Diana Ruiz Pino	France
Fang Zuo	Canada
Gi Hong	China
Hindumathi Palanisamy	Switzerland
HUMRAN-JURY	Yemen
Ivonne Montes	Peru
Junya Hirai	Korea
Karen Casciotti	USA
Maciej Telszewski	Poland
Manuel Meza	Chile
Moon Joongho	Korea
Nadja Steiner	Canada
O. Nasibullina	Russia
Philip Boyd	Australia
PoTeen Lim	Malaysia
Sanae Chiba	Canada
Sang-Mook Lee	Korea
Sarah L.C. Giering	Spain
Seonock Woo	Korea
Simon Clegg	UK
Steve Simpson	UK
TaeKeun Rho	Korea
Uchenna Emenyonu	Nigeria
Zheng Wei	China

APPENDIX 2. MEETING AGENDA

Block Agenda

	Mon. 3 October	Tues. 4 October	Wed. 5 October	Thurs. 6 October
am	SCOR Executive Committee closed meeting	Opening of 2022 annual meeting, reports from SCOR President and Executive Director, results of 2022 elections for SCOR officers and of new early career scientist. Presentation of new working group proposals	Reports/updates from current SCOR Working Groups and projects	Reports/updates from affiliated organizations (Part 2), and capacity development activities, closing of 2022 annual meeting
pm	SCOR-PICES-Korea Early Career Symposium	Discussion of new working group proposals Reports from affiliated organizations (Part 1)	Reports/updates from current SCOR Working Groups and projects	SCOR Executive Committee closed meeting Visit to KIOST
Evening		Group dinner hosted by KIOST		

Day 1. Tuesday, 4 October 2022. Chair: Sinjae Yoo / Note taker: Paul Myers

Time	Topic	Presenter
9:00	Welcome and introduction to agenda – In Memoriam	<u>Yoo</u>
9:15	Report from SCOR President	<u>Yoo</u>
9:30	Report from SCOR Executive Director	Miloslavich
9:45	Results of the election for SCOR Officers (proposed slate)	<u>Sicre</u>
10:00	Results of the 2022 selection of Early Career Scientist	Miloslavich
10:15	Report from the SCOR ad hoc 2021 Finance Committee	Molony et al.
10:30	BREAK (15 minutes)	
10:45	<p>Presentation of new Working Group proposals: Each presentation will be 12-15 minutes, plus time for questions (3-5 minutes) following each <u>presentation</u></p> <p>Towards best practices for Measuring and Archiving Stable Isotopes in Seawater (<u>MASIS</u>) Developing resources for the study of Methylated Sulfur compound cycling <u>PROcesses</u> in the ocean (<u>DMS-PRO</u>) Foraminifera in Extreme and Rapidly Changing Environments (<u>FIERCE</u>) Reducing Uncertainty in Soluble aerosol Trace Element Deposition (<u>RUSTED</u>) <u>DEveloping</u> Repositories for carbon FLUX quantification: Th-234 as a case study (<u>DEPOFLUX</u>) <u>DYNamic</u> Approaches for assessing Marine biota responses to fluctuating Oceans (<u>DYNAMO</u>) Impact of biotoxins on marine apex predators in Upwelling Systems (<u>ToxMAP</u>)</p>	<p>Zhang</p> <p><u>Sicre</u></p> <p>Uku</p> <p><u>Laufkoetter</u></p> <p>Moran</p> <p>Montes</p> <p><u>Aliani</u></p>
13:00	LUNCH (60 minutes)	
14:00	Ranking and discussion of new Working Group proposals	SCOR Executive and National Committees
15:45	BREAK (15 minutes)	
16:00	<p>Affiliated organizations reports (Part 1)</p> <p><u>IABO</u> – Biological Oceanography <u>IAPSO</u> – Physical Oceanography <u>IAMAS</u> – Meteorology and Atmosphere</p> <p>Partner organization updates (Part 1)</p> <p><u>IOC</u> – Intergovernmental Oceanographic Commission <u>POGO</u> – Partnership for Observation of the Global Ocean</p>	<p>Montes McDougall Penner (Recording)</p> <p><u>Sicre</u> Recording/<u>Aliani</u></p>
17:00	Adjourn for the day	
19:00	Group dinner hosted by KIOST	

Day 2. Wednesday, 5 October 2022. Chair: Sinjae Yoo / Note taker: Paul Myers

Time	Topic	Presenter / EC liaison
9:00	Introduction to Day 2 session WG and project presentations will be up to 8-10 minutes , plus time (~3-4 minutes) for questions following each presentation and comments/recommendations by EC liaison.	<u>Yoo</u>
9:10	Group 1. Presenters joining remotely from the <u>Americas</u> WG 155. Eastern boundary upwelling systems (<u>EBUS</u>) WG 163. Coupling of ocean-ice-atmosphere processes: from sea-ice biogeochemistry to aerosols and Clouds (<u>Clce2Clouds</u>) <u>GEOTRACES</u> – Trace elements and isotopes Group 2. Presenters joining remotely from Asia/Australia WG 152. Measuring Essential Climate Variables in Sea Ice (<u>ECV-Ice</u>) WG 157. Marine zooplankton biodiversity based on DNA (<u>MetaZooGene</u>) WG 160. <u>Analysing</u> ocean turbulence observations to quantify mixing (<u>ATOMIX</u>)	<u>I. Montes/Sicre</u> <u>Willis</u> / Myers <u>Casciotti</u> /Zhang <u>Nomura</u> /McDougall <u>Hirai</u> /Montes <u>McDougall</u>
10:30	BREAK (15 minutes)	
10:45	Group 2. Presenters joining remotely from Asia/Australia (cont.) <u>SOLAS</u> – Ocean/atmosphere interactions <u>IMBeR</u> – Marine biosphere research <u>SOOS</u> – Southern Ocean <u>observing</u> <u>GlobalHAB</u> – Harmful Algal Blooms <u>COBS</u> – <u>Changing ocean</u> on biota <u>JCS</u> – Joint Committee on Seawater Group 3. Presenters on site (EC liaison or attending member) WG 148. International Quality Controlled Ocean Database: Subsurface temperature profiles (<u>IQuOD</u>) WG 151. Iron Model Intercomparison Project (<u>FeMIP</u>) WG 153. Floating Litter and its Oceanic <u>TranSport</u> Analysis and Modelling (<u>FLOTSAM</u>) WG 162. Developing an Observing Air-Sea Interactions Strategy (<u>OASIS</u>) WG 164. <u>CoNCENSUS</u> : Advancing <u>standardisation</u> of <u>COastal</u> and Nearshore demersal fish visual CENSUS <u>techniques</u>	<u>Dai</u> /Penner <u>Zuo</u> / <u>Aliani</u> <u>Hancock</u> /McDougall <u>Lim</u> / <u>Yoo</u> <u>Boyd</u> / <u>Yoo</u> <u>McDougall</u> <u>Domigues</u> /Myers <u>Tagliabue</u> / <u>Laufkoetter</u> <u>Aliani</u> /Myers <u>Myers</u> <u>Montes</u>
13:00	LUNCH (60 minutes)	

14:00	<p>Group 3. Presenters on site (EC liaison or attending member) (cont.)</p> <p>IIOE-2 – Indian Ocean expedition II</p> <p>Group 4. Recordings</p> <p>WG 154. Integration of Plankton-Observing Sensor Systems to Existing Global Sampling Programs (P-OBS)</p> <p>WG 156. Active Chlorophyll fluorescence for autonomous measurements of global marine primary productivity</p> <p>WG 158. Coordinated Global Research Assessment of Seagrass System (C-GRASS)</p> <p>Group 5. Presenters joining remotely from UK/Europe</p> <p>WG 143. Dissolved N2O and CH4 measurements: a global network of ocean time series measurements</p> <p>WG 145. Chemical Speciation Modelling in Seawater to Meet 21st Century Needs (MARCHEMSPEC)</p> <p>WG 150. Translation of Optical Measurements into particle Content, Aggregation & Transfer (TOMCAT)</p>	<p>M.A. Sicre</p> <p>Recording/Montes</p> <p>Recording/Uku</p> <p>Recording / Aliani</p> <p>Wilson/Zhang</p> <p>Clegg/Sicre</p> <p>Giering/Laufkoetter</p>
15:45	BREAK (15 minutes)	
16:00	<p>Group 5. Presenters joining remotely from UK/Europe (cont.)</p> <p>WG 159. Deep-Sea Biology for the Decade of Ocean Science for Sustainable Development (DeepSeaDecade)</p> <p>WG 161. Respiration in the Mesopelagic Ocean (ReMO): Reconciling ecological, biogeochemical and model estimates</p> <p>WG 165. Mixotrophy in the Oceans – Novel Experimental designs and Tools for a new trophic paradigm (MixONET)</p> <p>IQOE – Quiet Ocean</p> <p>IOCCP – Ocean carbon</p>	<p>Hilario / Montes</p> <p>Robinson/Laufkoetter</p> <p>Mitra/Laufkoetter</p> <p>Simpson/Uku</p> <p>Telszewski/Moran</p>
17:00	Adjourn for the day	Yoo

Day 3. Thursday, 6 October 2022. Chair: Sinjae Yoo/ Note taker: Paul Myers

Time (am)	Topic	Presenter / EC liaison
9:00	Introduction to Day 3 session Presentations will be 8-10 minutes , plus time (~3-4 minutes) for questions following each presentation and comments/recommendations by EC liaison.	<u>Yoo</u>
9:10	<i>Affiliated projects reports (Part 2)</i> <u>IOCCG</u> – Ocean colour <u>InterRidge</u> – Ridge studies <i>Partner organization updates</i> <u>PICES</u> - North Pacific Marine Science Organization <u>GESAMP</u> – Group on marine environmental protection <u>ISC</u> – International Science Council <u>SCAR</u> – Scientific Committee Antarctic Research <u>Future Earth-Ocean/OceanKAN</u> <u>WCRP / CLIVAR</u> – World Climate Research Program	<u>Yoo</u> S.M. Lee / Zhang Chiba / Moran Zhang Recording / Sicre Griffin / Myers Fenn & Pendleton <u>Kulaiappan</u> / Penner
10:30	BREAK (15 minutes)	
10:45	Report on SCOR capacity development activities	Miloslavich
11:00	Future SCOR meetings / meeting mode Ecuador 2023, China 2024, Colombia 2025. Host for 2026	Open discussion
11:15	Summary of recommendations and close of meeting	<u>Yoo</u>
12:00	LUNCH (60 minutes)	
13:00	SCOR closed Executive Committee meeting	Executive Committee
14:00	Visit to KIOST	All invited

APPENDIX 3. LINKS TO WORKING GROUP PROPOSALS

MASIS: Towards best practices for Measuring and Archiving Stable Isotopes in Seawater

<https://scor-int.org/wp-content/uploads/2022/05/MASIS-SCOR-WG-stableisotopes-10052022-V3.pdf>

DMSO-PRO: Developing resources for the study of Methylated Sulfur compound cycling PROCesses in the ocean

https://scor-int.org/wp-content/uploads/2022/05/DMS-PRO_SCOR_WG_Proposal_2022.pdf

FIERCE: Foraminifera in Extreme and Rapidly Changing Environments

https://scor-int.org/wp-content/uploads/2022/05/FIERCE_SCOR_WPG_FINAL-with-appendix.pdf

RUSTED: Reducing Uncertainty in Soluble aerosol Trace Element Deposition

https://scor-int.org/wp-content/uploads/2022/05/SCOR-WG-proposal-2022_RUSTED.pdf

DEPFLUX: DEveloping Repositories for carbon FLUX quantification: Th-234 as a case study

https://scor-int.org/wp-content/uploads/2022/05/WG_Proposal_DEPOFLUX.pdf

DYNAMO: DYNamic Approaches for assessing Marine biota responses to fluctuating Oceans

https://scor-int.org/wp-content/uploads/2022/05/Scor-WG-Proposal_V2022_DYNAMO_final.pdf

ToxMAP: Impact of biotoxins on marine apex predators in Upwelling Systems

https://scor-int.org/wp-content/uploads/2022/05/ToxMAP-SCOR-WG-2022-Proposal_Gridley-et-al_Final.pdf

APPENDIX 4. LINKS TO WORKING GROUP REPORTS

WG 143. Dissolved N₂O and CH₄ measurements: a global network of ocean time series measurements

<https://scor-int.org/wp-content/uploads/2022/07/CH4-NO2-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG143-N2O-2022.pptx>

WG 145. MARCHEMSPEC: Modelling Chemical Speciation in Seawater to Meet 21st Century Needs

<https://scor-int.org/wp-content/uploads/2022/07/MARCHEMSPEC-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG145-MARCHEMSPEC-2022.pptx>

**WG 148. IQuOD: International Quality Controlled Ocean Database:
Subsurface temperature profiles**

<https://scor-int.org/wp-content/uploads/2022/07/IQuOD-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG148-IQuOD-2022.pdf>

**WG 150. TOMCAT: Translation of Optical Measurements into particle
Content, Aggregation & Transfer**

<https://scor-int.org/wp-content/uploads/2022/08/TOMCAT-2022.pdf>

https://scor-int.org/wp-content/uploads/2022/12/WG150-TOMCAT_2022.pptx

WG 151. FeMIP: Iron Model Intercomparison Project

<https://scor-int.org/wp-content/uploads/2022/07/FEMIP-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG151-FeMIP-2022.pptx>

WG 152. ECV-Ice: Measuring Essential Climate Variables in Sea Ice

<https://scor-int.org/wp-content/uploads/2022/07/ECV-Ice-2022.pdf.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG152-ECV-Ice-2022.pptx>

<https://youtu.be/dOgXRHVLxro>

**WG 153. FLOTSAM: Floating Litter and its Oceanic TranSport Analysis and
Modelling**

<https://scor-int.org/wp-content/uploads/2022/07/FLOTSAM-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG153-FLOTSAM-2022.pptx>

**WG 154. P-OBS: Integration of Plankton-Observing Sensor Systems to Existing
Global Sampling Programs**

<https://scor-int.org/wp-content/uploads/2022/07/P-OBS-2022.pdf>

<https://youtu.be/VJcgoYCCS5k>

**WG 155. EBUS: Eastern boundary upwelling systems: diversity, coupled
dynamics and sensitivity to climate change**

<https://scor-int.org/wp-content/uploads/2022/07/EBUS-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG155-EBUS-2022.pptx>

WG 156. Active Chlorophyll fluorescence for autonomous measurements of global marine primary productivity

<https://scor-int.org/wp-content/uploads/2022/07/Chlorophyll-2022.pdf>

WG 157. MetaZooGene: Toward a new global view of marine zooplankton biodiversity based on DNA metabarcoding and reference DNA sequence databases

<https://scor-int.org/wp-content/uploads/2022/07/MetaZooGene-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG157-MetaZooGene-2022.pptx>

<https://youtu.be/sXouqscYM4w>

WG 158. C-GRASS: Coordinated Global Research Assessment of Seagrass System

<https://scor-int.org/wp-content/uploads/2022/07/C-GRASS-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG158-C-GRASS-2022.pptx>

WG 159. DeepSeaDecade: Roadmap for a Standardised Global Approach to Deep-Sea Biology for the Decade of Ocean Science for Sustainable Development

<https://scor-int.org/wp-content/uploads/2022/08/DeepSeaDecade-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG159-DeepSeaDecade-2022.pptx>

WG 160. ATOMIX: Analysing ocean turbulence observations to quantify mixing

<https://scor-int.org/wp-content/uploads/2022/07/ATOMIX-2022-1.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG160-ATOMIX-2022.pptx>

WG 161. ReMO: Respiration in the Mesopelagic Ocean (ReMO): Reconciling ecological, biogeochemical and model estimates

<https://scor-int.org/wp-content/uploads/2022/07/ReMO-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG161-ReMO-2022.pptx>

WG 162. OASIS: Developing an Observing Air-Sea Interactions Strategy

<https://scor-int.org/wp-content/uploads/2022/07/OASIS-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG162-OASIS-2022.pptx>

WG 163. Clce2Clouds: Coupling of ocean-ice-atmosphere processes: from sea-Ice biogeochemistry to aerosols and Clouds

<https://scor-int.org/wp-content/uploads/2022/07/Clce2Clouds-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG163-Clce2Clouds-2022.pptx>

WG 164. CoNCENSUS: Advancing standardisation of COastal and Nearshore demersal fish visual CENSUS techniques

<https://scor-int.org/wp-content/uploads/2022/08/CoNCENSUS-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG164-CoNCENSUS-2022.pptx>

WG 165. MixONET: Mixotrophy in the Oceans – Novel Experimental designs and Tools for a new trophic paradigm

<https://scor-int.org/wp-content/uploads/2022/07/MIXONET-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/WG165-MixONET-2022.pptx>

APPENDIX 5. LINKS TO RESEARCH PROJECT REPORTS

GEOTRACES – Marine Biogeochemical Cycles of Trace Elements and Isotopes

https://scor-int.org/wp-content/uploads/2022/07/2022_GEOTRACES_AnnualReport.pdf

https://scor-int.org/wp-content/uploads/2022/07/2022_GEOTRACES_AnnualReport_Annex.pdf

<https://scor-int.org/wp-content/uploads/2022/12/GEOTRACES-2022.pptx>

SOLAS – Surface Ocean – Lower Atmosphere Study

https://scor-int.org/wp-content/uploads/2022/07/SOLAS-Report-to-SCOR-2021-2022_final.pdf

https://scor-int.org/wp-content/uploads/2022/12/SOLAS_2022.pptx

IMBeR – Integrated Marine Biosphere Research

<https://scor-int.org/wp-content/uploads/2022/07/IMBeR-annual-report-to-SCOR-2021-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/IMBeR-2022.pptx>

IQOE – International Quiet Ocean Experiment

<https://scor-int.org/wp-content/uploads/2022/08/IQOE-Newsletter-9-1-1.pdf>

<https://scor-int.org/wp-content/uploads/2022/08/Ocean-Sound-Workshop-Report.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/IQOE-2022.pptx>

IIOE-2 – International Indian Ocean Expedition 2

<https://scor-int.org/wp-content/uploads/2022/09/IIOE-2-annual-report-2022-to-SCOR-VFF.pdf>

APPENDIX 6. LINKS TO INFRASTRUCTURAL PROJECT REPORTS

SOOS – Southern Ocean Observing System

<https://scor-int.org/wp-content/uploads/2022/07/2021AnnualReport-SOOS.pdf>

<https://youtu.be/yMEIdKWz5bo>

IOCCP – International Ocean Carbon Coordination Project

https://scor-int.org/wp-content/uploads/2022/07/IOCCP-2022_SCOR-Report_Final.pdf

<https://scor-int.org/wp-content/uploads/2022/12/IOCCP-2022.pptx>

COBS – Changing Ocean Biological Systems

https://scor-int.org/wp-content/uploads/2022/07/COBS_2022-Annual-SCOR-Report_final_20-July.pdf

<https://scor-int.org/wp-content/uploads/2022/12/COBS-2022.pptx>

GlobalHAB – Global Harmful Algal Blooms

https://scor-int.org/wp-content/uploads/2022/07/GlobalHAB-Progress-Report2022_to-SCOR-2022-07-24_submitted.pdf

<https://scor-int.org/wp-content/uploads/2022/12/GlobalHAB-2022-1.pptx>

JCS – Joint Committee on Seawater (IAPWS/SCOR/IAPSO)

https://scor-int.org/wp-content/uploads/2022/07/JCS-Report_20220631.pdf

https://scor-int.org/wp-content/uploads/2022/12/JCS_2022.pptx

APPENDIX 8. LINKS TO AFFILIATED PROJECT REPORTS

IOCCG – International Ocean Colour Co-ordinating Group

https://scor-int.org/wp-content/uploads/2022/07/SCOR_IOCCG_Annual_report_2022.pdf

<https://scor-int.org/wp-content/uploads/2022/12/IOCCG-2022.pptx>

https://youtu.be/Hs_M2c1apXE

InterRidge – International Ridge Studies

<http://interridge.org/news/>

GACS – Global Alliance of Continuous Plankton Recorders

No report provided

APPENDIX 9. LINKS TO AFFILIATED ORGANIZATION REPORTS

IABO – International Association for Biological Oceanography

https://scor-int.org/wp-content/uploads/2022/08/IABO_Report_SCOR_2021-2022.pdf

<https://scor-int.org/wp-content/uploads/2022/12/IABO-2022.pptx>

IAMAS – International Association of Meteorology and Atmospheric Sciences

https://scor-int.org/wp-content/uploads/2022/08/IAMAS-2022_SCOR_report.pdf

https://scor-int.org/wp-content/uploads/2022/12/Penner_IAMAS_4_slides.pdf

<https://youtu.be/NL32o2USzpM>

IAPSO – International Association for the Physical Sciences of the Oceans

<https://scor-int.org/wp-content/uploads/2022/08/IAPSO-Annual-Report-23Aug2022.pdf>

APPENDIX 10. LINKS TO PARTNER ORGANIZATION UPDATES

IOC – Intergovernmental Oceanographic Commission

https://scor-int.org/wp-content/uploads/2022/08/IOC_REPORT_SCOR_2022_003.pdf

<https://scor-int.org/wp-content/uploads/2022/12/IOC-2022.pptx>

PICES - North Pacific Marine Science Organization

<https://scor-int.org/wp-content/uploads/2022/07/PICES-Report-for-SCOR-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/PICES-2022.pptx>

<https://youtu.be/4FTS6FO9LCI>

GESAMP WG38 – Group on marine environmental protection: The atmospheric input of chemicals to the oceans

<https://scor-int.org/wp-content/uploads/2022/07/WG-38-Annual-Report-to-SCOR-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/GESAMP-WG38-2022.pptx>

POGO – Partnership for Observation of the Global Ocean

https://scor-int.org/wp-content/uploads/2022/08/POGO_Report_SCOR_2022.pdf

<https://youtu.be/rFBn3CT0dXc>

ISC – International Science Council

https://scor-int.org/wp-content/uploads/2022/07/ISC-Annual-Report_2021-web-version.pdf

https://youtu.be/I_6VXM6Ppig

SCAR – Scientific Committee Antarctic Research

<https://scor-int.org/wp-content/uploads/2022/09/Report-of-the-Scientific-Committee-on-Antarctic-Research-to-SCOR-2022.pdf>

https://youtu.be/d_IP0nIYCcc

Future Earth-Ocean Knowledge Action Network (Ocean KAN)

<https://scor-int.org/wp-content/uploads/2022/07/Futue-Earth-and-OceanKAN-2022.pdf>

<https://scor-int.org/wp-content/uploads/2022/12/OceanKAN-FutureEarth-2022.pptx>

WCRP – World Climate Research Program

[https://scor-int.org/wp-](https://scor-int.org/wp-content/uploads/2022/07/WCRP_CLIVAR_to_SCOR_2022_final_28Jul2022.pdf)

[content/uploads/2022/07/WCRP CLIVAR to SCOR 2022 final 28Jul2022.pdf](https://scor-int.org/wp-content/uploads/2022/07/WCRP_CLIVAR_to_SCOR_2022_final_28Jul2022.pdf)

<https://scor-int.org/wp-content/uploads/2022/12/WCRP-2022.pptx>

APPENDIX 11. LINK TO REPORT ON SCOR CAPACITY DEVELOPMENT ACTIVITIES

https://scor-int.org/wp-content/uploads/2022/08/Capacity_development_2022.pdf

<https://scor-int.org/wp-content/uploads/2022/12/SCOR-Capacity-Development-2022.pptx>

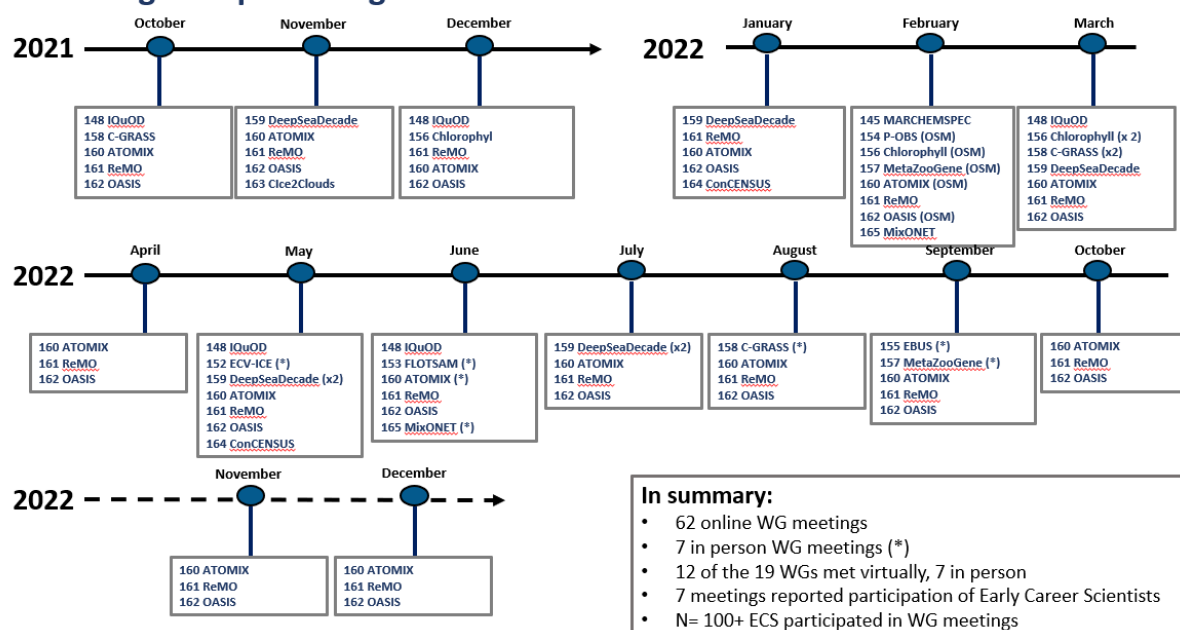
https://scor-int.org/wp-content/uploads/2022/08/POGO-SCOR-Fellowships_2022-incl-20202021-fellows.pdf

APPENDIX 12. 2021 AUDITED SCOR STATEMENT OF ACTIVITIES

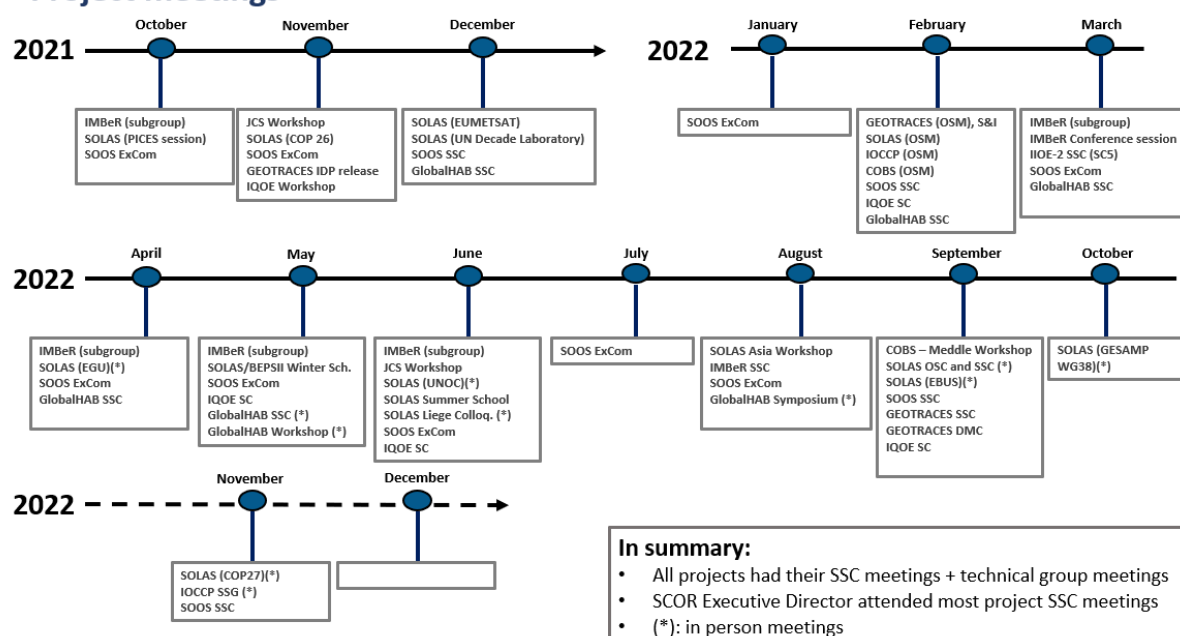
SCIENTIFIC COMMITTEE ON OCEANIC RESEARCH, INC. STATEMENT OF ACTIVITIES YEAR ENDED DECEMBER 31, 2021			
	Without Donor Restrictions	With Donor Restrictions	Total
SUPPORT AND REVENUE			
Grant revenue	\$ 534,787	\$ -	\$ 534,787
Contribution revenue	5,000	32,000	37,000
Membership dues	404,959	-	404,959
Miscellaneous income	5	-	5
Interest income	100	-	100
NET ASSETS RELEASED FROM RESTRICTIONS			
Satisfaction of program restrictions	9,596	(9,596)	-
Total support and revenue	954,447	22,404	976,851
EXPENSES			
Program services			
Scientific programs	560,010	-	560,010
Travel and subsistence programs	20,463	-	20,463
Other conferences and meetings	2,406	-	2,406
Total program services	582,879	-	582,879
Supporting services			
Management and general	293,052	-	293,052
Total expenses	875,931	-	875,931
CHANGE IN NET ASSETS	78,516	22,404	100,920
NET ASSETS			
BEGINNING OF YEAR	270,497	51,736	322,233
END OF YEAR	\$ 349,013	\$ 74,140	\$ 423,153

APPENDIX 13. SCOR RELATED MEETINGS (2021-2022)

Working Group meetings



Project meetings



APPENDIX 14. PRESENTATION OF BIOGEOSCAPES: Ocean Metabolism and Nutrient Cycles on a Changing Planet

Alessandro Tagliabue presented the BioGeoSCAPES project to the attendees of the SCOR 2022 annual meeting as an additional point to the agenda. BioGeoSCAPES is about developing an international program to study ocean metabolism and nutrient cycling by microbes in a changing ocean. BioGeoSCAPES seeks to combine genomics, physiology, biogeochemistry and modelling; it was designed as bottom up process from the science community, originating in 2018 following a workshop. It has self-identified ambassadors from 25 nations (8 national workshops completed), has 284 newsletter subscribers and ~1K Twitter followers (@biogeoscapes).

The need for BioGeoSCAPES: Ocean conditions, nutrient cycles and productivity are changing, therefore there is a need for improved science to understand and predict impacts, and to inform possible responses. At present, there are maturing analytical and computation capabilities which enhance our ability to measure key microbial and geochemical process across the global ocean. In addition, the UN Decade of Ocean Science for Sustainable Development is aiming for sustainable management of ocean resources.

BioGeoSCAPES addresses several UN Ocean Decade challenges by (1) understanding the effects of multiple stressors on changing ocean ecosystems (challenge 2), (2) understanding and protecting marine biodiversity, ecosystems and fisheries (challenge 3), (3) understanding the ocean-climate nexus (challenge 5), (4) developing a comprehensive digital representation of the ocean (challenge 8), and (5) enabling capacity development and equitable access to data, knowledge and technology (challenge 9).

The BioGeoSCAPES outcomes are expected to be:

- A baseline understanding of microbial communities and their metabolic function.
- New tools for data integration, visualization and analysis.
- Quantified biological and biogeochemical hierarchies structuring ocean metabolism at different scales.
- Key biological feedbacks represented in ocean ecosystem models.
- A foundation for study of future anthropogenic impacts on the ocean, and its resilience to change.
- To train a new generation of scientists worldwide for increased capacity in omics, bioinformatics, modelling, and biogeochemistry.

The activities planned for BioGeoSCAPES are:

2018-2023

- National planning workshops
- Intercalibration and standardization activities
- Special session at conferences
- International Royal Society Workshop
- Successful funding from NSF (~\$2M)

2023-2027

- International workshop being planned for 2023 to design BioGeoSCAPES Science Plan and its implementation
- Additional workshops for informatics and modelling integration, intercalibration
- Summer schools and early career development plan

2025-2027**Launch BioGeoSCAPES**

Alessandro Tagliabue wanted to share with SCOR their planned activities and timeline endorsed by the international community towards developing a BioGeoSCAPES Science Plan by 2024. They hope to launch BioGeoSCAPES in 2025 and would love for SCOR to support them somehow. Once they have a Science Plan, they would like to discuss with the SCOR executive committee the best way to do this. Co-developing the Science Plan with SCOR would also be desirable.