

Template for Annual SCOR Project Reports to SCOR

Summary:

The Eastern Boundary Upwelling systems (EBUS) SCOR WG funded at the end of 2017, started its activities in early 2018 with its first in person meeting in Washington DC, USA in May 2018, during the PICES 4th Conference of Climate Change Impact on the World Ocean. The terms of reference (TORS) of the WG include: 1) a synthesis of current information on EBUS physical and biogeochemical processes and their time and space scales affecting EBUS dynamics, 2) the development of a web-based portal for EBUS to graphically query integrated information on published data, model output as well as protocols for measuring key properties and indicators in EBUS, 3) the determination of the strengths and weaknesses of existing EBUS coupled physical-biological models, and 4) a recommendation framework for regional interdisciplinary (physics to biology) EBUS observing and modelling systems. During 2019 the WG carefully planned for a Summer School at Dakar, Senegal, the writing of a review paper for TOR 1, and the organization of an international conference on EBUS. Unfortunately, the COVID pandemic greatly impacted the execution of the activities, leading to delays, postponements, and cancellations. The Summer School was cancelled together with a meeting of the WG associated with this event. This was a significant setback. In spite of this a web-based portal on published data for EBUS was developed and continues to grow. The WG has been forced to continue meeting and working virtually. This has included the planning for an international EBUS conference (<https://www.ebus-lima2022.com/>) to take place in Lima Peru September 2022. The EBUS conference will be a major contribution from the WG. During the Conference the WG will hold an in person meeting to review pending tasks and set a strict timeline to achieve the TORS by mid 2023.

1. Name of project

SCOR WG 155 Eastern Boundary Upwelling Systems (EBUS): Diversity, Coupled Dynamics and Sensitivity to Climate Change

2. Activities since previous report to SCOR (e.g., virtual or in-person meetings, email discussions, special sessions). Limit 1000 words

Review Article: Virtual meetings and several discussions by e-mail have been held over the last months to make progress on the review article and in the modelling paper. The EBUS conference in September 2022 will provide an opportunity to meet and see what new information can be incorporated into the two papers.
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Open Science Conference: Monthly and recently weekly virtual meetings and significant e-mail exchanges have been held to organize sessions, select abstracts and plenary speakers for the September EBUS conference. There are 5 members of the WG on the organizing committee and several are acting as session conveners.

Web portal: Meetings and e-mail discussions were held in subgroups to refine this task with undergraduate students from different fields (e.g., computing science, environmental engineering, physics, mechatronics engineering)

Further information related to WG can be found in <http://www.igp.gob.pe/programas-de-investigacion/ciencias-de-la-atmosfera-e-hidrosfera/proyectos/SCOR>

3. Documents published since previous report to SCOR (e.g., peer-reviewed journal articles, reports, Web pages) and should be limited to publications that resulted directly from project activities and which acknowledge SCOR support.

Contributions from WG Members that acknowledge SCOR 155 EBUS WG:

- Update of webportal <https://ebus.science>
- Articles:
 - Gregorie et al. (2021) <https://doi.org/10.3389/fmars.2021.724913>
 - Parouffe et al., South East Pacific Oxygen Minimum Zone future habitability using climate velocities, under review
 - Linford et al., Recent deoxygenation of Patagonian fjords subsurface waters connected to the PCUC-ESSW variability, under review
 - Bograd et al., Climate change impacts on Eastern Boundary Upwelling Systems. Under review
 - González et al., Lateral transport and trophic and taxonomic similarity of zooplankton size-classes over the zonal gradient of central Chile. Under review Journal of Marine Systems
- Projects:
 - Participation in regional program as SCOR WG EBUS representative: CLAP (Research Program for Climate Action Planning)
 - ENSO-Climate Change and the Carbon cycle in the Pacific South-East (ECLIPSE). Funded by the Chilean National Agency of Research and Development (ANID). 3-years funding 2021-2023

4. Progress toward achieving project's terms of reference. List each term of reference separately and describe progress on each one. Limit 1000 words

Deliverable #1. A scientific review paper on the value of ocean observation and modeling in relation to ecosystem services and climate in EBUS and a summary for policy makers will be the key deliverables.

Members of the WG are actively working on this paper.

Deliverable #2. Develop an information system for EBUS.

A platform has been developed for finding published scientific information on EBUS using a graphical environment (<https://ebus.science>). The platform has been updated since the last report. This will be officially introduced at the EBUS Conference as part of a poster presentation associated to session 28 ‘Engaging citizen science, traditional knowledge, and scientific research for the formulation of management strategies, pollution mitigation and public policies in EBUS’.

Deliverable #3. Determine the strengths and weaknesses of existing EBUS coupled physical-biological models.

WG members are analyzing global models to evaluate biases in EBUS. In addition, advances in the development of a dynamical high-resolution forecast system of the oceanic and atmospheric circulation in the EBUS, focusing in Humboldt, will be presented in the session 27 ‘Towards the establishment of integrated multidisciplinary Earth-system observational and modeling systems in EBUS’.

Deliverable #4. Recommend a framework for regional interdisciplinary (physics to biology) EBUS observing and modeling systems.

Members of the WG have been working with other interested parties (e.g. IMARPE, IRD, IOC) to organize an Open Science Conference on EBUS in Lima in September 2022. This conference is an activity in support of this deliverable in that it will help define the framework.

5. Project activities planned for the coming year. Limit 500 words

Planned activities include: 1) completing and submitting the review article; 2) continue the organization of the Open Science Conference, including young scientists and executive panel activities; 3) annual in-person meeting of WG; 4) complete the analysis of the global models and prepare a report/publication; 5) Write up a recommendation for the framework for EBUS observing and modeling systems.

6. Is the project having difficulties expected in achieving terms of reference or meeting original time schedule? If so, why, and what is being done to address the difficulties Limit 200 words

The work and actions of this WG are still being influenced by the COVID-19 pandemic. Virtual meetings and e-mail remain the only methods to move activities forward. The pandemic has not only influenced the ability to meet in person but also the time for dedicated focus on the WG activities. WG members are actively pushing forward and finding ways to achieve the WG goals which have moved forward at a much slower rate than originally expected. The EBUS conference will hopefully provide an impetus for the activities.

7. Any special comments or requests to SCOR. Limit 100 words.

The COVID pandemic has influenced some key events (summer school in Dakar-Senegal involving a workshop and an annual in-person meeting of the WG were cancelled). The EBUS Open Science Conference (OSC), scheduled for September 19-23, 2022 (Lima - Perú) in hybrid mode, where WG members are key organizers (5 members as part of the organizing committee, several as session conveners, several as coauthors to oral or poster presentations and as keynote or invited speakers), will provide an opportunity to move along key activities. At the EBUS conference there will be early career scientist (ECS) and executive panel activities; the WG requests financial support for ECS. In addition, the EBUS OSC will be an important opportunity for the WG to meet in person and make progress. Therefore, we request that the SCOR leadership consider extending the WG through June of 2023.

Additional information can be submitted and will be included in the background book for the SCOR meeting at the discretion of the SCOR Executive Committee Reporter for the WG and the SCOR Secretariat.