

Working Group Report to SCOR (2020)

1. Name of group

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

Activities previously to October 2019 were described in the October report:

E-Mail Discussion: Many emails of very active discussion on the Summer School organization, revision of applicants, budget and organization took place between December 2019 and March 2020.

Virtual Meeting Summer school: This meeting was held in 20 January 2020 and attended by the Summer School subgroup, along with Chairs of the SCOR WG and it was carried out to discuss the budget for the Summer School and SCOR WG annual meeting planned for May 2020 in Dakar, Senegal.

E-mail discussion took place between February and May 2020 by the Subgroup coordinating the Open Science Conference in Lima 2021.

An online meeting of the Summer School Subgroup took place on 29 May to discuss next steps related to the planned Summer School in Dakar in May 2020, as cancelled (postponed) due to Coronavirus pandemic.

Online Annual Meeting: This annual virtual meeting was held on 3, June 2020 and chaired by R. Escribano. Key issues were a review paper, coordination with CLIVAR EBUS, Lima Open Science Conference, and cancellation or postponing the Summer School for 2021.

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 WG activities and which acknowledge SCOR support

Contributions from WG Members and with acknowledge to SCOR 155 EBUS WG:

Riascos, J.M., Gutiérrez, D.A., Escribano, R., Thadje, S. 2019. Editorial: El Niño-Southern Oscillation on a Changing Planet –Consequences for Coastal Ecosystems. *Frontiers in Marine Sciences*. Published in 20 December 2019. doi: 10.3389/fmars.2019.00774. 17, 455–473, 2020

Tutasi, P., Escribano, R. 2019. Zooplankton diel vertical migration and downward C flux into the Oxygen Minimum Zone in the highly productive upwelling region off Northern Chile. *Biogeoscience*. Published in January 2020. doi.org/10.5194/bg-17-455-2020.

Garçon, V. et al., 2019, Multidisciplinary Observing in the World Ocean's Oxygen Minimum Zone Regions: From Climate to Fish — The VOICE Initiative, *Frontiers in Marine Science*, <https://doi.org/10.3389/fmars.2019.00722>.

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

Our progress toward achieving the TORs include the following:

ToR #1. Synthesize available information on important EBUS processes, their time and space scales (i.e., diurnal, intraseasonal, interannual, decadal, multidecadal) and their implications on water column properties, biogeochemical cycles, biodiversity/ecosystem structure and functioning, and the ecosystem services they provide. Seek to identify key feedback mechanisms, establish similarities, differences and knowledge gaps across all EBUS. A scientific review paper and a summary for policy makers will be the key deliverables.

A review article entitled "Ecosystems services and climate change: a new paradigm - A case study in the EBUS" is being drafted as part of this TOR. Leader authors include most WG Members. The key focus and scope of the work have been defined and progress is being made on writing.

The SCOR WG 155 'EBUS' Summer school called '*Changes in coastal upwelling systems and their impact on marine resources*' was organized, in conjunction with TARA seminar 'Biodiversity to Ecosystems and Science to Policy in the High seas', from May 4 to 15, 2020 in Dakar – Senegal (<https://sites.google.com/view/scor-wg-ebus-ss-2020/home?authuser=0>). Baye Mbaye (Full Member) is the summer school main director, accompanied by Eric Machu (Associate Member), Xavier Capet (Associate Member), Ivonne Montes (co-chair), and Véronique Garçon (WG invited member). The scientific committee was listed in the program proposal. Nine WG 155 members accepted to participate as lecturers in the summer school. Discussion on potential new dates for 2021 is currently going on, although there is also discussion on the need to continue developing Webinars while plans for re-scheduling the summer school are underway.

ToR #2. Develop a Web portal for EBUS by creating a web-based platform to graphically query integrated information on published data, model outputs, as well as protocols for measuring key properties and indicators in EBUS.

We are currently discussing on availability of existing platforms (e.g., POMEQ, EMODNET, CCLME ECO-GIS viewer) for data gathering and synthesis. However, new directions and advices from the recent work of Todd et al. (2019 *Frontiers in Marine Science*), in which several SCOR 155 WG are co-authors, are under consideration in the context of developing a global observational network of EBUS dynamics.

ToR #3. Determine the strengths and weaknesses of existing EBUS coupled physical-biological models. Such an analysis will have mostly a regional focus, but it will also attempt to address subregional scales building upon past and ongoing research programs on upwelling centers (e.g., Bay of Hann near Dakar (Senegal), Monterey Bay (USA), Bay of Concepcion (Chile)). This TOR will require interaction with the CLIVAR EBUS Research Focus. The key product will be a publication in a high-impact journal.

No recent progress has been made yet on this ToR. However, we have been discussing preliminary ideas where a comparison from existing EBUS regional models with a global regional simulation is proposed and we are aiming at this action in collaboration with CLIVAR EBUS Research Focus.

ToR #4. Recommend a framework for regional interdisciplinary (physics to biology) EBUS observing and modeling systems. This stems from TORs 1-3. The observation system will be designed to improve the performance and reliability of forecast models in these socio-economically relevant regions of the world ocean. Such a recommendation brief will also address needs for fostering interactions between the observational and modelling communities (e.g., coordinated experiments with common forcing; recommendations on

resolution of specific processes or a specific scale, etc). The recommendations will be included in the summary for policy makers.

This ToR depends on completing ToRs 1, 2 and 3, so our efforts are focused on ToRs #1 and #2. The Open Science Conference is another proposed activity for this goal and organization is under-way, although now it is much depending on the Covid-19 pandemic during 2021.

Outreaching on WG actions for a wider community is also being developed through our webpage <https://scah.igp.gob.pe/scor-working-group-155>. Information on the SCOR WG 155 can be found, including ToRs, members, publications, activities, and special announcements, such as info about the summer school (<https://sites.google.com/view/scor-wg-ebus-ss-2020/home>) and the Open Science Conference (https://scah.igp.gob.pe/sites/scah.igp.gob.pe/scor/OSC_SCORWG155.pdf).

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

- During the recent online meeting (June 2020) the possibility of developing a Webinar on EBUS dynamics and socio-economical implications has been proposed. This idea came up after raised concern on how our WG can contribute to reduce the Carbon footprint by avoiding presential lectures and meetings. This activity may initiate during the second half 2020.
- Two online meetings are considered during July-September 2020. Main issues to be under discussion will be the Summer School next year, the Open Science Conference next year, and advances of the review paper.
- Potential activities and actions, such as participation and organization of Conferences, Workshops and Special Sessions in Congresses during second term 2020 and early 2021 are depending on the pandemic situation, and therefore these activities will be under continuous evaluation and discussion in next virtual meetings and e-mail interaction.

6. Is the group 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 current situation during the recent months have slowed down the work and actions, because of the COVID-19 pandemic. Most universities and research centers have been closed for more than 3 months making difficult to advance in science and collaboration and so reducing scientific products. Lately, we are relying on virtual meetings and e-mail interactions to maintain activities of the WG. We are hoping the situation improves late this year as to resume main activities, but presential meetings, courses, Conferences or others will most likely be postponed until mid or second half 2021.

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

N/A

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.