

REPORT ON POGO WORKING GROUPS

Contractor's Report

Title of Working Group: COLaB

Name of Contractor: University of Ghana

Names of Participants: Benjamin Osei Botwe, Gregory Cowie, Jethan d'Hotman, Amanda Mgwali, Emmanuel Klubi, Kofi Ferni Anyan, Desmond MacCarthy, Eugene Attah, Comfort Opoku, George Ofosu-Amoako, Emmanuel Fynn

Total expenditure to be reimbursed (please attach a financial report with copies of receipts): 0

1) Please provide a brief description of the activities undertaken by the working group.

The Coastal Observation Lab in a Box (COLaB) initiative is associated with the UN Decade of the Ocean *CoastPredict* program. Its objectives are to develop a package of instruments, protocols, and hands-on training for water sampling and physical, biological, and biogeochemical observations, to build marine science capacity in under-resourced countries. A key feature of the initiative is that the methods package is applicable to settings ranging from rivers and wetlands to the continental shelf edge but requires no formal research vessel or laboratory.

The objectives of the field exercise were to use a subset of COLaB instruments and methods to demonstrate and provide training in the assessment of river discharge and circulation (within the river and offshore), as well as sediment transport and physical and biogeochemical processes occurring across the estuarine salinity gradient. Over 8 days, river discharge was determined by conducting a flow and bathymetry river transect using simple hand-held flow meters and depth finders. Current measurements were made with drifters and acoustic current meters (fixed-depth and profiling) and water structure and mixing were assessed through CTD profiling across the estuarine salinity gradient. Several chemical analyses (nutrients, pigments, and dissolved organic matter) were conducted on water samples collected across the same gradient. Comparative studies were conducted under rising vs falling tidal conditions. Notably, the field and lab work also allowed us to test newly developed affordable instruments (CTD, colorimeter, and fluorimeter) against commercial counterparts. Finally, suspended sediment samples were collected to determine mercury concentrations. All sampling and instrument deployment were conducted using local fishing boats, and analyses were conducted at a makeshift laboratory set up at a local hotel.

2) Please describe the milestones and deliverables achieved.

Most of the analyses have been completed, and we are now in the process of working up the CTD, river discharge, and current data. This data, alongside sediment load and mercury results, will be modeled by a COLaB partner (Hanert, Belgium) to provide a first assessment of the fate of sediment and mercury discharged from the Pra River. This should be completed by July 2025.

3) Is this Working Group likely to continue to meet beyond the dates outlined in the original proposal?

Chair: Prof. Nicholas Owens

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Multiple plans are in place for the COLaB working group, for 2025 and beyond. The field exercise in July 2024 was followed by a training camp in Kenya in September (focused on the Mida Creek estuary) and a full regional COLaB training camp is being planned for Mozambique (Maputo Bay and Inhaca island) for the second half of 2025. A proposal is also being submitted to support a similar COLaB training camp in Ghana (for the Gulf of Guinea region), and continued work on sediment and mercury dynamics in the Pra and Ankobra rivers. We will also provide training as part of CoastPredict's Global Coast program, and COLaB and coastal marine science capacity building have now been incorporated into the next phase of the 2nd International Indian Ocean Expedition (IIOE-2).

4) Please provide your comments on the POGO-funded Working Group Initiative (e.g. has the funding made a significant difference in the progress of this Working Group?).

The funds received from POGO for the COLaB working group initiative have been critical to setting all the above plans in motion and enabling a first COLaB "proof-of-concept" field exercise in Ghana in July 2024 with participating scientists from the UK (Gregory Cowie), South Africa (Jethan d'Hotman and Amanda Mgwali), and the University of Ghana. We are extremely grateful. Funds received from POGO supplemented those obtained through an *Experiment.com* crowdfunding bid.

Please return completed form by e-mail to pogoadmin@pml.ac.uk and enclose a copy of the Workshop report, if applicable.

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