Integration of bio-optical profiling floats within an Indian Ocean biogeochemical observing system.

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The integration of robotic profiling floats with next-generation optical sensors (bio-profilers) is enabling measurement of optical proxies for several biogeochemical variables in remote areas of the ocean that were previously inaccessible to observation, except through occasional snapshots from ship-based expeditions. While Earth observation satellites can measure optical proxies of several of these quantities (chlorophyll, CDOM, light scattering), their field of view is restricted to the surface layer (first optical depth) of the ocean. Simultaneous measurement from bio-profilers and satellites provides the potential to derive a dynamic 3D view of biogeochemical dynamics at the basin and global scale. Understanding the capabilities and stability of these sensors for prolonged deployments, development of standardised quality control (QC) procedures and investigation of optimised deployment configurations are all key challenges for including bio-profilers in basin-scale ocean observing systems. Here we describe results that address these challenges from a joint project between Australia’s Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Indian National Institute of Oceanography (CSIR-NIO), the Indian National Centre for Ocean Information Services (INCOIS) and the Indian Ocean regional program office of the Intergovernmental Oceanographic Commission (IOC). We address QC issues, comparisons with ocean colour remote sensing and considerations for capturing high-frequency and mesoscale variability in observing system design.