ABSTRACT
The global view of ocean productivity has been defined for the past three decades by satellite-derived images of optical properties of the ocean's surface layer. Yet in most of the ocean, zones of enhanced phytoplankton production and nutrient recycling are located at depths below the view of optical satellites. In the subtropical gyres, the almost ubiquitous deep chlorophyll maximum is often located at depths exceeding 100m, along density interfaces at a boundary between the down welling light flux and upward transport of nutrients. Below the chlorophyll maximum heterotrophic production is the dominant process resulting in strong oxygen consumption and dissolved nutrient regeneration. Observing the physical forcing and biogeochemical dynamics that drive this transport of nutrients. Below the chlorophyll maximum heterotrophic production is the dominant process resulting in strong oxygen consumption and dissolved nutrient regeneration. Observing the physical forcing and biogeochemical dynamics that drive this system at the relevant time scales ranging from the diel to the seasonal has been a long-standing challenge in oceanography. In particular, measuring the processes occurring through perturbations to relaxation has often been more happenstance than design. In this presentation we describe advances in sensor systems deployed on autonomous robotic profilers to quantify carbon, oxygen and nutrient cycling within the interior ocean and present examples from the subtropical Indian Ocean and western Mediterranean.

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Biogeochemical Floats
Autonomous ARGO floats have proven to be reliable and economical vehicles for collecting data from remote locations and on a world wide scale. As the float technology has proven itself, the range of biogeochemical sensors installed on floats has rapidly expanded.

Sensors: CTD, DO, Backscattering, Chlorophyll, FDOM, PAR, NO3, pH

Floats have also increased in mission flexibility, with the ability to perform complex mission plan sequences. Floats can also be reprogrammed after release with new mission sequences to, for example, increase the time the float spends in an eddy structure.

Locations of the floats discussed in this poster. The Indian Ocean floats are still functioning. The Western Mediterranean float ran out of battery power after 245 profiles.

Diel Data: Float 391

Four consecutive profiles by float 391 demonstrate coherence between chlorophyll, particles (as backscattering) and the nutricline (as NO3). Note that vertical excursions are mostly due to variability of the density field, using the salinity as a proxy for density.

Profiles just before (93) and after an overturn event in the Western Mediterranean off the Gulf of Lyon. The overturn event acts as a boundary condition that allows for rate calculations of net changes in biogeochemical parameters in the upper water column. Trend data are the averages in the upper 200 m.