

Mesoscale to Submesoscale variability during the OUTPACE cruise: Contrasting Biological and Physical regimes in the oligotrophic SW Pacific

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In the past decades, both modeling and theoretical studies have identified the submesoscale as a dynamical regime with large consequences for planktonic ecosystems. These impacts relate primarily to altered light and nutrient fields, brought about by rapid restratification, vertical advection of nutrients to the surface, and/or mixing, all occurring on timescales similar to planktonic growth. Despite the ubiquitous nature of mesoscale and submesoscale features in the ocean, most physical studies naturally focus on vigorously forced, energetic mixed layers in the context of temperate latitudes, coastal transition areas, and/or wintertime conditions. How do submesoscale structures arise for plankton in more quiescent regions, such as the margins of subtropical gyres? Additionally, what impact does submesoscale motion have upon phytoplankton and subsequent biological production?

Here we present results from the OUTPACE campaign (<https://outpace.mio.univ-amu.fr>), undertaken from February 18 to April 3, 2015, across the SW Pacific from Noumea to Tahiti onboard the French R/V L'Atalante. Using a combination of in situ and remote sensing data, we assess how both physical and biological variability manifests from the regional to the submesoscale. Understanding the drivers of biological variability in these regions has become imperative in light of both historical undersampling and to better understand the role they may play in time with ongoing climate change.

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