

Oceanography Seminar

“Tracing the 3-dimensional pathways of mode waters in the Pacific: Oxygen and nitrate transport into the interior and biases in Apparent Oxygen Utilization”

Water masses moving through the ocean interior follow complex 3-dimensional pathways that are not easily sampled from ships. We use robotic profiling floats to trace changes in oxygen, nutrients, and carbon along these pathways and test some of the basic assumptions we have about ocean biogeochemistry.

Thursday, March 14, 2024, 3:00p.m., MSB 100

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Mode waters are well mixed slabs of the ocean that form in winter-time sub-polar waters before subducting into the ocean interior. These waters ventilate the ocean at a depth range of 300-800 m, relieving oxygen deficiency and supplying nutrients that support up to $\frac{3}{4}$ of global primary production. However, much of what we know about the impact of mode waters in global biogeochemical cycles comes from models unconstrained by observations. We are now able to characterize mode water biogeochemical properties in the ocean interior, using autonomous profiling floats, revealing a very different 3-dimensional picture than we commonly get from typical ocean sections. We find that the waters supplying the majority of nutrients and oxygen to the ocean interior follow distinct pathways and are supplied by a small density range of mode waters. Furthermore, by tracing these waters and looking at how oxygen and nitrate evolve as they move equatorward and age, we show that a commonly used metric of interior ocean respiration, Apparent Oxygen Utilization, overestimates respiration by $\sim 50\%$, due to disequilibrium at the time of formation and interior ocean mixing.

[Schedule of upcoming seminars](#): Thursdays, 3:00pm, MSB 100