Woods Hole Oceanographic Institution

Biology Department Seminar

Thursday, December 14, 2023 – 12:00 Noon

Evaluating the Contributions of Mesopelagic Prey to Top Teleost Predators in the Open Ocean Using Compound-Specific Stable Carbon Isotope Analysis

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The ocean's twilight zone is a vast area of the global ocean that lies between the sunlit surface waters and perpetually dark midnight zones, covering depths from c. 200 to 1000 meters. While marine science has historically focused on shallow and nearshore regions, recent work in the twilight (or mesopelagic) zone has revealed unexpected biomass and diversity that may not only challenge scientific understanding of marine systems but also provide a new and largely untapped resource for fisheries harvest. One of the key knowledge gaps in our understanding of the mesopelagic is how its food webs support unquantified foraging activity by commercially valuable, highly migratory top predators. Here, as part of WHOI's Ocean Twilight Zone project, we trace the flow of carbon through pelagic ecosystems in the northwest Atlantic to three predators – bigeye tuna (*Thunnus obesus*), swordfish (*Xiphias gladius*), and yellowfin tuna (*Thunnus albacares*) – via compound-specific stable carbon isotope ratio (δ13C) analyses. Mesopelagic-associated carbon was estimated as both a direct and indirect source of predator carbon, with the resulting contributions as high as 92%. Additionally, we describe the seasonally shifting carbon sources of predators as they move between temperate and tropical waters by contrasting tissues (liver, muscle) and season of sampling (summer, fall). This work informs the motivations of deep diving in large marine predators, and provides key estimates of food web linkages to inform multi-species fisheries management of both mesopelagic prey and migratory predators.

HYBRID! **In Person**: Redfield Auditorium **Zoom:** https://whoi-edu.zoom.us/j/91660744747 Meeting ID: 916 6074 4747 **By phone**: Find your local number: https://whoi-edu.zoom.us/u/abee7P9F66