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“Dynamics of nitrogen cycling microorganisms in the open sea”

Abstract: The ocean’s nitrogen cycle is controlled by the metabolic activities of diverse microorganisms. In the aerobic waters of the open sea, nitrogen fixation and nitrification are two major processes governing the transformation of nitrogen containing compounds in the upper ocean. Nitrogen (N₂) fixing microorganisms (termed diazotrophs) introduce bioavailable nitrogen to plankton food webs, while nitrifying microorganisms oxidize ammonia to nitrite and nitrate. Our understanding of the contributions of these microorganisms to ocean biogeochemistry has improved dramatically over the past several decades; however, to date, we have only limited information on the ecology and population dynamics of the microorganisms driving these processes. By merging measurements on rates of nitrogen transformation with molecular-characterizations of the diversity and abundances of nitrogen cycling microorganisms, our understanding of the processes regulating the microbial ecology underlying the ocean nitrogen cycle continues to improve. This presentation will describe variability associated with the population structure of diazotrophs and nitrifying microorganisms based on work being conducted at Station ALOHA. Results from these studies highlight some of the processes controlling time-varying physiology and population structure of nitrogen cycling microbes in this ecosystem.

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