Studies of Marine N_2 fixation from Physiology to Ecology: Data Synthesis and Modeling

Ya-Wei Luo

College of Ocean and Earth Sciences, State Key Laboratory of Marine Environmental Science, Xiamen University, Xiamen, China

Abstract:

Marine N_2 fixation is a crucial process, contributing approximately half of the bioavailable nitrogen input to the global ocean. In this presentation, I will discuss our research on marine N_2 fixation through data synthesis and numerical modeling. We integrate laboratory experiment results into cellular physiological models to examine how the major marine N_2 fixers, *Trichodesmium*, respond to ocean acidification and manage the conflict between O_2 generation from photosynthesis and O_2 inhibition on N_2 fixation. Additionally, I will present a comprehensive database compiled from all available in situ measurements of N_2 fixation rates and diazotroph abundances. Our analysis of the measurements over the past decade suggests an increased global estimate of marine N_2 fixation. Finally, I will explore the environmental factors influencing the spatial variations in observed N_2 fixation. Overall, my talk will highlight the opportunities and challenges in studying N_2 fixation across physiological and ecological scales.