



THE MARINE SCIENCE INSTITUTE
COLLEGE OF SCIENCE
UNIVERSITY OF THE PHILIPPINES



SEMINAR

THE EFFECTS OF SUBMARINE GROUNDWATER DISCHARGE ON TROPICAL REEF BENTHIC COMMUNITY COMPOSITION, STRUCTURE, AND PRIMARY PRODUCTIVITY

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ABSTRACT:

Submarine groundwater discharge (SGD) has been recognized as an important source of inorganic nutrients and freshwater to coastal waters worldwide. In Hawai'i, SGD has been implicated in changing reef community structure and hypothesized to enhance primary productivity. My dissertation work sought to clarify the role of SGD in structuring benthic macroalgal communities and changing overall reef productivity. My overall approach was to measure SGD and oceanographic processes in situ and use a variety of modeling techniques to understand when and where SGD structures benthic communities in Maunalua Bay, O'ahu. I used benthic chamber stable isotope incubations to show that SGD increases productivity of a dominant benthic alga by 82% and water column productivity by 32%. The highest productivity rates occur at intermediate salinities (~21–22), indicating that mixing of nutrient-rich groundwater stimulates the productivity of algae and plankton in specific areas of coral reefs. Using surveys of macroalgae I found that species-specific macroalgal biomass and growth are significantly related to both SGD and long-term integrated indices of wave and wind exposure. I also related multivariate community structure to the temporal and spatial variability in tidally modulated SGD, showing that there are very few benthic species that can tolerate the biogeochemistry associated with SGD seeps. Areas with SGD can be hotspots for algal restoration and for species with large tolerance ranges for temperature, salinity, and nutrients to thrive. The site differences in both the SGD biogeochemistry and community structure underlines the importance of doing these types of studies at the watershed level. Understanding the effects of SGD on coastal communities will help direct and prioritize conservation and management efforts.

ABOUT DR. LA VALLE

Dr. Florybeth La Valle is a postdoctoral researcher working at the University of California in Berkeley on water quality and coastal ecology issues in nearshore environments. She received her Ph.D. in Marine Biology at the University of Hawai'i at Mānoa. Her research interests are in near-shore community ecology and biogeochemical cycling. Specifically, she studies the effects of land-based pollutants on algal communities in coral reef ecosystems.

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