Early Career Faculty Innovators Seminar Series

Hypoxia and Ω variability in the coastal ocean: Processes that lead to predictability on the west coast

Samantha Siedlecki, University of Connecticut

Thursday, August 1, 2019, 12:00 pm – 1:30 pm

WOR Board Room, Fleischmann Building

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Abstract: Ocean acidification and hypoxia of coastal waters are of increasing concern to local fisheries. Low dissolved oxygen and hypoxic events are increasingly common in the Northern California Current System (N-CCS), and projected to become more intense and persist over more of the upwelling season in the future. In the N-CCS, direct effects have been observed on the $100 million shellfish industry from ocean acidification. The ability to forecast and project the severity of hypoxic events as well as the degree of acidification could be of considerable benefit to these stakeholders. Through the design of biogeochemically relevant tracers, regional simulations can improve our understanding of processes difficult to observe, investigate relationships between the ecology of marine organisms and ocean health, and generate forecasts and projections of changes to the region. For example, seasonal forecasting is now possible in the region with JISAO's Seasonal Coastal Ocean Prediction of the Ecosystem, J-SCOPE, (Siedlecki et al, 2016). Predictive skill has been shown in the region on seasonal timescales for variables relevant to management decisions for fisheries, protected species, and ecosystem health (Siedlecki et al. 2016), but a mechanism that drives that predictability for hypoxia, saturation states or pH remains unidentified. Analysis of model results indicate the integrated wind stress of the preceding winter downwelling season significantly influences shelf water properties of the following upwelling season. Years exhibiting stronger winter downwelling experience higher depth-averaged nutrients within the mixed layer and then higher volumes of hypoxic waters during the following upwelling season. A local amplifying mechanism for an atmospheric ENSO teleconnection is identified with important implications for seasonal forecasts of biogeochemistry and future projections in the region.

Bio: Samantha Siedlecki is an assistant professor in the Department of Marine Sciences at the University of Connecticut. As a biogeochemical oceanographer, she focuses on coastal regions where she investigates interdisciplinary processes within that environment responsible for the observed carbon dynamics. She regards models as tools that integrate observations and theory and uses them to investigate processes and mechanisms, or to try and understand future scenarios. Her current research is largely centered on forecasting and projecting ocean acidification and hypoxia in coastal regions of the US. Through the forecasting work, she works closely with stakeholders and end users to forecast relevant conditions for their decision making.

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