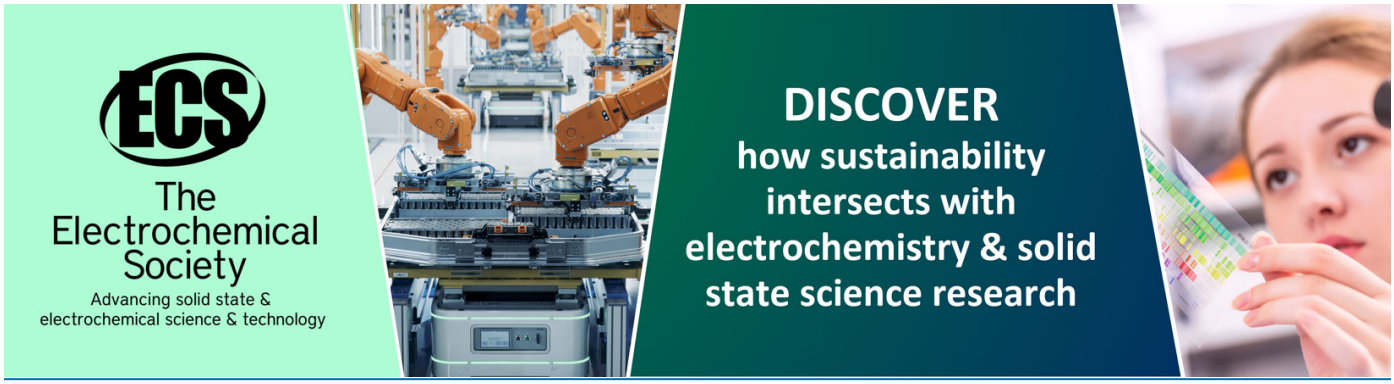
Assessing climate change impacts on primary production and calcification on a coral reef — a pilot study of ocean acidification processes on the Great Barrier Reef



Session: 46 - Consequences of Acidification of Land and Ocean Poster Presentations

P46.01

Assessing climate change impacts on primary production and calcification on a coral reef – a pilot study of ocean acidification processes on the Great Barrier Reef

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Coral reefs are some of the most productive and diverse ecosystems in the world, thus nurturing many fisheries and sustaining coastal communities in the tropics. However, these ecosystems are fragile and are currently being significantly threatened by the process of ocean acidification, which is directly related to climate change. With increased levels of atmospheric CO2, more CO2 dissociates in the ocean, affecting its delicate chemical balance and the calcifying abilities of many organisms vital to ecosystem health and productivity. In order to understand the future of coral reef health, paths to conservation, and natural resource management in many coastal communities dependent on coral reef resources, we need to study ocean acidification trends on various temporal and spatial scales. We combine approaches from the fields of engineering, physical oceanography, and marine biogeochemistry to develop a more quantitative understanding of the flow of carbon throughout the physical environment of a healthy coral reef. We have designed an instrumentation technique that enables us to make high-resolution in-situ carbon system measurements in various reef environments. We are currently testing the system on Heron Island, on the Great Barrier Reef in Australia. As reefs have a crucial biogeochemical role in maintaining equilibrium in the carbon system in surface waters in the tropics, we attempt to describe diurnal and seasonal variations in rates of primary production and calcification on the reef, as well as their dependency on flow regime and carbonate saturation state. Once we have a better understanding of the dynamic variability in primary production and calcification on this reef, we hope to be able to develop predictive assessment of regional reef ecosystem vulnerability, based on the high-resolution data acquired, regarding the coral reef system response in light of ongoing perturbations to the global climate system.

