PI curve

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Project
» OCE-PRF: Mechanisms of coral resistance to climate change driven stressors in the Tropical Eastern Pacific (TEP coral resistance)

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BCO-DMO Curation Notes

These data are currently being processed by BCO-DMO.

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Parameters

Parameters for this dataset have not yet been identified

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Project Information

OCE-PRF: Mechanisms of coral resistance to climate change driven stressors in the Tropical Eastern Pacific (TEP coral resistance)

Coverage: Panamanian Tropical Eastern Pacific

This award is funded in whole or in part under the American Rescue Plan Act of 2021 (Public Law 117-2).

Coral reefs, one of the most productive and biodiverse habitats in the ocean, are at risk of collapse from climate change-related stress. Their ability to resist climate change events such as increasing temperatures is expected to be greater in regions of the world where substantial variations in climate conditions occur. Some Tropical Eastern Pacific (TEP) areas experience seasonal winds that push warm water away and allow cold water from the ocean bottom to the surface. This annual phenomenon called “upwelling” brings variation in ocean conditions such as temperature, pH, salinity, and nutrients. While coral populations from upwelling regions are expected to be better adapted to resist climate change-related stress, the mechanisms by which corals can cope with changing conditions are poorly documented. This project investigates why some corals in the TEP may be more resistant to the damaging effects of climate change than corals elsewhere., This study

aims to elucidate corals' physiological responses to changes in temperature and salinity through extensive field and laboratory experiments, which can inform coral reef restoration efforts worldwide.

The objectives of this project are to determine differences in performance (i.e., photosynthetic or respiration rate) with thermal reaction norms (TRNs) of coral populations from upwelling and non-upwelling regions along to the Pacific coast of Panama and assess whether coral sensitivity varies in response to altered regimes of temperature and salinity. Differences in coral population performance are investigated in situ across temporal temperature gradients and from experimental assays combining temperature gradients and extreme salinities expected under climate change. This study proposes to use the empirical results in a model of population performance that includes a new formulation of a temperature-salinity interaction to test the prediction that suboptimal salinity is likely to exacerbate environmental warming effects on corals. So far, the synergistic effects between temperature and salinity as climate-driven stressors on coral populations have not yet been thoroughly studied. This study is expected to yield important knowledge for coral reef conservation and restoration efforts. This project is primarily conducted in Panama, Central America, and it includes training undergraduate students from underrepresented minorities by fully engaging them in the research activities. This training is an excellent opportunity to prepare them for a successful scientific career in an international forum. The research team also promotes awareness of climate change and its impact on coral reefs through various activities, including outreach and educational activities for school children in Panama. Information that can apply to the conservation and restoration of corals will be disseminated to a wide variety of stakeholders from the U.S., Panama, and neighboring countries.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-2126524

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