Persistent El Niño driven shifts in marine cyanobacteria populations

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From 2014 through 2016, a significant El Niño event and the North Pacific warm anomaly (a.k.a., “the blob”) resulted in a marine heatwave across the Eastern North Pacific Ocean. To develop a deeper understanding of the impacts of El Niño on the Southern California Bight (SCB), we used coastal cyanobacteria populations in order to “bi-directionally” link shifts in microbial diversity and biogeochemical conditions. We sequenced the rpoC1 gene from the ecologically important picocyanobacteria *Prochlorococcus* and *Synechococcus* at 434 time points from 2009–2018 in the MICRO time series at Newport Beach, CA. Across the time series, we observed an increase in the abundance of *Prochlorococcus* relative to *Synechococcus* as well as elevated frequencies of clades commonly associated with low-nutrient and high-temperature conditions. The relationships between environmental and diversity trends appeared to operate on differing temporal scales. In addition, microdiverse populations from the *Prochlorococcus* HLI clade as well as *Synechococcus* Clade II that shifted in response to the 2015 El Niño did not return to their pre-heatwave composition by the end of this study. This research demonstrates that El Niño-driven warming in the SCB can result in persistent changes in key microbial populations.