Oceanic Primary Producers' Responses to ENSO Variability: The Role of Continental-Oceanic Interactions
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Oceanic primary producers respond rapidly to a complex spectrum of climate-driven perturbations, confounding attempts to isolate the principal causes of observed changes. A dominant mode of variability in the Earth-climate system is that generated by the El Niño phenomenon. Recently, marked variations have been observed in the centroid of anomalous warming in the Equatorial Pacific under El Niño, associated with quite different teleconnection patterns. Here, using observational and reanalysis datasets, we differentiate the regional forcing mechanisms, including continental-oceanic interactions, and assess their influence on oceanic primary producers during two extreme types of El Niño. We find robust evidence that Eastern Pacific (EP) and Central Pacific (CP) types of El Niño generate regionally-different, and sometimes opposite, impacts on primary producers, associated with changes in inland precipitation, as well as wind-driven dust transport from inland deserts and vegetation fires. Our analysis highlights complex interactions between continental and oceanic processes that: 1) are forced by remote teleconnection patterns, and 2) may act in synergy to create larger responses in oceanic primary producers.

キーワード：海洋一次生産、リモートセンシング、ENSO
Keywords: Oceanic primary producers, Remote sensing, ENSO