Geophysical Research Abstracts
Vol. 21, EGU2019-7468, 2019
EGU General Assembly 2019

The implication of local vs regional based reconstructions in upwelling areas

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The implication of local vs regional based reconstructions in upwelling areas
Upwelling areas are of extreme importance regarding social and economic aspects. They represent a small area of the oceans. However due to the ecological richness, they support a strong fishing-based economy. Therefore, trying to understand how such areas and upwelling processes can be affected by estimated future climate changes will help to mitigate negative impacts on these specific ecosystems.
A crucial step in this process is the ability that the scientific community has in reconstructing past variations related with past climate changes. These reconstructions are based on mathematical equations that result from modern calibrations and validations. However, the scientific community often must decide on the type, size and quality of these calibrations. This means deciding between small but local and regional or more spread global calibrations. Most of these decisions are based on statistical measurements. However, how can one decide better? Specially with such nutrient rich upwelling areas that in addition are often seasonally induced.
Here we present a case study regarding the impact of different calibrations in the coastal upwelling reconstructions of the NE Pacific. We used a local transfer function and compared the results in the primary production reconstructions with the ones obtained by using a regional (entire North Pacific) one for the past 25,000 years B. P.. The results show that not only the most statistically significant oceanic property changes (from primary productivity to sea surface temperature) when changing from a local to a regional calibration, but also the strength of the predictive equation varies (the sea surface temperature increases and the primary productivity decreases). Finally, we will show sea surface temperature and primary production reconstructions for the NE Pacific upwelling system for the past 25,000 years B.P. Our results imply that this system might be more effective in Carbon sequestration with warming.