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The impact of global warming on the upwellings and primary productivity at the southern limb of the California Current, Baja California, Mexico

Jose Carriquiry¹, Christina Treinen-Crespo¹, Julio Villaescusa¹, Ann Pearson², and Loic Barbara¹

¹Instituto de Investigaciones Oceanológicas, Universidad Autónoma de Baja California, Ensenada, Mexico

(carriquiry@uabc.edu.mx)

²Department of Earth and Planetary Sciences, Harvard University, Cambridge, MA, USA

Although most simulation models published have concluded that coastal upwelling will intensify in three of the most productive marine ecosystems of the world, the results seem contradictory for the California Current System (CCS). These contradictory results may be due to the fact that instrumental records are too short to yield reliable predictions. Because of this, we opted to test this hypothesis by studying the sedimentary record of Soledad basin, in Baja California, Mexico, using geochemical proxies to reconstruct at ultra-high resolution the history of productivity and sea surface temperature during the last two millennia, with particular emphasis on the Anthropocene. Our results indicate that SST (alkenones and TEX-86) do not show a cooling trend during the Anthropocene, but rather multidecadal cycles related to PDO. Likewise, primary productivity organic biomarkers [i.e., alkenone concentration (C37 Total) as a proxy for phytoplankton productivity, etc] show an increasing trend that started 2000 years ago with prominent multidecadal cycles, but without any observable trend taking place during the Anthropocene. An interesting feature of the organic matter record is the increasing amplitude of the cycles towards the present, starting 2000 years ago. Primary productivity is probably controlled by large scale mesoscale eddies developing at the southern Baja California margin.