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Seasonality and ENSO in high resolution cores in the NE Pacific

Juan Carlos Herguera and Daniela Rabiela
CICESE, Oceanography, Ensenada, Mexico (herguera@cicese.mx, 52 646 1750545)

The largest changes in temperature in the ocean happen on the seasonal timescale while interannual to decadal variability tend either to amplify or dampen it. These interannual to decadal variability, though much lower in amplitude, are critical to reconstruct past changes in ENSO and longer term variability for which there are a wide range of potential mechanisms to explain them. However most of these mechanisms remain controversial on a variety of time scales. One reason for these conflicting results is that extracting an unequivocal ENSO variability spectrum in ENSO sensitive regions is inevitably hampered by changes in the seasonal variability which is usually larger than changes introduced by ENSO. To date fossil corals are the best archives for past ENSO variability reconstructions since they record both the seasonal and interannual variability although with a great limitation their restriction in time for the past few centuries and their very limited preservation for periods prior to that. In principle marine sediment archives could provide this type of information for longer periods, however extracting that signal from the record requires renewed efforts in high to ultrahigh sedimentation rate cores to extract the seasonality in the eastern boundary regions of the Pacific known to be highly sensitive to ENSO variability. Here we attempt to reconstruct seasonality in the NE Pacific through two different approaches, one is based on core-tops from continental margin settings, on an array of high sedimentation rate core tops and box cores from the southern California Current and the Gulf of California with high to ultra-high sedimentation rates, to evaluate the response of different planktic foraminifera under different amplitude seasonal variability. The other approach is based on time series from several ultra-high resolution box cores from the southern Baja California margin where we examine how the the interannual to interdecadal variability modify the climatological seasonality patterns.