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ENSO variability during the last 28 kyr estimated in laminated sediment from the Santa Barbara Basin

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El Niño Southern Oscillation (ENSO) is one of the most important source of inter-annual modern climate variability. To understand long term variability of this phenomenon and check its stability during the last 28 kyr, we analysed sediment from the Santa Barbara Basin (core MD02-2503). The core, located in an upwelling zone strongly influenced by El Nino, presents large sequence of lamination. Seven series were collected each representing time-windows of 20 to 220 years. Those seven time windows were selected where laminated sediments are particularly well preserved and were extracted from the Holocene (4 windows), the Bolling-Allerod (2 windows) and during the Dansgaard-Oeschger event 3. Every lamina was sampled twice, one sample in the clear band, one in the dark band, providing a semi-annual resolution. A smear slide was realised for each sample and analysed using an automated system of recognition of coccoliths (SYRACO, Beaufort and Dollfus, 2004) allowing precise estimates of the coccoliths assemblages. Spectral analyses on the relative abundance of the most abundant species (E. huxleyi) showed strong fluctuations in its relative abundance through the last 28 kyr. The spectral analyses of these series show significant peaks at around 3-6 year (ENSO), 9-12 year (PDO) as well a strong 20 year period. The power of the ENSO period relative to the PDO one varied significantly through time, as well as its frequency. The late Holocene and the Dansgaard-Oeschger event 3 exhibit dominant periods around 4-7 years. The Bolling-Allerod series are dominated by a period of 8-10 years. The early Holocene is characterised by period of 2-4 years. The frequency of climate variability in Santa Barbara appears to shift in a pattern which follows precession driven changes in insolation.