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High resolution multi-decadal climate record of the last 1200 years in the southern Gulf of California

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A laminated sediment core DIPAL III-T43 from Alfonso Basin was analyzed in order to infer changes in precipitation patterns during the last 1200 years, associated with Monsoon climate. Samples were taken every centimeter and were dried and grounded. Elemental chemical concentrations were measured using an X-Ray fluorescence analyzer (Niton XL3t GOLDD).

Alfonso Basin is a small depression located in the Bay of La Paz in the southwestern Gulf of California, due to its location is a sensitive recorder of climate regional variations in the Gulf and in the subtropical Pacific Ocean. Currently, climatic conditions in the Gulf are dominated by seasonal processes (monsoon climate), mainly driven by the position of Subtropical High pressure system and ITCZ. In winter during cool and dry conditions, the ITCZ is located on or below the equator in the Pacific Ocean and strong northwesterly winds dominate, with intense upwelling, promoting increases in primary productivity of surface waters. In the summer, during wet and warm conditions, ITCZ moves northward ($\sim$9°N), and southeasterly winds dominate and there is an incursion of the Pacific equatorial current into the Gulf. Local rainfall reaches a maximum and upwelling weakens, with increase terrigenous input to the basin.

Age Model is based on radiocarbon AMS dating, estimated sedimentation rate is 0.61 mm/yr, and thus the time scale resolution is multi-decadal

Variations in Ti and Fe downcore are used as proxies of past hydrological changes, so higher values are interpreted to reflect increase rainfall, small peninsular drainages and terrigenous input into the basin. In this context, detailed Ti and Fe records reveal important relatively higher concentrations at AD 910, 1008 and 1253, indicating an increase in precipitation. Meanwhile, low Ti and Fe concentration are recorded from AD 1549 to AD 1700 show a tendency towards reduced terrigenous input (precipitation minima) suggesting dry and cool conditions prevailing in the region, corresponding to Little Ice Age.