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Atmospheric carbon invasion in the meridional border of California Current surface waters

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Eastern Boundary Upwelling Systems (EBUS), such as the California Current System (CCS), alternate seasonally between more acidic surface waters than most of the rest of the surface ocean due to the vertical mixing of carbon rich subsurface waters driven by the intensification of equatorward winds during spring to early summer. These processes make EBUS especially sensitive to ocean acidification and play an important role in the ocean carbon exchange.

We present the d13C isotopic records of organic and inorganic carbon for the last century, that show the direction and magnitude of the atmospheric carbon invasion in the surface waters for the last 3 decades. Results reported here depict the importance of these processes in the southern dynamic boundary of the California Current System. Cores were retrieved from San Lázaro basin (25° 10' N and 112° 44' W), a 540 m deep enclosed in the west by a 100 m deep uplifted fault system that is broken in the southwest by a narrow sill of 350 m depth. The constriction on circulation imposed by this sill coupled with the oxygen poor waters entering through this depth, and the relatively high export productivity of organic carbon control to suboxic conditions of the bottom waters. These conditions inhibit biological bioturbation processes and allows for the well preserved laminated sediments on the sea floor.

We present results from the carbon isotopic composition of organic fraction and the inorganic carbon, calcitic from planktic foraminifera, from three different cores. Preliminary results show similar trend toward lighter isotopic compositions of both, calcitic and organic carbon during the last three decades that mimic the atmospheric record, but with different slopes. We discuss the physical, chemical, and biological processes that could influence this behavior and their relative importance with implications on the dynamics that control the CCS.