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## Hydrographic variability in Bahía de La Paz, B. C. S, Mexico, during the 1997-1998 El Niño

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Bahía de La Paz is an integral part of the coast of the Gulf of California and is the biggest bay of the eastern side of the Baja California Peninsula. Dynamic forcing and water interchange occur between the bay and the gulf through two different openings, the main and deep North Mouth with 350-m depth and the shallow San Lorenzo Channel with an average depth of 10 m. To determine the oceanographic conditions before and during El Niño 1997-1998 in Bahía de La Paz, CTD data were collected in four surveys aboard the research yacht CICIMAR XV during July 1996, March 1997, July 1997, and March 1998. The results revealed important variations in the hydrographic structure of the bay, both in space and time. The two summers had a complete absence of the mixed layer with a sharper thermocline during summer 1996 ( $0.25^{\circ}\text{C}/\text{m}$ ) than in summer 1997 ( $0.21^{\circ}\text{C}/\text{m}$ ). Additionally, the entire water column experienced an average temperature increase from  $1.5^{\circ}\text{C}$  at the surface with a maximum of  $4.2^{\circ}\text{C}$  to 28 m and around  $1^{\circ}\text{C}$  between 100 and 350 m, showing a halocline structure in summer 1997. At the end of the winters of 1997 and 1998, a 50-m mixed layer was detected, with higher average temperatures of  $2.3^{\circ}\text{C}$  in winter 1998. The temperature differences decreased with depth and were the same at 340 m with no traces of the halocline in winter 1998. The increase of temperature observed in the study area during the periods affected by El Niño 1997-1998 resulted in a sinking of the thermocline and isotherms, showing the strongest effect of this warming ( $\approx 4^{\circ}\text{C}$ ) in the surface layer to 70 m during summer 1997. The stratification increased during the El Niño and was more evident in the period of small stratification in the region (winter) as showed by the  $[\phi]$  parameter with values of  $45 \text{ J}/\text{m}^3$  in 1998 and  $29 \text{ J}/\text{m}^3$  in 1997, whereas during the strong stratification period (summer) the difference was small, with values of  $137 \text{ J}/\text{m}^3$  in 1996 and  $139 \text{ J}/\text{m}^3$  in 1997. In periods not affected by El Niño, the Gulf of California and the Subtropical Subsurface Waters are usually present in the bay, but during this episode their presence varies in space. Additionally, Surface Equatorial Water was found in the bay, mainly at the end of winter 1998 and with some traces in summer 1997.

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