



# Nitrogen isotopic composition of shelf and slope sediments in the Eastern Tropical North Pacific



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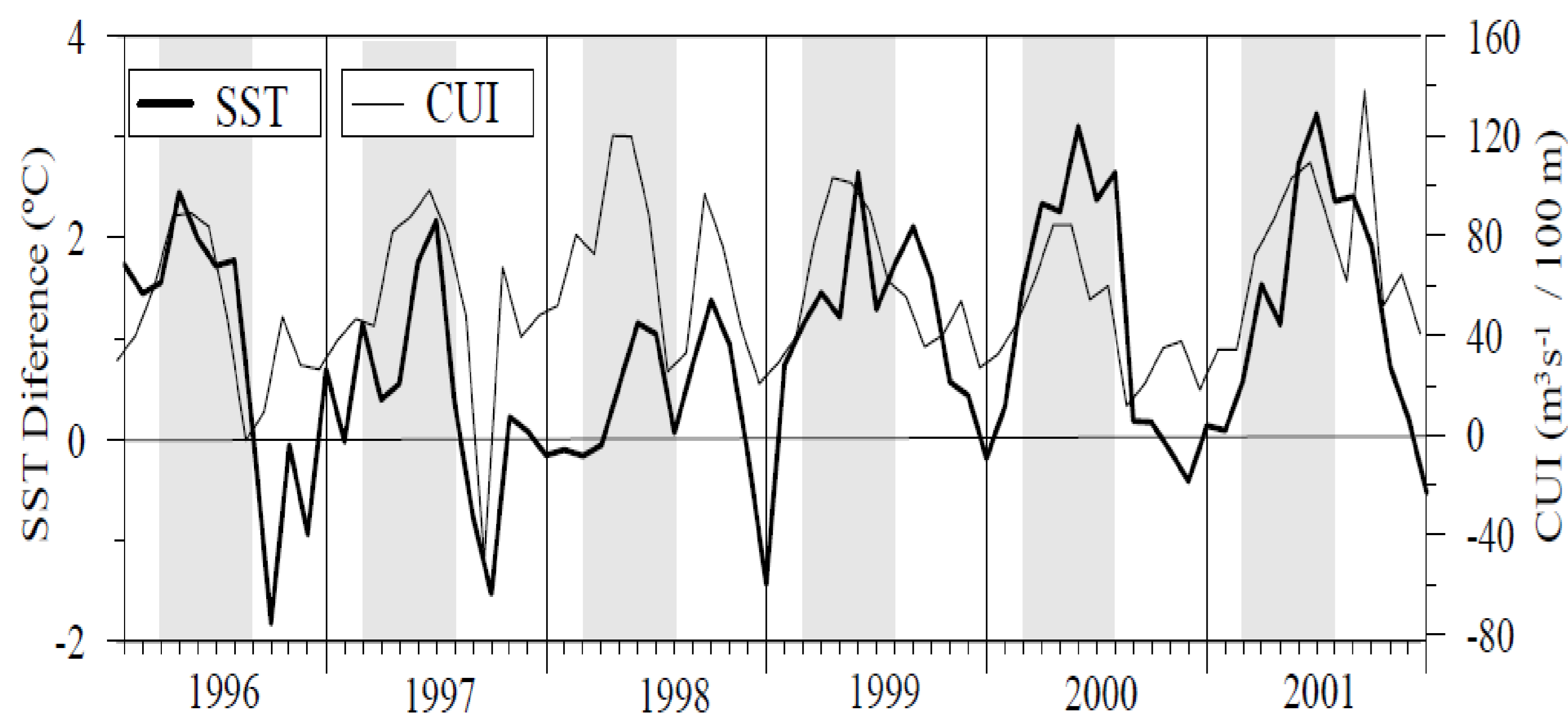
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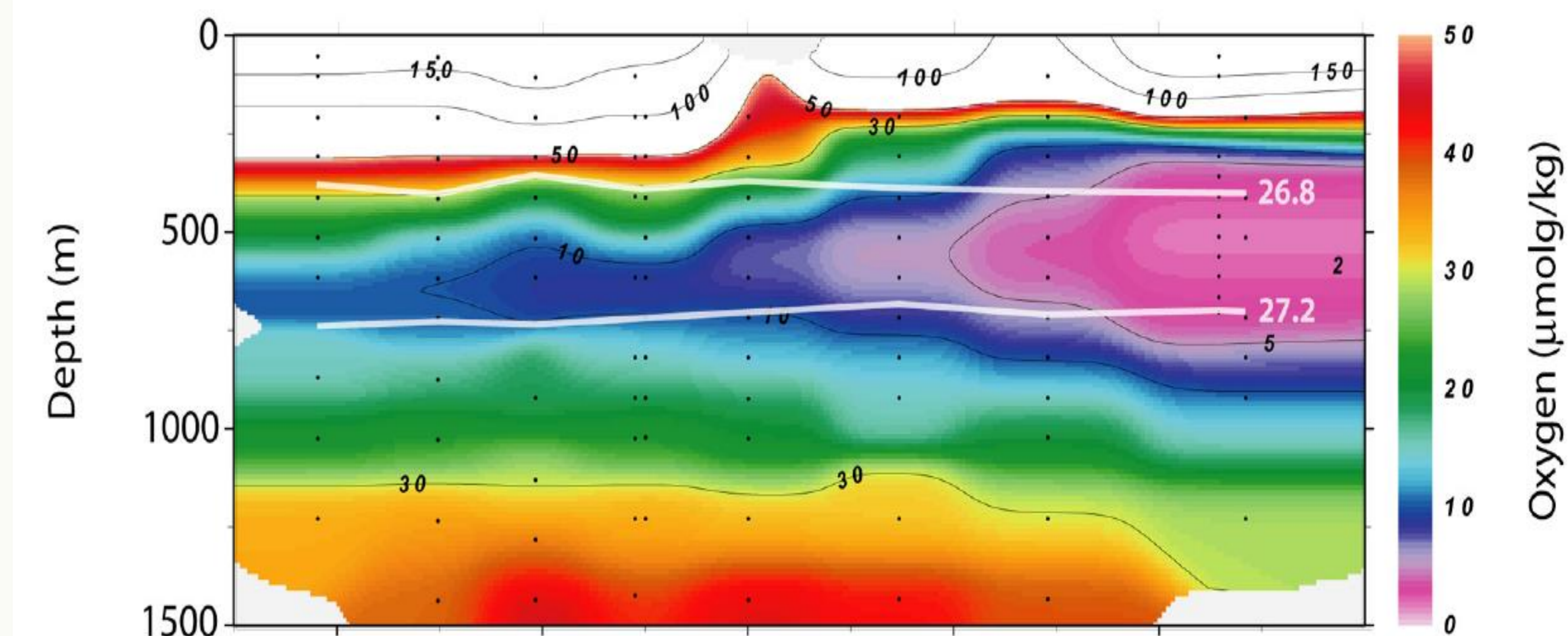
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## 1. Introduction

The southwestern margin of the Baja California peninsula are characterized by high primary production, driven by persistent upwelling of nutrient-rich subsurface waters, oxygen minimum zone and denitrification.



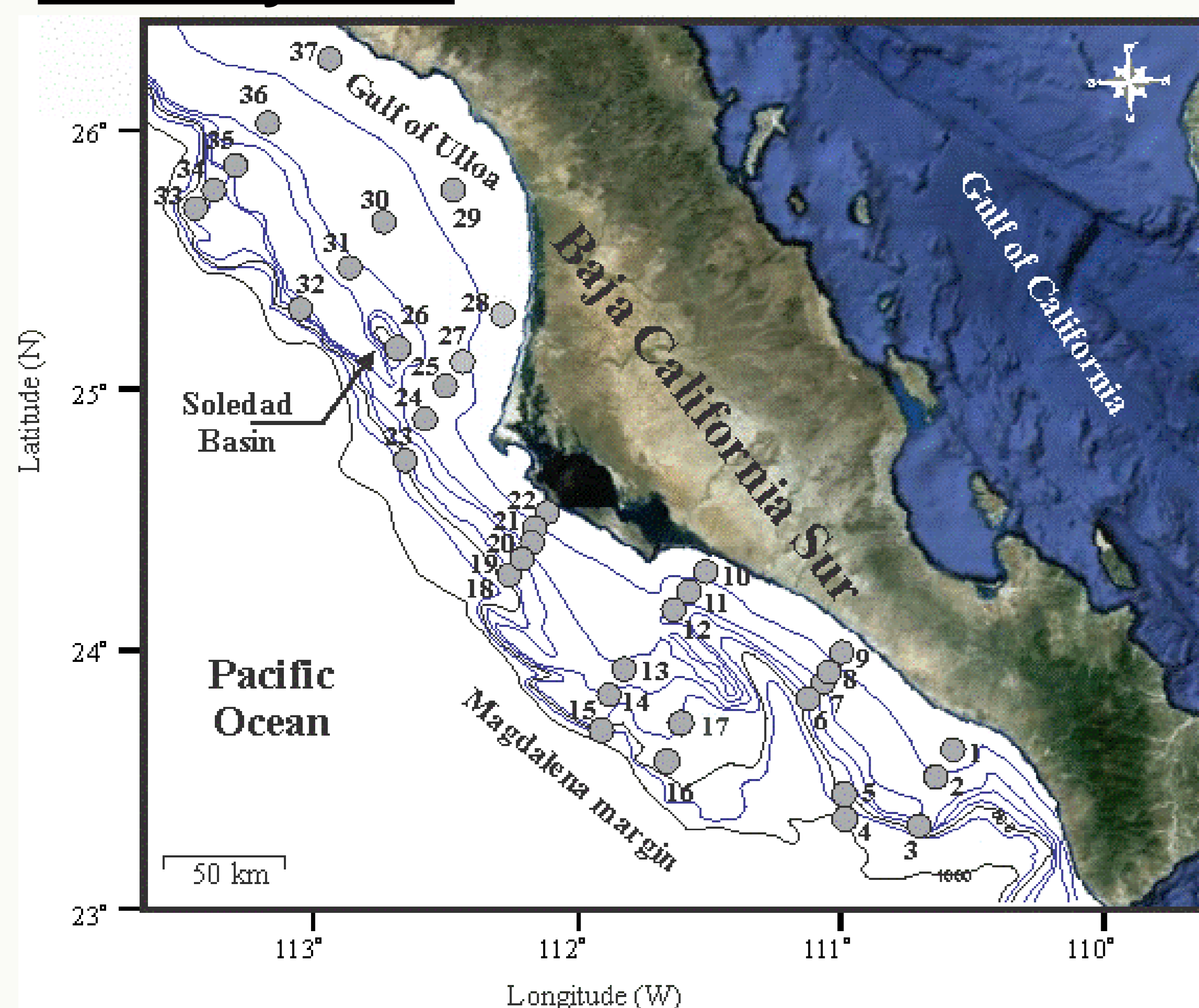
Costal Upwelling Index (CUI) with difference in SST between the upwelling zone and the adjacent sea (Zaitzev *et al.*, 2003).



Spatial distribution of dissolved oxygen ( $\mu\text{mol/kg}$ ) and oxygen minimum zone from Baja California margin (Van-Geen *et al.* 2003).

Nitrogen isotopic composition in sediments has been widely used as a tracer of water column denitrification. We present new surface-sediment nitrogen isotope data that are compared with the signatures from water-column nitrate and particulate nitrogen to investigate the controls on the sedimentary record in the region and to provide a more robust basis for interpretation of down-core records.

## 2. Study area



Baja California Sur, Mexico and surface sediment samples.

## 3. Methods

Sediment samples (37 stations) > Smith-McIntyre grab.

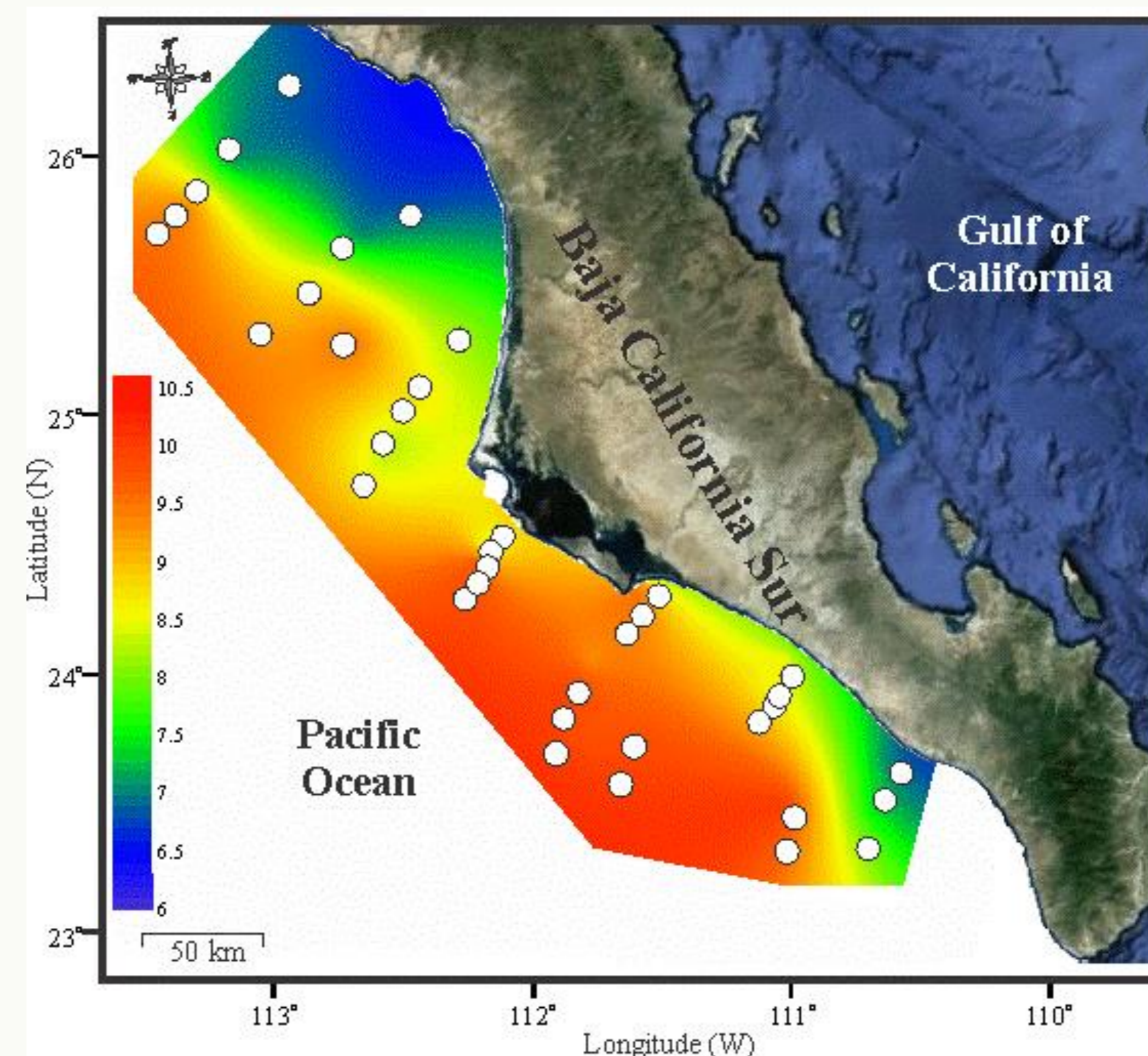
Top 2-cm sediments > dried at 50°C > homogenized.

5 to 6 mg sediment > COSTECH 4010 EA-IRMS.

$\delta^{15}\text{N}$  (‰) =  $((^{15}\text{N}/^{14}\text{N}_{\text{sample}}/^{15}\text{N}/^{14}\text{N}_{\text{reference}})-1) \times 1000$ .

Analytical precision  $\delta^{15}\text{N} < 0.2$  ‰.

## 4. Results



Spatial distribution of the  $\delta^{15}\text{N}$  in surface sediments.

Two distinct trends emerged from the  $\delta^{15}\text{N}_{\text{sed}}$ : (1) offshore ( $r^2 = 0.65$ ,  $P < 0.05$ ) and (2) latitude ( $r^2 = 0.19$ ,  $P < 0.05$ ), the latter is not very clear. Magdalena margin:  $\delta^{15}\text{N}_{\text{sed}}$  is broad offshore area ( $> 9$ ‰). Gulf of Ulloa: broad nearshore zone with  $\delta^{15}\text{N}_{\text{sed}} < 7$ ‰, and values increase sharply offshore on the slope and in the Soledad basin. The distribution of  $^{15}\text{N}$ -enriched sediments is broader and shallower on the Magdalena margin, whereas this distribution is more constricted, deeper and further offshore in the Gulf of Ulloa.

## 5. Conclusions

The  $\delta^{15}\text{N}$  values show that the organic matter is enriched in  $^{15}\text{N}$  with increasing distance and depth offshore in response to denitrification of the water column in the ETNP.

## 6. References

van Geen, A., Zheng, Y., Bernhard, J. M., Cannariato, K. G., Carriquiry, J., Dean, W. E., ... & Pike, J. (2003). On the preservation of laminated sediments along the western margin of North America. *Paleoceanography*, 18(4).

Zaitsev, O., Cervantes-Duarte, R., Montante, O., & Gallegos-García, A. (2003). Coastal upwelling activity on the Pacific shelf of the Baja California Peninsula. *Journal of oceanography*, 59(4), 489-502.