

ED44B-3727 Coastal influences on sedimentary organic matter in deep basins offshore of Southern California



Thursday, 20 February 2020



16:00 - 18:00



Poster Hall C-D (SDCC)

Abstract

The concentration and isotopic composition ($\delta^{13}\text{C}$; C/N) of sedimentary organic matter (SOM) in near-shore bays and offshore shelves and basins is impacted by organic matter source (e.g., marine algae, terrestrial plants, and agricultural and sewage runoff) and natural and anthropogenic processes such as pollution, terrestrial runoff, and climate change, which can expand oxygen minimum zones, leading to decreased bottom-water dissolved oxygen (DO) and enhanced organic matter preservation.

The factors that affect the sources and concentrations of SOM have not been extensively investigated in the California margin. The objective of this study was to determine how the SOM concentrations and stable isotopes ($\delta^{13}\text{C}$; C/N) vary between shallow urban bays, offshore shelves, and deep basins and with other factors (water depth, DO and grainsize).

On cruises in 2018, surface sediments were collected using multicores and van-veen grabs. Samples were collected from shelves (10-14km offshore; 100-300m) and basins (90-130km offshore; 618-997m) and for comparison, urban bays in San Diego. The dissolved oxygen (DO) concentrations of seafloor-water preserved in the multicores were measured with a hand-held DO meter. In the lab, SOM concentrations were determined by Loss on Ignition (5 hours, 550°C) and grain-size distributions were determined by scanning on a CILAS 1190 particle size analyzer. Select sediments were dissolved in HCl and filtered to remove inorganic carbonates and the $\delta^{13}\text{C}$ and C/N measured at UC Davis.

All sediments were organic rich (2-21%) with mean grain sizes of fine sand or silt with variable clay (3-12%). In general, the sands were lower in organic matter (< 5%) compared to silty samples with variable concentrations (2-22%). The greatest organic matter was found in the deeper hypoxic basins where DO was less than 1.5 mg/L. The $\delta^{13}\text{C}$ & C/N were consistent with mixed terrestrial and marine organic sources and there was not a difference in mean values between the bays, shelves and basins. However, the values were highly variable for the urban bay and shelf sediments suggesting heterogenous input.

Organic matter in coastal sediments are an important component of the global carbon cycle and a better understanding of controlling factors is important in the face of climate change and increased anthropogenic impacts.

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