



Biogeochemical budgets in the eastern boundary current system of the North Atlantic: Evidence of net heterotrophy and nitrogen fixation

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ABSTRACT: Thermohaline and chemical data from three WOCE (World Ocean Circulation Experiment) cruises conducted in 1997 and 1998 define the MedBox region, bounded by the Strait of Gibraltar, 24° N, 41° N, and 22° W. The carbon budget indicates that the MedBox is a heterotrophic region, where carbon is mineralized at a net rate of $17 \pm 11 \text{ g C m}^{-2} \text{ yr}^{-1}$, supported by the input of allochthonous organic matter, mainly in the dissolved form, from the adjacent ocean. Dissolved organic carbon accounts for 90% of the organic carbon demand. In vitro measurements to estimate the net community production of the study area differ largely from our geochemical budget estimation, likely reflecting different spatial and temporal scales and/or terms or processes not taken into account by both methods. The nitrogen budget of the MedBox pointed to a significant atmospheric input via N₂ fixation ($3.4 \pm 3.1 \text{ g N m}^{-2} \text{ yr}^{-1}$).

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