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ZOOPLANKTON BIOMASS, ETS ACTIVITY, AND RESPIRATORY FLUX AROUND THE CANARY ISLANDS

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Abstract: The ocean sinks approximately one-third of greenhouse gas emissions out of the atmosphere, including carbon dioxide. An important part of this downward carbon flux is driven actively by large zooplankton and micronekton during their downward diel vertical migration (DVM) and their residence at depth. However, there is a considerable gap in the role that zooplankton and micronekton play in the biological carbon pump (BCP) as only a few studies are addressing this downward transport (Ariza et al., 2015), (Boyd et al., 2019), (Hernández-León et al., 2019). Here, we show the results of migrant biomass and respiratory flux of these organisms and their relationship to primary productivity around the Canary Islands. We measured zooplankton biomass from 200 meters depth up to the surface day and night during March 2022, following an E-W transect around 29˚N, from the more productive waters near the African coastal upwelling to the oligotrophic gyre west of the Canary Islands. Mesozooplankton biomass and abundance were estimated from day and night hauls using a WP-2 net. We estimated biomass from protein converting to dry weight and carbon using published relationships. Respiration was estimated by measuring the enzymatic activity of the electron transfer system (ETS) of the organisms (King & Packard, 1975). Migrant biomass was assessed by the difference between day and night samples in the upper 200 m layer. Respiratory flux and carbon export through zooplankton DVM were estimated converting ETS activity in the upper layers to oxygen consumption at depth. The results showed differences about the different physical scenarios observed and agree with previous estimations in the area. We also compared our results with an earlier sampling carried out in November 2021 during much more stratified conditions.

Keywords: Carbon pump, Zooplankton, Diel vertical migration, Active flux, Respiratory flux, Migrant biomass, Canary current.

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