SUSPENDED POC TRANSPORT AND CONSUMPTION IN SURFACE AND DEEP WATERS OF CANARY CURRENT: A BOX MODEL STUDY

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The eastern boundaries of oceanic basins connect the eutrophic waters of coastal upwelling areas with the oligotrophic open ocean waters. As a consequence, boundary currents have been postulated as potential key regions for organic matter production and export to the interior ocean. Nevertheless, there are almost no studies available on the role of boundary regions as sinks or links of coastally-produced organic matter to the open ocean waters of the subtropical Gyres. Here, we have evaluated the horizontal transport and consumption, from surface to 3000 m, of suspended particulate organic carbon (POC) through a boxmodel approach (20-29º N, 20-26º W) in the Canary Current region (subtropical Northeast Atlantic Ocean) . Our results show that a close balance exists if considering the whole water column, although sharp differences may be observed at different water masses. The upper Surface Waters (<100 m) show a westward transport of 3.5 x 10^8 mol C d^{-1} between 21º N and 24º N. However, the Central Waters (100-700 m) show a negative balance of – 4.2 x 10^8 mol C d^{-1}, with the highest POC entering through the more coastal section. Intermediate Waters (Mediterranean and Antarctic waters; 700-1000 m) present lower transports, except in the north transect, where 5.8 x 10^8 mol C d^{-1} are transported northward at the easternmost sector of the section. In the Deep Waters (>1000 m) the transport is almost negligible. Our results indicate that, during the time of our study, the upper Surface Waters accumulated and transported POC to the open ocean, perhaps due to the large mesoscale activity of the region. However, the Central Waters behaved as net sinks of coastally produced organic carbon, in agreement with the high remineralization rates reported for the mesopelagic zone of this region. Our results contradict previous studies from other boundary regions, which suggest that ocean margins act as links for coastal organic carbon sedimented on the continental shelf before being transported to the deep waters of the interior ocean.