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Title: Contribution of allochthonous carbon subsidies to the Minho estuary lower food web

Authors: Ester Dias, Pedro Morais, Anne M. Cotter, Carlos Antunes, and Joel C. Hoffman

Abstract:

To study the contribution of autochthonous and allochthonous organic matter (OM) sources fuelling the lower food web in Minho River estuary (N-Portugal, Europe), we characterized the carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) stable isotope ratios of zooplankton and their potential OM sources, as well as the concentration and stable isotope ratios of dissolved inorganic carbon (DIC) and particulate OM (POM) along the estuarine salinity gradient, during a summer flow base. The $\delta^{13}\text{C}_{\text{DIC}}$ values were lowest in the tidal freshwater (TFW) portion and higher toward the river mouth, following the expected conservative mixing. In the TFW portion, particulate organic carbon (POC) $\delta^{13}\text{C}_{\text{POC}}$ values (bottom: -28.5‰ to -25.5‰ ; surface: -29.3‰ to -26.3‰) and C:N (>10) of particulate samples indicated that terrestrial-derived sediment comprised a large portion of the bulk POM pool. In the polyhaline portion, $\delta^{13}\text{C}_{\text{POC}}$ values (bottom: -20.5‰ to -18.8‰ ; surface: -25.5‰ to -23.2‰) indicated that the bulk POM pool was generally derived from phytoplankton. In the brackish estuary, zooplankton $\delta^{13}\text{C}$ values were similar to bottom $\delta^{13}\text{C}_{\text{POC}}$ values, suggesting that marine-derived OM provided a subsidy to the planktonic food web. In contrast, zooplankton $\delta^{13}\text{C}$ values in the TFW were similar to surface and bottom $\delta^{13}\text{C}_{\text{POC}}$ values, suggesting increasing importance of terrestrial-derived OM. Our stable isotope data suggest that the Minho River estuary has a high degree of connectivity along the estuarine salinity gradient and that both marine and freshwater inputs provide a food web subsidy. Therefore, any activity that disconnect the estuary from its adjacent systems (e.g. river, sea, land) may have profound impacts on the estuarine food web.

(No EPA disclaimer b/c this is a student's research)