

Zooplankton mortality and the potential contribution of carcasses to the autochthonous particulate organic carbon along the Valdivia estuary.

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Estuaries are one of the most productive aquatic ecosystems in coastal areas. The productivity of these systems is linked to the formation of fronts which generate nutrient mixing and retention that can be used by autotrophs. This environment exhibits strong thermal and haline clines which might have significant effect on zooplankton survival. This study aims to assess *in situ* mortality and the potential fate of mesozooplankton carcasses on exposed to haline gradients along the Valdivia river estuary. The zooplankton community was dominated by copepods during autumn and winter, while during summer cirriped nauplii outnumbered copepods. On average 22% of the whole zooplankton community appeared dead, while the seasonal variability showed increased (44%) and decreased (16%) mortalities during winter and summer, respectively. The instantaneous mortality of copepods (*Paracalanus* spp. and *Acartia tonsa*) and copepod naupliar stages were always higher at surface, where low salinity water was recorded, while dead cirriped nauplii were usually homogeneously distributed in the water column. The degradation of copepod carcasses regardless of the salinity averaged $17\% \text{ C d}^{-1}$ on the first 3 days, which combined with an average sinking velocity of 4.3 m h^{-1} , resulted in an efficient vehicle for the sequestration of organic matter to the benthos (6-20m depth). The average contribution of zooplankton carcasses to the total autochthonous particulate organic carbon (POC) available in the estuary ranged between 0.03 to 0.87%, suggesting that mortality of zooplankton might have a minor contribution to the total POC in this microtidal estuary.