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On the relationship between the vertical distribution-migration of zooplankton and the organic carbon flux, before, during and after convective events, in the open southern Adriatic Sea

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The Southern Adriatic (SA) is the deepest part of the Adriatic Sea (1242 m) and one of three sites of open-sea deep convection in the Mediterranean. Due to winter convection events, the dense water formation processes in the open SA result in a homogenization of the water column, which determines the nutrient input into the euphotic zone, enhances phytoplankton growth and consequently, the abundance of zooplankton.

By analyzing zooplankton samples, together with acoustic data (ADCP) and data from sediment traps (at 125 m and 1150 m) taken in the SA from November 2015 to June 2016, we investigated the relationship between the distribution of zooplankton abundance and the flow of organic carbon in the deep open southern Adriatic Sea. During the pre-convection period (November 2015), the highest organic carbon flux (C org flux) was found at both depth (125 m, 1150 m), which is probably related to the autumn phytoplankton bloom and consequently an increase in zooplankton abundance. During the winter mixing phase, a lower C org flux was recorded in the upper trap samples which was a consequence of the reduced growth of phytoplankton and the transport of the cells to the deeper aphotic layers; where some increase of org C flux in the lower trap was recorded. Thus, the deepest layers were enriched leading to a minimum vertical zooplankton-migration (DVM). In spring, during the post-convection period (March, April), high abundance of mesozooplankton, mostly copepods, was registered in the upper layer, as well as an evident increase of C org flux. Other species than copepods (which remain at the food rich surface), probably ostracods and euphausiids, played a significant role in the DVM because they are more abundant in the deeper layers. The increase in C org flux in the upper samples in May is in accordance with a recorded salp bloom (also evident through a strong backscatter signal). Salp fecal pellets were observed to contribute significantly to vertical carbon flux in various ocean regions.

The relationship between vertical zooplankton distribution, zooplankton migration and carbon

export has generally been poorly studied in the Adriatic Sea. Preliminary results for the open SA are presented here, but for more accurate knowledge of this topic, a long term study is needed.

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