

ICES/PICES 6APS 2016/S1

Zooplankton abundance, biovolume and size spectra in Pacific western boundary currents in the Northern Hemisphere during boreal winter

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Abstract

Zooplankton community structure in the Pacific western boundary currents in the Northern Hemisphere was characterized between November 26 and December 12, 2012. Zooplankton abundance and biovolume ranged from 35.1 to 456.8 ind. m^{-3} and 4.3 to 231.7 $mm^3 m^{-3}$, respectively. Copepoda were the most dominant species, followed by Chaetognatha and Tunicata. According to the Bray–Curtis cluster analysis based on biovolume of zooplankton size classes of each taxonomic group at intervals of 1 ($\log_2 mm^3 ind.^{-1}$) between -6 and 12 and considering the effect of regional factors, zooplankton communities were classified into four groups, which basically coincided with the geographical patterns of different currents: the North Equatorial Current (NEC), the North Equatorial Counter Current (NECC), the Kuroshio Current (KC), and the Mindanao Eddy (ME), respectively. The largest and lowest biovolumes were observed in the NECC region and the NEC region, respectively, and both were dominated by the 0.3 to 1 mm equivalent spherical diameter (ESD) size class, while the ME region was dominant by the 1 to 2 mm ESD size class. The slopes of the normalized biovolume size spectra for each group were slightly lower than -1 (range from -0.85 to -0.92), which indicates that zooplankton communities in the study area were characterized by low productivity and high energy transfer efficiency.

Keywords: normalized biovolume size spectra, zooplankton, Western Pacific, western boundary currents, ZooScan

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