Comparative analysis of zooplankton communities in the east and west coast of United States – biological response to large scale driving forcing?

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Zooplankton samples were collected in June 1998 – 2008 along the Washington and Oregon coast, the west coast of the United States, and May – June in 1977 – 1987 and 1992 – 2008 in Georges Bank, the east coast of the USA. While two systems are dramatically different, the west coast is a typical eastern boundary current system with strong upwelling and narrow shelf and the east coast is a western boundary current system with a broader shelf, we examine how zooplankton communities respond to large scale decadal variation in climate forcing. Nonmetric multidimensional scaling (MDS) was applied on both datasets. Pacific decadal oscillation (PDO) and Atlantic multidecadal oscillation (AMO) were adopted as indicators for large scale forcing in two systems respectively. Zooplankton communities in the west coast were consistent with PDO. When PDO was positive, there were more warm water species and when PDO was negative, cold water species were abundant. Zooplankton communities in the east coast did not display a consistent pattern with AMO, especially after 2000. We hypothesized that changes in zooplankton community structure in both coasts were associated with source water. On the west coast, when PDO was positive, more offshore water entered the coast and warm water copepods were abundant, and when PDO was negative, more cold water come from Alaska coast and cold water copepods were abundant. On the east coast, when more low salinity water from north entered the coast, smaller copepods became more abundant.

Keywords: zooplankton, communities, multidimensional scaling, transports, PDO, AMO.

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