COMPARISON OF ZOOPLANKTON ECOLOGY OF THE MEDITERRANEAN AND THE NORTH ATLANTIC

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Abstract

Zooplankton is a key link between primary producers and larger predators and most zooplankton population changes can be attributed to environmental causes. Multi-year zooplankton time series provide an important tool for examining climate-ecosystem interactions. The CIESM Zooplankton Indicators program developed comparative studies of bio-geographical variations across the sea basins through international co-operation and through the constitution of networks of institutes and experts.

Keywords: Zooplankton , Biogeography, Time Series, Sampling Methods, Global Change

Mediterranean Sea is oligotrophic with low fisheries production, similar to the subtropical part of the North Atlantic; nevertheless the extraordinarily rich variety of singularities driving ocean life and biogeochemical dynamics of this enclosed sea makes more critical its sustainable use by the surrounding human populations. The North Atlantic encompasses several highly productive sea areas around its continental shelf margins that provide work and living to local communities. While there are important differences between these two ecosystems, they also share several common features and belong to the same ecosystem type or biome as defined by Longhurst (1998, The Ecological geography of the Sea), given that the greatest number of species in the Mediterranean Sea are of Atlantic origin.
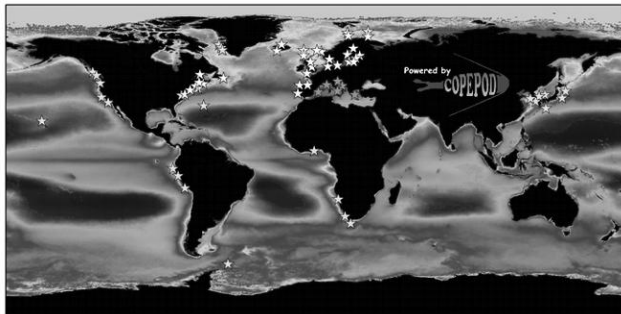

Fig. 1. World map long-term series of zooplankton from COPEPOD's analytical and data processing www.st.nmfs.noaa.gov/plankton. In green, the Mediterranean series, structured through the CIESM Zooplankton Indicators Program.

Both areas have a strong history of plankton research. In the Mediterranean and the Black Sea, the Mediterranean Science Commission's (CIESM) Zooplankton Indicators Program supports a network of marine researchers from 23 member states, applying the latest scientific tools to better understand, monitor and protect their fast changing and highly impacted sea areas. In the North Atlantic, The ICES Working Group on Zooplankton Ecology (WGZE), reviews sampling and analysis technologies, and monitors zooplankton sampling activities. In the framework of their activities both groups developed interactions with the aim to mutually enrich the marine zooplankton research activities (fig. 1).

The terms of reference of this collaboration were:
a) review and consider comparison of zooplankton ecology of the Mediterranean and the North Atlantic, with emphasis on common species and size structure using common numerical methods;

b) review and consider overview of on-going time-series programmes;
c) review and consider harmonization of methods, overview of experimental work;

The web page (http://www.wkzem.net/), hosted at the NOAA-NMFS, Science and Technology gives detailed information on the activity undertaken in a form of a workshop organized in Heraklion, Crete, in October 2008. The zooplankton time series results are expressed in a consistent form (see fig. 2 and the site address in the legend of fig 1).
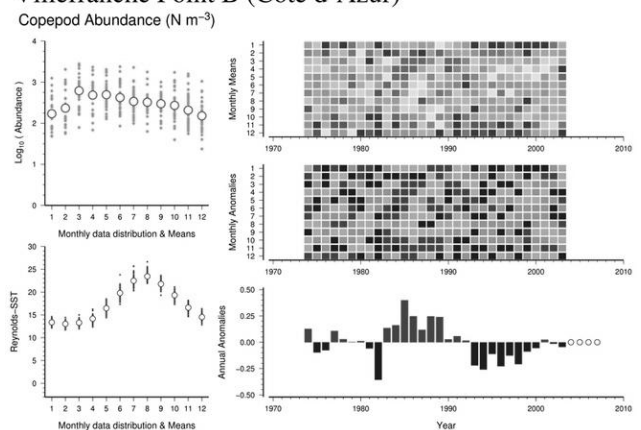

Fig. 2. Standard analysis plots (distrograms, histograms, means and anomalies) of the Villefranche Point B dataset consists of more than 30 years of samples collected off Villefranche at 43°41 N 07°19 E. Samples were collected by a vertical tow from bottom to surface (75-0 m), using a Juday-Bogorov net (330 µm mesh). Copepod abundance was counted from ongoing and historical samples using the wet-bed image scanning technique of ZooScan (Gorsky et al., in press). Copepod abundance was highest during the well-mixed winter period, followed by a general decline, with rising water temperatures and increasing stratification.

The different activities undertaken in the framework of the CIESM program on Zooplankton Indicators and the main achievements will be presented.

References

1 - Gorsky et al. In press. Digital zooplankton image using the ZooScan integrated system. *J. Plankt. Res.*