



MARITIME FORUM

Map of the week – Seasonal variation in Zooplankton abundance

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In this week's Map of the Week, we are focusing on some small-sized marine organisms that have a large-scale impact. Zooplankton are small, free-floating aquatic microorganisms including crustaceans, rotifers, open water insect larvae and aquatic mites. The role of the zooplankton community in supporting and shaping marine ecosystems is often under-appreciated. They play a crucial role as a source of food to fish, marine birds and mammals. Subtle changes in the zooplankton community (e.g. abundance of different zooplankton species) can have profound effects on the species at higher levels in a marine food web. They also provide critical ecosystem services such as supporting commercial and non-commercial fish stocks, nutrient cycling, and climate regulation.

So what can zooplankton tell us about the condition of ecosystem? First, the biological condition can be assessed based on the information on the zooplankton species found in the water, and the abundance of certain species relative to one another. Second, the environmental changes (e.g. nutrient pollution, temperature) over time can be indicated by zooplankton because they are highly sensitive to changes and respond to changes in rapid and unambiguous ways.

Among the zooplankton, the tiny Crustacean copepod (i.e. the "oar-footed insect of the sea") makes up a large proportion of the animal mass in the ocean. They can live in the water from the surface to the seafloor, and even on sea ice. The natural lipids such as omega-3 oils produced by phytoplankton and from copepods are not only important for marine life but can be extracted as a source of essential nutritional supplement for humans.

This map shows the abundance of *Calanus finmarchicus*, a copepod species, in surface waters of the North Sea and Channel in the autumn and winter over the last fifty years, from 1959 to 2012. Abundance data were collected with the Continuous Plankton Recorder (CPR), a small and towed vehicle behind the ship that uses through-flow water to take water samples that are analysed for plankton. The data shows clear differences between autumn and winter, including a northward and more coastal migration of *C. finmarchicus* from autumn to winter, when temperature decreases.

Scientists are still putting together pieces of the zooplankton puzzle. According to a recent study in *Nature Climate Change*[\[1\]](#), climate change is reshaping communities of ocean organisms, such as copepods and other zooplankton. More specifically, zooplankton are showing unexpected changes in composition and abundance in response to climate variability, marine water temperature and chemistry.

You can check out the abundance of three copepod species (i.e. *Temora longicornis*, *Acartia* and *C. finmarchicus*) in four seasons to explore how they respond to seasonal changes.

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The data in these maps were provided by [EMODnet Biology](#). [3]

[1] <https://www.nature.com/articles/s41558-019-0631-5> [4]

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[3] <https://emodnet-biology.eu/>

[4] <https://www.nature.com/articles/s41558-019-0631-5>