

# Distribution of zooplankton in the coastal area of the Belgian part of the North Sea, with focus on the harbors of Oostende, Zeebrugge and Nieuwpoort

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The mesozooplankton community structure and its spatial variability in the Belgian part of the North Sea (BPNS) was studied in relation to the interaction between physicochemical stressors, such as temperature, salinity, nutrients and pollutants. This is the first study that integrates the main Belgian harbors of Nieuwpoort, Oostende and Zeebrugge. The sampling campaign at 13 stations during June 2015 yielded a total of 67 different mesozooplankton taxa (19 classes, 21 taxa identified at order level, 15 at genera level and 22 at species level). From this, 44 taxa were considered holoplanktonic, 18 meroplanktonic and five tycho planktonic. The order Maxillopoda dominated the mesozooplankton (79%), especially with high densities of calanoid (57%) and harpacticoid (15%) copepods, followed by appendicularians represented by *Oikopleura dioica* (9%) and ophiurid larvae (7%). The predominance of small copepods such as *Acartia (Acartiura) clausi*, *Temora longicornis*, *Paracalanus parvus*, *Pseudocalanus elongatus*, *Centropages hamatus* and *Euterpina acutifrons* characterized the mesozooplankton community of the BPNS. Based on the mesozooplankton diversity and the ubiquitous spatial distribution of the dominant species, the mesozooplankton in the BPNS could be described as one neritic community with the occasional appearance of oceanic species. In terms of density, the mesozooplankton showed a density peak in the midshore stations. The mesozooplankton was distributed in small-scale assemblages with dominance of certain species in different zones and the communities were mainly influenced by temperature, salinity, ammonia, phosphate and acenaphthene. Hence, environmental stressors may influence the densities of the mesozooplankton in the BPNS. The effect of seasonality between spring (March) and summer (June) was marked by differences in density, with highest densities noted in June. The copepod communities also exhibited a succession of species. However, this effect was more marked in the harbors with an increase in density from cyclopoids during spring compared to summer. The demographic composition of the species *Acartia (Acartiura) clausi* and *Temora longicornis* was dominated by copepodite stages I-III with variations in adult sex ratio with females being more abundant than males. This study is the first effort to identify mesozooplankton communities in a high spatial resolution taking the influence of diverse environmental parameters and pollutants into account. It provides a detailed insight on the current status of zooplankton in the BPNS and contributes to the development of predictive models.

Keywords: mesozooplankton; copepods; marine biodiversity; community