

IOW-Press Release, June 19, 2020

Our “top athletes” on the seafloor: *Hediste diversicolor*, *Arctica islandica*, *Echinocardium cordatum*, *Amphiura filiformis*

A comparative study in four sea regions (German Baltic Sea, German North Sea, Belgian part of the North Sea and Eastern Channel) identified the organisms behind these Latin names as the most important actors in wide areas of the North Sea and the Baltic Sea in terms of bioturbation. They ensure that the bottom is supplied with oxygen, which triggers a chain of other vital processes. In different environments, only the ranking within this group changes. An international team led by the Warnemünde biologists Mayya Gogina and Michael Zettler now published the results. Using maps of the bioturbation potential, they defined areas of high ecosystem service particularly worthy of protection.

Bioturbation – the mixing of substrate by organisms – is one of the key processes in seabed habitats. It leads to an intensive interaction between the water column and the sea floor, which leads to the oxygenation of the sediment. What sounds so simple launches a whole chain of other vital processes: chemical compounds change, bacterial activities are triggered. Because bioturbation is so important in so many ways for the whole ecosystem, any impairment of this ‘ecosystem service’ by human activities should be avoided. Previous studies on bioturbation were limited to individual sites and the findings were then transferred to larger areas. Thus, regional differences in environmental conditions were unaccounted for – understandable in view of the high effort required for bioturbation analyses. With this multi-regional analysis, the marine biologists Mayya Gogina and Michael L. Zettler from the Leibniz Institute for Baltic Sea Research Warnemünde (IOW), together with an international team of authors, have for the first time used the bioturbation potential (BPc), a functional indicator for the bioturbation of bottom-living communities, to conclude area-wide assessments that take into account regional characteristics.

Based on macrofaunal data from four sea areas (German Baltic Sea, German North Sea, Belgian part of the North Sea and Eastern Channel) key species for BPc were identified for each region and sediment type. With the help of existing environmental data, this information enabled statements on the areal distribution of the key species. In this way, the regions could be easily compared with each other and the causes of possible differences could be identified.

The multi-regional analysis made it possible to identify regional differences in the performance of macrofauna. “We see very clearly from these analyses that it is important to develop conservation and management strategies specifically for each sea area,” Mayya Gogina explains one of the conclusions of the study. “The main actors of bioturbation and its relevance for ecosystem services depend on the biotic and abiotic conditions of the environment. This should be considered when identifying the so-called hotspots of ecosystem functions in order to protect them.”

So who is behind these pompous Latin names? They are the iridescent sea annelid (*Hediste diversicolor*), the common heart sea urchin (*Echinocardium cordatum*), the Icelandic clam (*Arctica islandica*) and the brittle star (*Amphiura filiformis*).



More about these top performers and their colleagues, the methodology of the study and its many results can be read here:

Gogina, M., M. L. Zettler, J. Vanaverbeke, J. Dannheim, G. Van Hoey, N. Desroy, A. Wrede, H. Reiss, S. Degraer, V. Van Lancker, A. Foveau, U. Braeckman, D. Fiorentino, J. Holstein and S. N. R. Birchenough (2020). *Interregional comparison of benthic ecosystem functioning: Community bioturbation potential in four regions along the NE Atlantic shelf*. *Ecol. Indic.* 110: 105945, doi: 10.1016/j.ecolind.2019.105945

Scientific experts:

Dr. Mayya Gogina | Tel.: +49 (0)381 5197 393 | mayya.gogina@io-warnemuende.de

Dr. Michael L. Zettler | Tel.: +49 (0)381 5197 236 | michael.zettler@io-warnemuende.de

This publication was initiated and facilitated by the Benthos Ecology Working Group (BEWG), an expert group of the International Council for the Exploration of the Sea (ICES). Mayya Gogina was supported by the German Federal Ministry for Education and Research KÜNO Project SECOS-Synthese (03Fo738) and the BONUS ECOMAP project supported by BONUS (Art 185) at different stages of work on this manuscript. The work in the Belgian North Sea is framed within the “Face-it” project (Functional biodiversity in a changing sedimentary environment: implications for biogeochemistry and food webs in a managerial setting), financed by BELSPO (BR/154/A1/Face-it) and a senior postdoctoral fellowship at the Research Foundation – Flanders (FWO; Grant No. 1201720N).

Media contact:

Dr. Kristin Beck: +49 381 5197 135 | kristin.beck@io-warnemuende.de

Dr. Barbara Hentzsch: +49 381 5197 102 | barbara.hentzsch@io-warnemuende.de

The IOW is a member of the Leibniz Association with currently 95 research institutes and scientific infrastructure facilities. The focus of the Leibniz Institutes ranges from natural, engineering and environmental sciences to economic, social and space sciences as well as to the humanities. The institutes are jointly financed at the state and national levels. The Leibniz Institutes employ a total of 19,100 people, of whom 9,900 are scientists. The total budget of the institutes is 1.9 billion Euros. www.leibniz-association.eu