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Climate variability effects on long-term macrofaunal abundance trends in the German Bight (North Sea)

Mehdi Ghodrati Shojaei, Thomas Brey and Lars Gutow and Jennifer Dannheim
Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Germany

We examined long-term variability in the abundance of German Bight soft bottom zoobenthos together with the environmental factors responsible for these dynamics using one of the most comprehensive long-term ecological data sets in the North Sea. Dynamic factor analysis (DFA), which is particularly suitable for analyzing relatively short (>15-25 yrs.), non-stationary multivariate time series, was used to identify common trends. The analysis revealed two major overlaying temporal trends in the benthic macrofauna. The most important DFA common trend (i.e. first common trend) is characterized by a slight decrease until mid-1990s followed by a sharp trough in the late 1990s. Subsequently it increased again until the end of time series. The second trend showed considerable fluctuations over time with two sharp troughs from 1981 to 1986 and from 1996 to 1999. Our analysis confirms that temperature is the predominant environmental driver of temporal variations in German Bight macrofaunal. Additionally, a strong correlation between temperature and the North Atlantic Oscillation Index (NAO) indicates the crucial role of temperature as a mediator between climate variability and benthic fauna in the German Bight.

Biography

Mehdi Ghodrati Shojaei is a PhD student at Alfred Wegener Institute Helmholtz-Center for Polar and Marine Research (AWI). Hereceiveda Bachelor's degree in Biology from SBU (1998) and a Master's degree in Marine Biology (2003) from TMU. Prior to his current position he joined the PGOSERI institute, as a researcher, where he focused on Fisheries science and trophic studies (2004-2010). He is carrying out his PhD project under the supervision of Prof. Dr. Thomas Brey in the department of functional ecology at AWI and University of Bremen. The project focuses on the effects of climate change and anthropogenic stressors on benthic macrofauna in the North Sea. During his PhD-research, he is developing marine macrofauna traits of as much as 300 taxa. He will use this trait information to study the structure of communities in terms of functional composition as well as linking traits to environmental variables. The specific aim of his study is to identify the climate variables best matched to biological trait patterns. Dynamic factor model is one of the several models and methods that he has currently applied to appropriately interpret the data.

Mehdi.Shojaei@awi.de