

Carotenoids in the Gulf of Gdansk sediments- useful markers of environmental conditions in the past

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Carotenoids are a large group of natural compounds widespread in the aquatic environment. Most of carotenoids in sediments originate from phytoplankton, macroalgae, vascular plants and bacteria. Carotenoids undergo different reactions in water column and after deposition in sediments. Concentration and relative composition of pigments in sediments depend on such factors like primary production, phytoplankton taxonomy, sedimentation and accumulation rate, hydrological and post-depositional conditions. Because some pigments are unstable and can be degraded both by abiotic and biotic factors - in the presence of light, oxygen, herbivores or microorganisms activity, they provide information about conditions in water column and in sediments. They differ in stability and, due to that, carotenoids in marine sediments are indicators, not only of organic matter sources but also of pre- and post-depositional conditions.

This work presents a concentration and distribution of selected carotenoids in recent (6 cores 0-20 cm) and deep (1 core, up to ~400 cm) sediments of the Gulf of Gdansk- a highly eutrophic area of high primary production and high sedimentation rate. The sediments were collected during two cruises and analysed in framework of CLISED ('Climate Change Impact on Ecosystem Health- Marine Sediment Indicators') Polish- Norwegian research Project, grant no. 196128. Just after collection, the samples were frozen and kept in such a state until analysis in land laboratory. There, after extraction, carotenoids were analysed using high performance liquid chromatography (HPLC-DAD). Sediment age has been defined using C-14 dating.

Sediments contained parent carotenoids, markers of the main phytoplankton groups occurring in the Baltic, e.g. diatoms, green algae and cyanobacteria. B-carotene in sediments is a better, averaged, marker of primary production than chlorophyll- a and similarly stable one as sum of chloropigments-a. Presentation will focus on cyanobacteria and their pigments record in sediments, because cyanobacterial blooms are good indicators of eutrophication and anaerobic conditions in the past. Carotenoids record in deep sediments was varied and there are periods of better or worse carotenoids preservation which proves climate changes.