Geophysical Research Abstracts
Vol. 18, EGU2016-4212, 2016
EGU General Assembly 2016

Variations in phytodetritus derived carbon uptake of the intertidal foraminifera Ammonia tepida and Haynesina germanica

Julia Wukovits (1), Patrick Bukenberger (1), Annekatrin Enge (1), Wolfgang Wanek (2), Margarete Watzka (2), and Petra Heinz (1)

(1) Department of Palaeontology, University of Vienna, Vienna, Austria (julia.wukovits@univie.ac.at), (2) Department of Microbiology and Ecosystem Research, University of Vienna, Vienna, Austria

Phytodetritus represents a major component of particulate organic carbon in intertidal mudflats. Estuaries and tidal currents yield an extensive amount of these particles that display a substantial nutrient source for littoral food webs. For benthic foraminifera, a group of marine protists, phytodetritus serves as the main food source. Foraminifera are considered to play a significant role in marine carbon turnover processes and show seasonally very high population densities in intertidal sediments. Therefore, it is important to gather explicit data about the specific carbon uptake behavior of intertidal foraminiferal species. In this study, laboratory feeding experiments were carried out to observe phytodetrital carbon uptake of foraminiferal specimen collected in the German Wadden Sea. Artificially produced phytodetritus was labelled with 13C to follow carbon ingestion into foraminiferal cytoplasm over time at different simulated conditions. The experiments were performed with monocultures under exclusion of other meiofauna. Chlorophyte detritus (Dunaliella tertiolecta) was fed to the two common species Ammonia tepida and Haynesina germanica. Ammonia tepida showed a significantly higher affinity to this food source than H. germanica. Testing the effect of temperature revealed a significant decrease of carbon ingestion with increasing temperature in H. germanica. Observations focusing on A. tepida showed a rising phytodetrital carbon content in the biomass of juvenile individuals in contrast to adult foraminifera. In general, carbon uptake reaches saturation levels a few hours after food supply. Furthermore, A. tepida benefits from constant availability of fresh food rather than from a high amount of phytodetritus derived from a single food pulse. Our investigations showed that the foraminiferal impact on intertidal processing of phytodetrital carbon sources is species specific, temperature related and depends on developmental stage and input dynamics. Additionally, the presented data reveal the quantitative level of food derived carbon gathered within foraminiferal biomass.