

Foraminiferal survival after long-term in situ experimentally induced anoxia

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Anoxia was successfully induced in four benthic chambers installed at 24 m depth on the northern Adriatic seafloor from 9 days to 10 months. To accurately determine whether benthic foraminifera can survive experimentally induced prolonged anoxia, the CellTrackerTM Green method was applied and calcareous and agglutinated foraminifera were analyzed. Numerous individuals were found living at all sampling times and at all sampling depths (to 5 cm), supported by a ribosomal RNA analysis that revealed that certain benthic foraminifera were active after 10 months of anoxia. The results show that benthic foraminifera can survive up to 10 months of anoxia with co-occurring hydrogen sulfides. However, foraminiferal standing stocks decrease with sampling time in an irregular manner. A large difference in standing stock between two cores sampled under initial conditions indicates the presence of a large spatial heterogeneity of the foraminiferal faunas. An unexpected increase in standing stocks after one month is tentatively interpreted as a reaction to increased food availability due to the massive mortality of infaunal macrofaunal organisms. After this, standing stocks decrease again in cores sampled after 2 months of anoxia to then attain a minimum in the cores sampled after 10 months. We speculate that the trend of overall decrease of standing stocks is not due to the adverse effects of anoxia and hydrogen sulfides but rather due to a continuous diminution of labile organic matter.

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