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Short-term response of benthic foraminifera to fine sediment depositional events simulated in microcosm

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An *in vitro* experiment was designed to describe how benthic foraminifera (as witness of the benthic ecosystem) reacts to “one-time high volume” vs “frequent low volume” sediment discharge, as it may occur in coastal benthic environments regularly or occasionally buried during (e.g.) river flood massive deposits, or glacier melting events in polar regions. The influence of these events on the ecology of benthic ecosystems is often neglected and the resilience of benthic foraminiferal communities is poorly known. During a 53-day long experiment in microcosm, the NE Atlantic mudflat foraminifera community, mainly represented by *Ammonia* T6 and *Haynesina germanica* species, was confronted to two kinds of sedimentary disturbance: 1) one-time high volume (OHV) deposit, i.e. about 3 cm thick sediment is added in one time at the beginning of the experiment, and 2) frequent low volume (FLV) deposits, i.e. about 0.5 cm added each week for 4 weeks. The geochemical environment (e.g. O₂ penetration in the sediment, salinity, temperature and nutrient content in the supernatant water) was monitored to follow its steady-state before and during the experiment. In the two studied cases, the foraminifera react to the disturbance by immediately moving upward to the surface within 1 day after the deposit. In the OHV treatment, a species vertical distribution in relation to the surface, comparable to the vertical distribution before the disturbance (i.e. a resilient state), is established at most 1 week after the deposit, and no effects are visible on the foraminiferal diversity after 1 month experiment (without any other sediment input). In the FLV treatment, the resilient state is already reached 1 day after a low thickness burial. This suggests that foraminifera can migrate rapidly to their preferential life position under the new sediment-water interface. However, after 4 recurrent burring events the density of *H. germanica* drastically decreases, changing in this way the foraminiferal community structure. The results of this microcosm experiment suggest that the entire foraminiferal community can migrate upward quickly enough to keep pace with at least 3 cm of abrupt burial but needs several days to reach a resilient state. Furthermore, frequent sediment deposition may affect foraminiferal biodiversity more than a massive erratic event.