Potential impact of cable bacteria activity on hard-shelled benthic foraminifera: implications for their interpretation as bioindicators or paleoproxies

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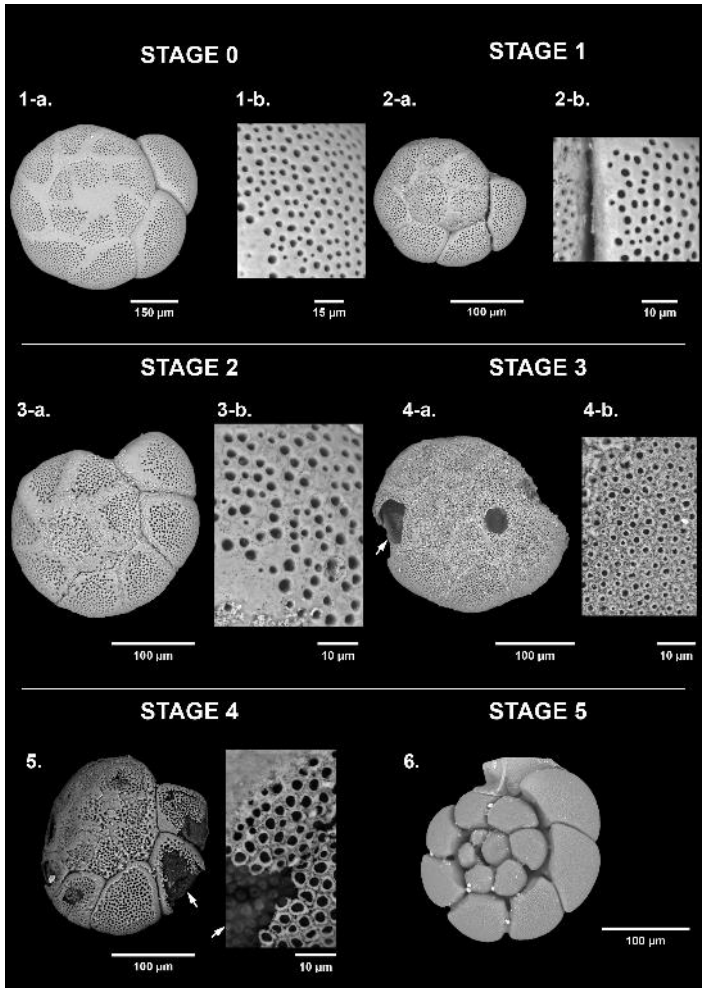

Fig. 2 Dissolution scale of Ammonia spp. based on high-resolution SEM images (spiral view). The specimens are classified into six stages of test dissolution from intact (stage 0) to fully dissolved (stage 5). For stages 0 to 2, a zoom on the last formed chamber was done (1-b, 2-b, 3-b), and on the n-1 chamber for stage 3 (4-b). White arrows point the organic lining.

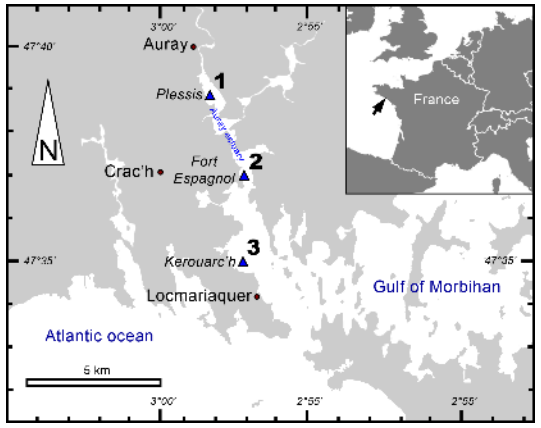

Fig. 1 Locations of sampling stations in the intertidal mudflats of the Auray estuary (France).

- pH and O_2 profiles combined with q-PCR suggested that cable bacteria were most likely to cause the acidifying process. Volumetric filament densities are comparable to those observed in the literature for coastal environments, with 7.4 ± 0.4 (St 1) and 74.4 ± 5.0 (St 2) m.cm^{-3} per bulk sediment.
- Highly contrasting sediment acidification (from low to very intense) were described from 1.0 to 2.4 ΔpH.
- This seems to lead to various dissolution stages of the calcareous test of living foraminifera from intact to fully dissolved test revealing the organic lining (based on SEM observations of living *Ammonia* spp. and *Haynesina germanica* specimens).
- Dead foraminiferal assemblages showed a strong calcareous test loss and an organic lining accumulation throughout depth under low pH, hampering the test preservation in deep sediment.

M. Daviray, E. Geslin, N. Risgaard-Petersen, V. Scholz, M. Fouet, E. Metzger, 2024. Biogeosciences, https://doi.org/10.5194/bg-2023-169

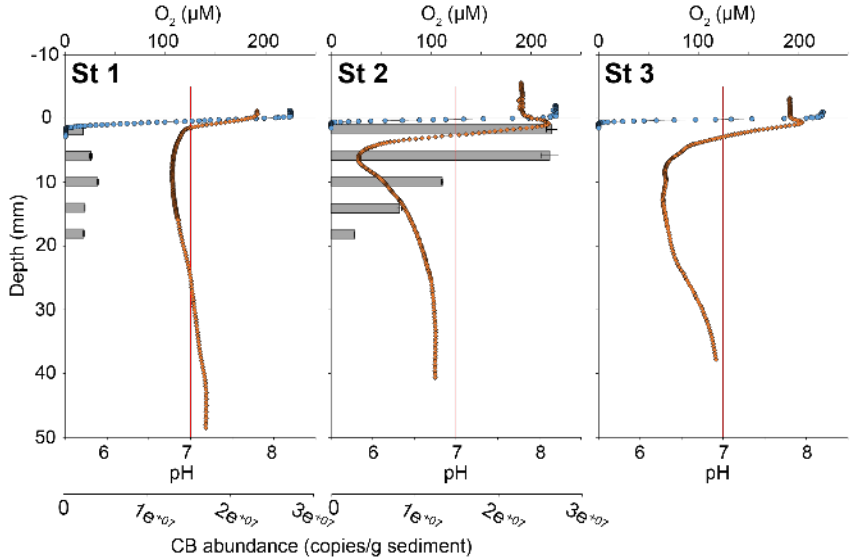

Fig. 3 Sediment oxygen (blue circles) and pH (orange diamonds) microprofiles at the three stations, and vertical distribution of cable bacteria abundance (qPCR of Ca. Electrothrix 16S rRNA gene copies, grey bars) for stations 1 and 2.

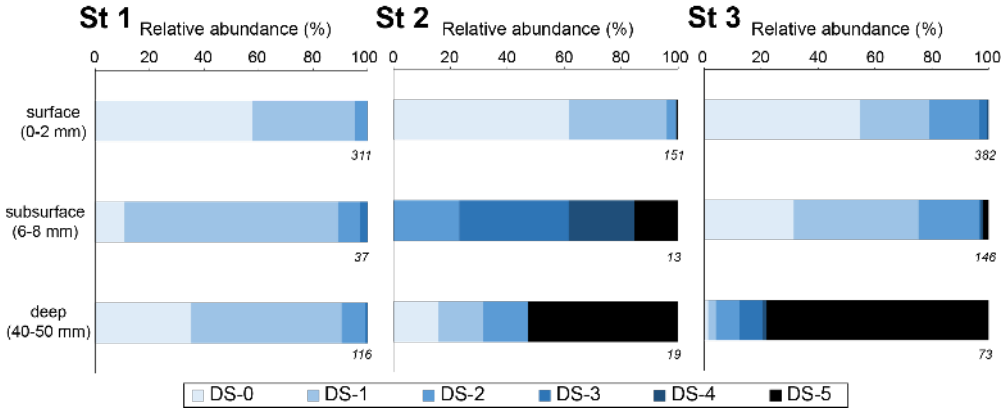

Fig. 4 Relative abundance of living benthic foraminifera with calcareous test for each dissolution stage. The numbers on the lower right of the boxes are the total numbers of SEM photographed specimens (*Ammonia* spp. *and H. germanica* from the >125 µm fraction).