Benthic foraminiferal species tolerance for hydrothermal activity: a case of study from the Lucky Strike vent field.

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Supplementary figures and data

Supplementary 1a

Plate of the scanning electronic microscope images of the most common species observed at the Lucky Strike vent field (Mid-Atlantic Ridge). 1) *Cruciloculina triangulis*, 2) *Triloculina oblonga*, 3) *Quinqueloculina auberiana*, 4) *Pyrgo informata*, 5) *Nevillina coronata*, 6) *Cribromiliolinella subvalvularis*, 7) A*mmodiscus* sp., 8) *Spiroloculina* sp., *9) Pyrgo depressa,* 10) *Fissruina foliformis,* 11) *Parafissurina saturni,* 12) *Fissurina striata,* 13) *Fissruina orbignyana,* 14) *Fissurina anectens,* 15) *Favulina hexagona,* 16) *Lagena laevigata,* 17) *Reussolina laevis,* 18) *Lagena striata,* 19) *Uvigerina peregrina,* 20) *Uvigerina auberiana,* 21) *Eubulimina exilis*, 22) *Vaginulina* sp.*,* 23) *Trifarina angulosa*, 24) *Globocassidulina subglobosa,* 25) *Melonis affinis,* 26) *Pullenia quinqueloba,* 27) *Alabaminella weddellensis,* 28) *Epistominella exigua,* 29) *Gavelinopsis translucens, 30) Laeticarinina pauperata,* 31) *Cibicides wuellerstorfi var. lobatulus,* 32) *Cibicides wuellerstorfi,* 33) *Martinottiella cylindrica,* 34) *Karreriella bradyi,* 35) *Vanhoeffenella* sp.*,* 36) *Reophax agglutinatus*

(Figure attached as Supplementary 1a)

Supplementary 1b

Plate of the most common species observed at the Lucky Strike vent field (Mid-Atlantic Ridge) under a stereomicroscope. 1) *Cruciloculina triangulis,* 2) *Triloculina oblonga,* 3) *Quinqueloculina auberiana*, 4) *Pyrgo informata, 5) Cribromiliolinella subvalvularis,* 6) *Ammodiscus* sp., 7) *Spiroloculina* sp., 8) *Pyrgo depressa*, 9) *Fissruina foliformis*, 10) *Parafissurina saturni*, 11) *Fissruina orbignyana*, 12) *Fissurina anectens*, 13) *Favulina hexagona*, 14) *Lagena laevigata*, 15) *Reussolina laevis*, 16) *Lagena striata*, 17) *Uvigerina peregrina*, 18) *Uvigerina auberiana*, 19) *Eubulimina exilis, 20) Vaginulina* sp., 21) *Globocassidulina subglobosa*, 22) *Melonis affinis*, 23) *Pullenia quinqueloba*, 24) *Alabaminella weddellensis*, 25) *Epistominella exigua*, 26) *Gavelinopsis translucens*, 27) *Cibicides wuellerstorfi var. lobatulus*, 28) *Cibicides wuellerstorfi*, 29) *Martinottiella cylindrica*, 30) *Karreriella bradyi*, 31) *Vanhoeffella* sp., 32) *Reophax agglutinatus*

(Figure attached as Supplementary 1b).

Supplementary 2

(Excel sheet attached as Appendix 2\_XRF). File containing the raw data of X ray Fluorescence analyses and additional information on methodology.

Supplementary 3

Living benthic foraminiferal (>63 µm) specific richness (A), Shannon diversity index (B), counting (C) and rarefaction curves (D) for the 11 cores with available environmental data and non-null count of foraminifera.

Supplementary 4

14C dating measured on planktonic foraminiferal species *Neogloboquadrina pachyderma* in two cores collected in reference and close to Eiffel Tower edifice.

Supplementary 5

Pore water profiles of selected dissolved metals.

Methods

Rhizomes connected to pre-drilled blade cores were used to collect pore water at each station: every 5 mm at the top core (0-20 mm) and every 20 mm below. Two out of the seven stations were not analyzed due to the lack of available water in the sediment (i.e., MS N and MS). All samples have been preserved for future analyses of metals and sulfate in laboratory, adding 10 µM of HNO3 (40%) per ml of sample.

Results

Pore water chemistry has been investigated in one core at five stations (except for MS and MS N) of the study area (Appendix 3), focusing on metal concentrations to investigate the dissolved elements derived from hydrothermal fluids. Most of the cores displayed low and constant dissolved metal content, except for SC\_CL6 and Cap\_CL6 that were enriched in all elements. However, these two cores showed opposed signals in Fe and Mn with high concentrations in the bottom horizon (250 and 5 µmol kg-1, respectively) decreasing upward in Cap\_CL6 while these high values characterized the top horizon in SC\_CL6 (103 and 2 µmol kg-1, respectively), decreasing with increasing sediment depth. Relatively high concentrations of Ba (2 µmol kg-1) and Cu (14 µmol kg-1) also characterized the first centimeter of SC\_CL6. Zn concentration was high in Cap\_CL6 only, reaching 72 µmol kg-1 at 80 mm.

Supplementary 6

Excel sheet attached with raw data of benthic foraminiferal counting of dead and living specimens.