Supporting Information for

**Deep-sea benthic foraminiferal response to the Late Lutetian Thermal Maximum at Demerara Rise (ODP Site 1260, equatorial western Atlantic)**

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**Introduction**

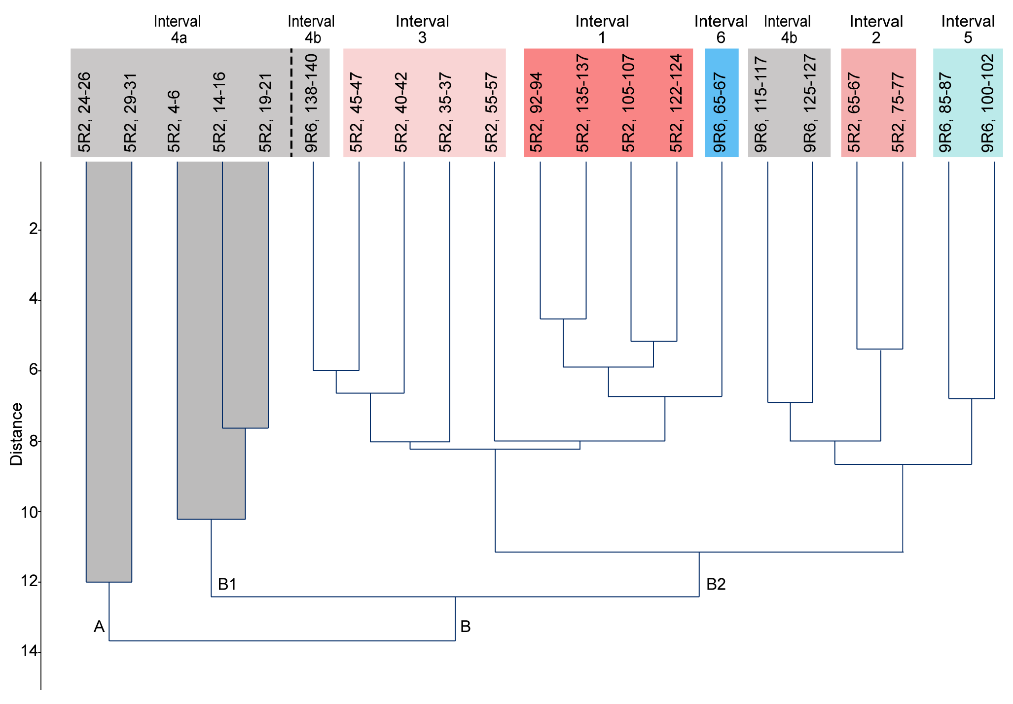
In this study, we combined published with new data from ODP Site 1260 to understand the biotic response to the Late Lutetian Thermal Maximum. The supplement contains information about the statistical analyses, including supplementary figures to support the interpretation in the manuscript.

**Statistical analyses**

Q-mode (samples) and R-mode (species) analyses were completed using the PAST software (Hammer et al., 2001) on a data matrix. The data matrix included the 21 studied samples and selected species that showed relative abundance >2% in at least one sample. Hierarchical cluster analysis on samples was completed and was processed using the correlation similarity index and the unweighted pair-group average algorithm (UPGMA) (Suppl. Fig. S1). Additionally, Detrended Correspondence Analysis (DCA) was performed using the same software and dataset (Q-mode and R-mode, Fig. 5 and Suppl. Fig. S2). This served to both deepen the understanding of the clustering results and to examine the correlation between foraminifera and environmental variables (Hammer and Harper, 2005, Rivero-Cuesta et al., 2020).

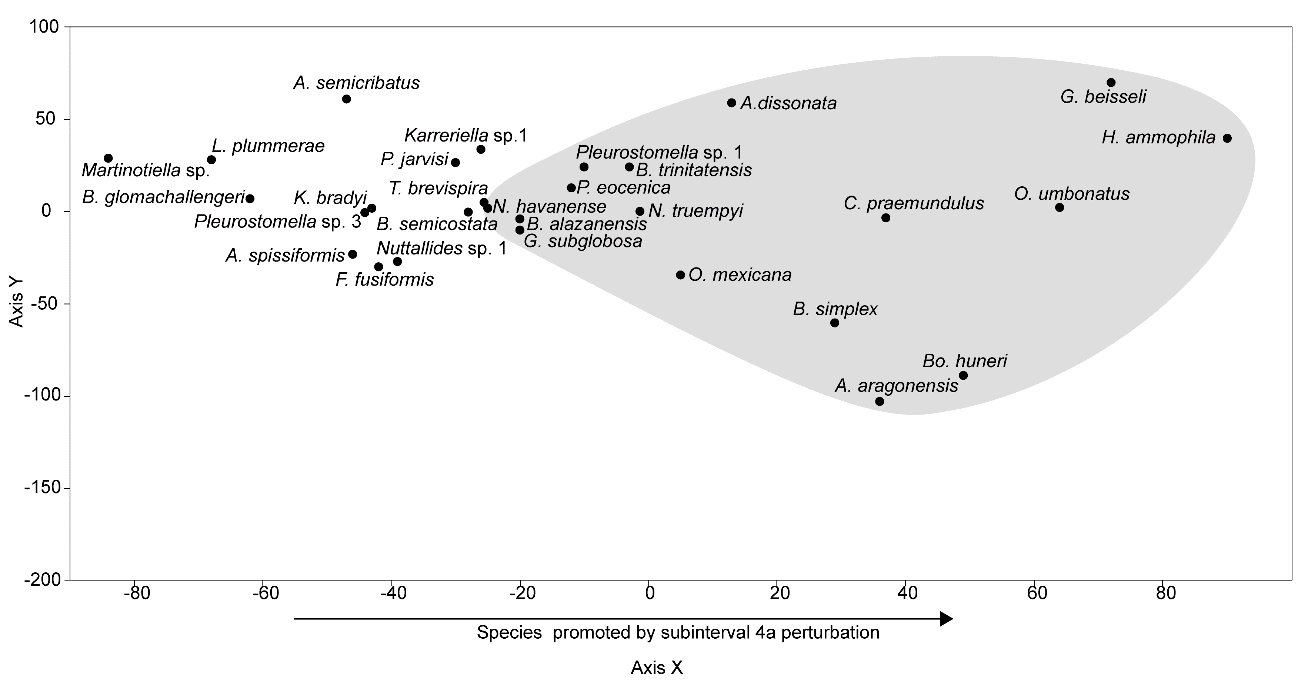
* **Q-mode (samples) hierarchical cluster analysis**

The Cluster analysis (Suppl. Fig. S1) separates the six stratigraphic intervals defined in our study section from ODP Site 1260, with interval 4 including the depths of the LLTM event. Interval 4/LLTM is subdivided into subinterval 4a, which include the depths that reflects the most significant environmental perturbation, and subinterval 4b. Cluster A groups two samples from subinterval 4a showing lower CaCO3 values, fewer percentages of planktonic organisms, higher number of fish teeth per gram of sediment, and warmer temperatures. Within cluster B, subcluster B1 contains the rest of the samples from subinterval 4a, while all remaining samples are included in subcluster B2.

Supplementary Figure S1. Cluster analysis plot of studied samples across the ODP Site 1260.

* **R-mode (species) Detrended Correspondence Analysis (DCA)**

The DCA analysis (Suppl. Fig. S2), along with changes in the relative abundance of benthic foraminiferal taxa throughout the LLTM, allow us to identify the species promoted by the warming perturbation described in subinterval 4a. These species, included in the grey area of Supplementary Figure S2, show the highest values along Axis X. The environmental perturbation is related to decreased export productivity, which could be associated with changes in the primary productivity caused by carbonate dissolution, altering the type and/or quality of organic matter reaching the deep-sea, and/or increased organic matter remineralization in the water column.

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Supplementary Figure S2. DCA analysis plot of benthic foraminiferal species identified across the ODP Site 1260.

**References**

Hammer, Ø. and Harper, D.: Paleontological Data Analysis, Blackwell Publishing, Oxford, 2005.

Hammer, Ø., Harper, D.A.T., and Ryan, P.D.: PAST: Paleontological statistics software package for education and data analysis, Paleontol. Electron. 4 (1), 9, 2001.

Rivero-Cuesta, L., Westerhold, T., Alegret, L.: The late Lutetian thermal Maximum (middle Eocene): first record of deep-sea benthic foraminifera response, Palaeogeogr. Palaeoclimatol. Palaeoecol., 545, 109637, 2020.