



*Supplement of*

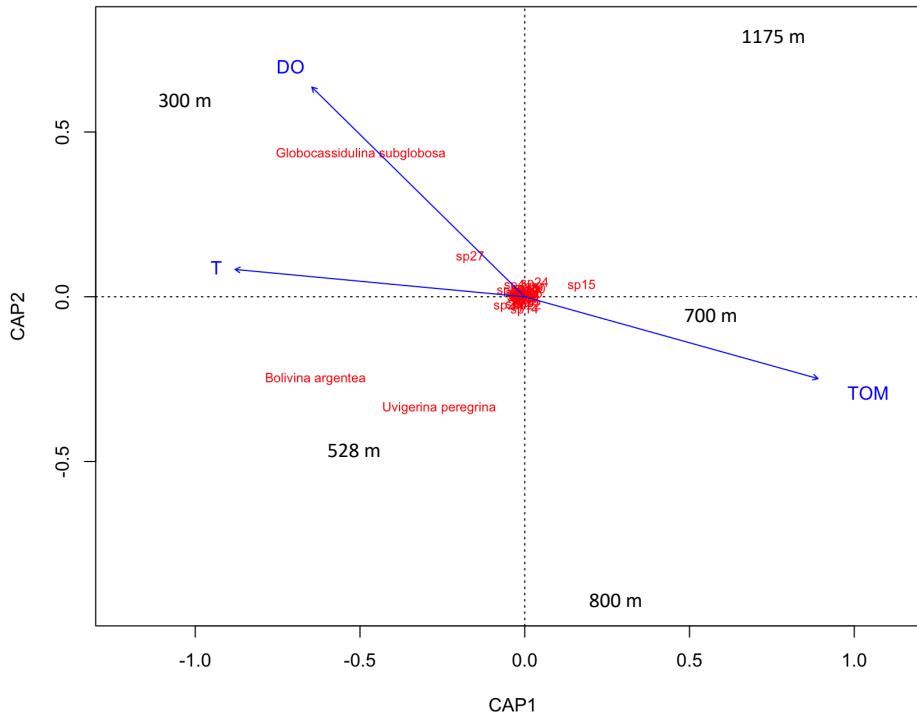
## **Southern California margin benthic foraminiferal assemblages record recent centennial-scale changes in oxygen minimum zone**

**Hannah M. Palmer et al.**

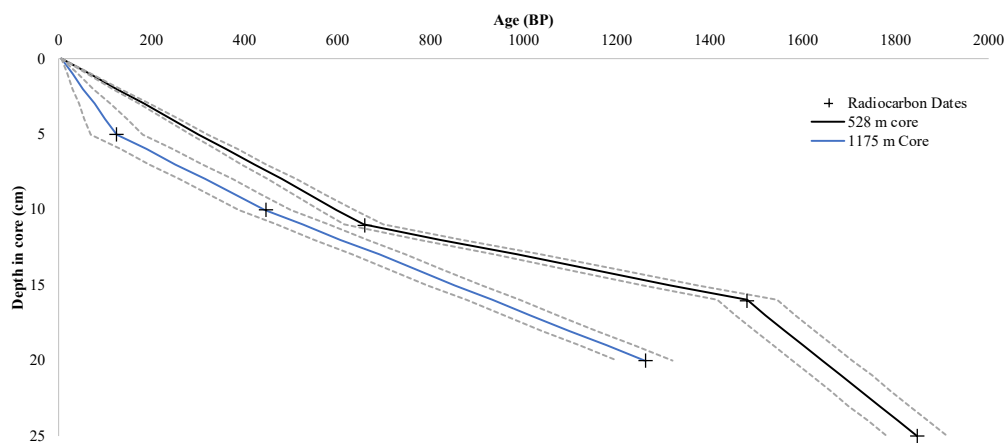
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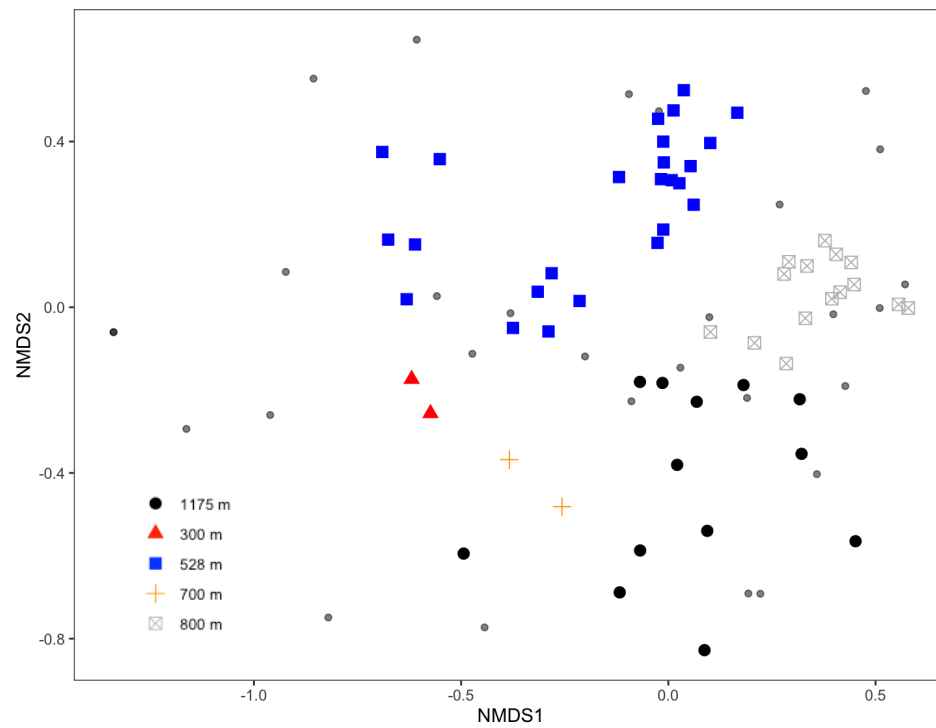
This supplement contains four supplemental figures and a taxonomic reference list for the benthic foraminiferal species included in the text of the manuscript. All materials and methods for data collection are described in the main text of this article.



**Figure S1.** Distance Based Redundance Analysis of core-top benthic foraminiferal assemblages including both size fractions ( $>63 \mu\text{m}$ ). Species are listed in red – species discussed in manuscript are labeled. Sites are listed as water depth in meters. Blue arrows show ordination of environmental factors T= temperature, DO = dissolved oxygen, TOM= total organic matter). Eigenvalues for two axes are CAP1 (0.4575) and CAP2 (0.2024).



**Figure S2.** Age model for two cores. Age shown in years before present. Linear interpolation between radiocarbon dates (+). MV1217-2-3 (528 m water depth) is black line. MV1217-4-3 and MV1217-4-1 (1175 m) is blue line. Dashed lined represent  $\pm 1$  sigma years.



**Figure S3.** Non-metric multidimensional scaling plot of all benthic foraminiferal assemblages through time. Species are plotted as small gray dots. All other points represent assemblages from 1 cm intervals through time at each of the 5 cores. Legend shows which dots represent each water depth/site (Red triangle = 300 m, blue square = 528 m, orange crosshair = 700 m, Grey box with x = 800 m, black circle = 1175 m).



**Figure S4:** Light microscope images of benthic foraminifera (*Bolivina spissa*, *Uvigerina peregrina*, *Bolivina argentea*, *Epistominella* sp., *Cassidulina carinata*, *Globocassidulina subglobosa*) evaluated in this study. All scale bars are 100 µm.



## **Taxonomic reference list of benthic foraminifera species included in manuscript**

*Bolivina argentea* Cushman 1926. (Figure S4)

*Bolivina spissa* = *Bolivina subadvaena* Cushman var. *spissa* Cushman 1926. (Figure S4)

*Bulimina* spp. \* (includes *Bulimina mexicana* = *Bulimina inflata* Seguenza var. *mexicana* Cushman, 1922 and

*Bulimina exilis* = *Bulimina elegans* d'Orbigny var. *exilis* Brady, 1884.)

*Cassidulina carinata* = *Cassidulina laevigata* d'Orbigny var. *carinata* Silvestri, 1896. (Figure S4)

*Cibicidoides* sp. \*\*

*Epistominella* sp. (Figure S4)

*Globobulimina pacifica* Cushman, 1927.

*Globobulimina ovata* d'Orbigny 1846.

*Globocassidulina subglobosa* = *Cassidulina subglobosa* Brady, 1881. (Figure S4)

*Nonionella stella* = *Nonionella miocenica* Cushman var. *stella* Cushman and Moyer, 1930.

*Quinqueloculina* sp. \*\*

*Uvigerina peregrina* (Figure S4) Cushman 1923.

\* Individuals in this genus were identified to species but considered together for the interpretations of this paper.

\*\*Due to low abundance, individuals in this genus were not identified to species level.