

Supporting Information for

# **Southern California margin benthic foraminiferal assemblages across a modern environmental gradient record recent centennial-scale changes in oxygen minimum zone**

Hannah M. Palmer<sup>1,2</sup>, Tessa M. Hill<sup>1,2</sup>, Peter D. Roopnarine<sup>3</sup>, Sarah E. Myhre<sup>4</sup>, Katherine R. Reyes<sup>1,5</sup>, and Jonas T. Donnenfield<sup>1,6</sup>

<sup>1</sup>Bodega Marine Laboratory, University of California, Davis, California, USA

<sup>2</sup>Department of Earth and Planetary Sciences, University of California, Davis, California, USA

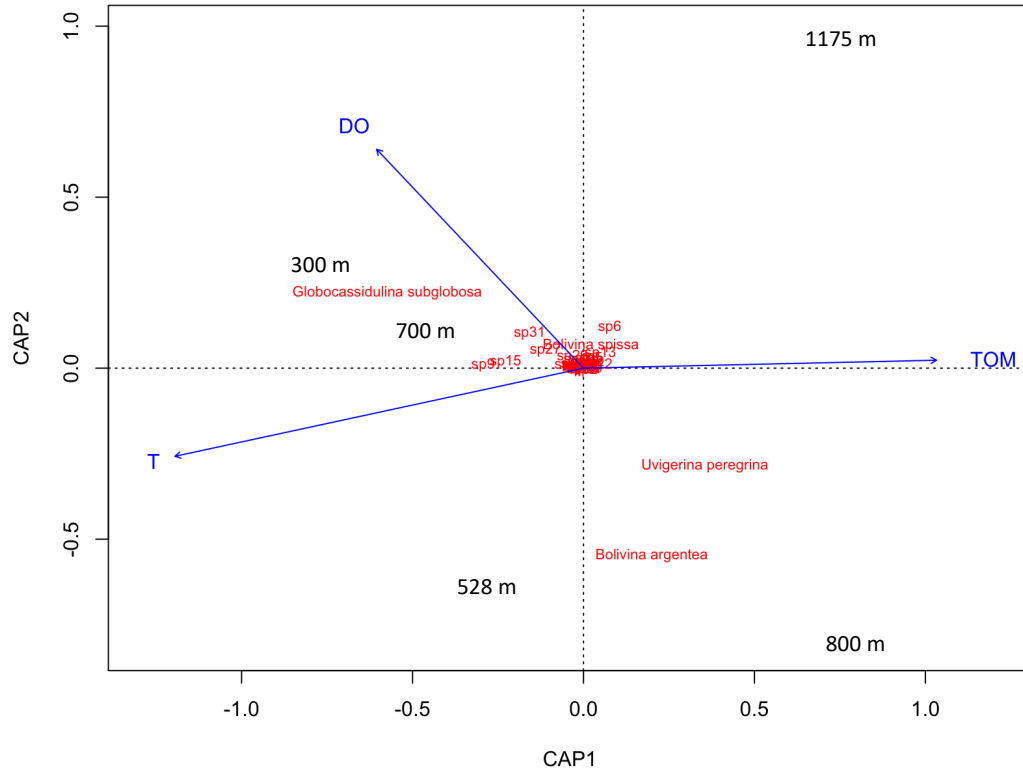
<sup>3</sup>Department of Invertebrate Zoology and Geology, California Academy of Sciences, San Francisco, California, USA

<sup>4</sup>School of Oceanography, University of Washington, Seattle, Washington, USA

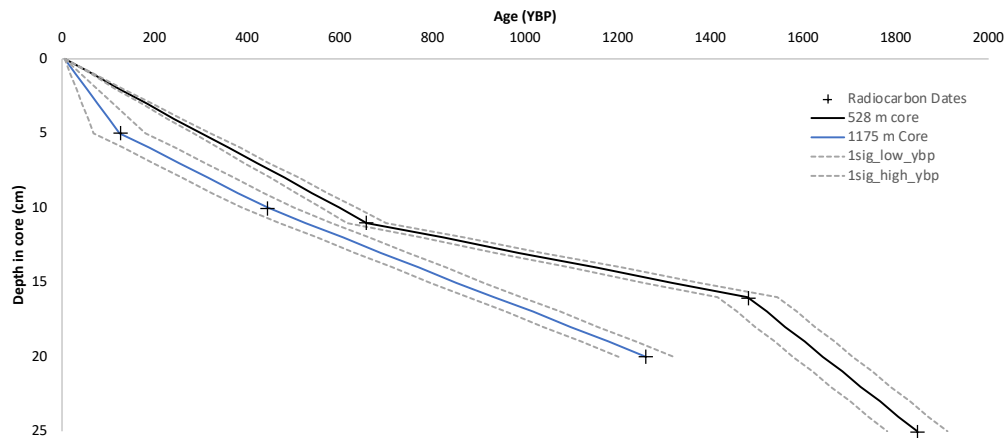
<sup>5</sup>Department of Natural Sciences and Mathematics, Dominican University of California, San Rafael, California, USA

<sup>6</sup>Geology Department, Carleton College, Northfield, Minnesota, USA

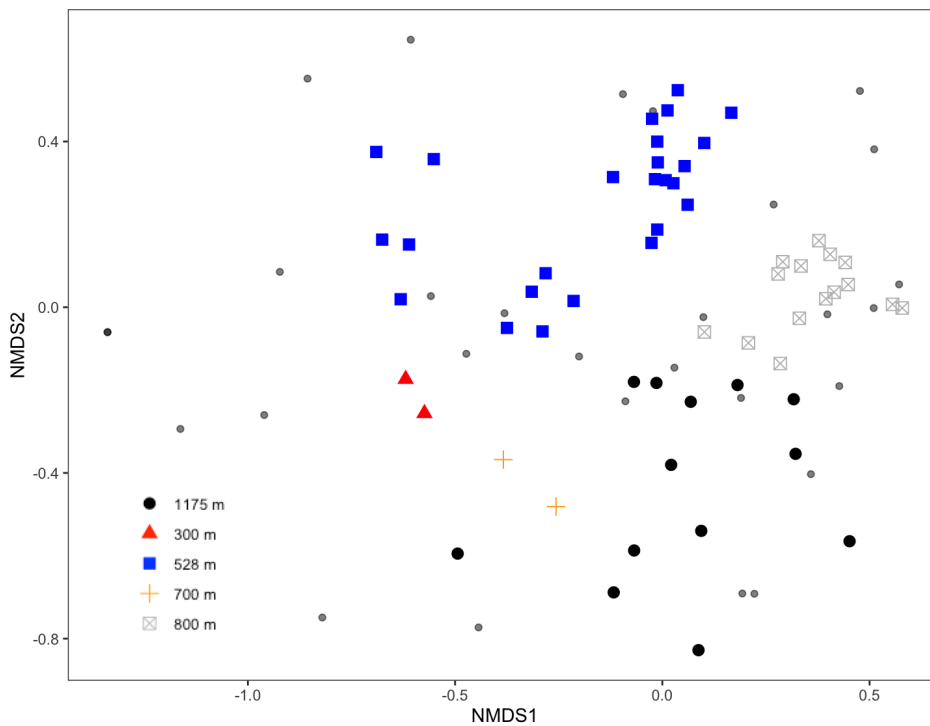
This supplement contains three supplemental figures. All materials and methods for data collection are described in the main text of this article.



**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 (0.3658) and CAP2 (0.2505).



**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 +/- 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).