Paleoceanography and Paleoclimatology

Supporting Information for

Oxygenation of offshore Southern California Marine Basins through the Holocene

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Introduction

Supporting information contains five supporting figures and two supporting tables. All methodology is discussed in main text.

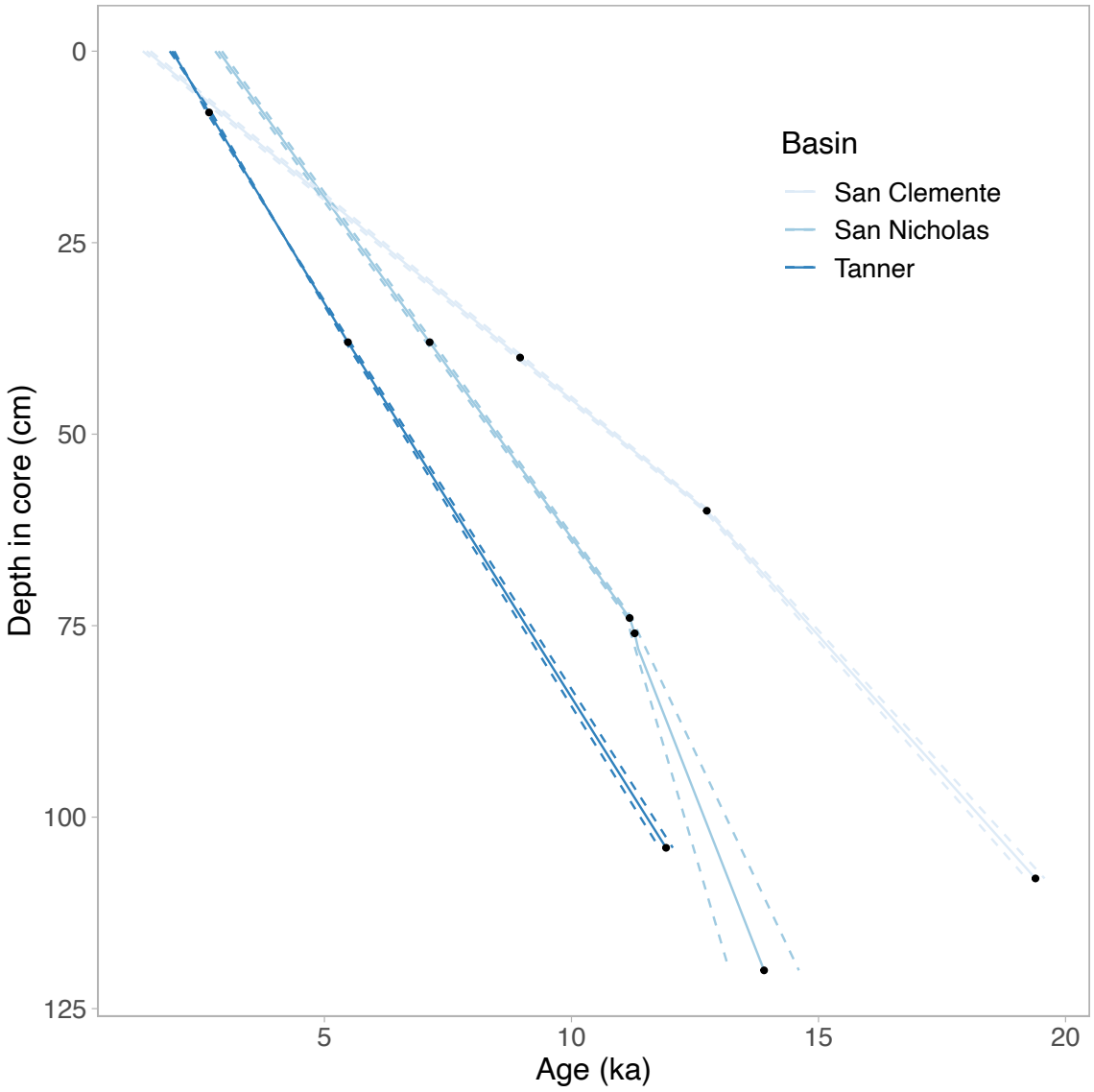

Figure S1. Radiocarbon-based age model for three cores included in study. Age shown in thousands of years before present. Linear interpolation (solid lines, Tanner= dark blue, San Nicolas = medium blue, San Clemente = light blue) between radiocarbon dates (black dots). Dashed lined represent +/- 1 sigma years.

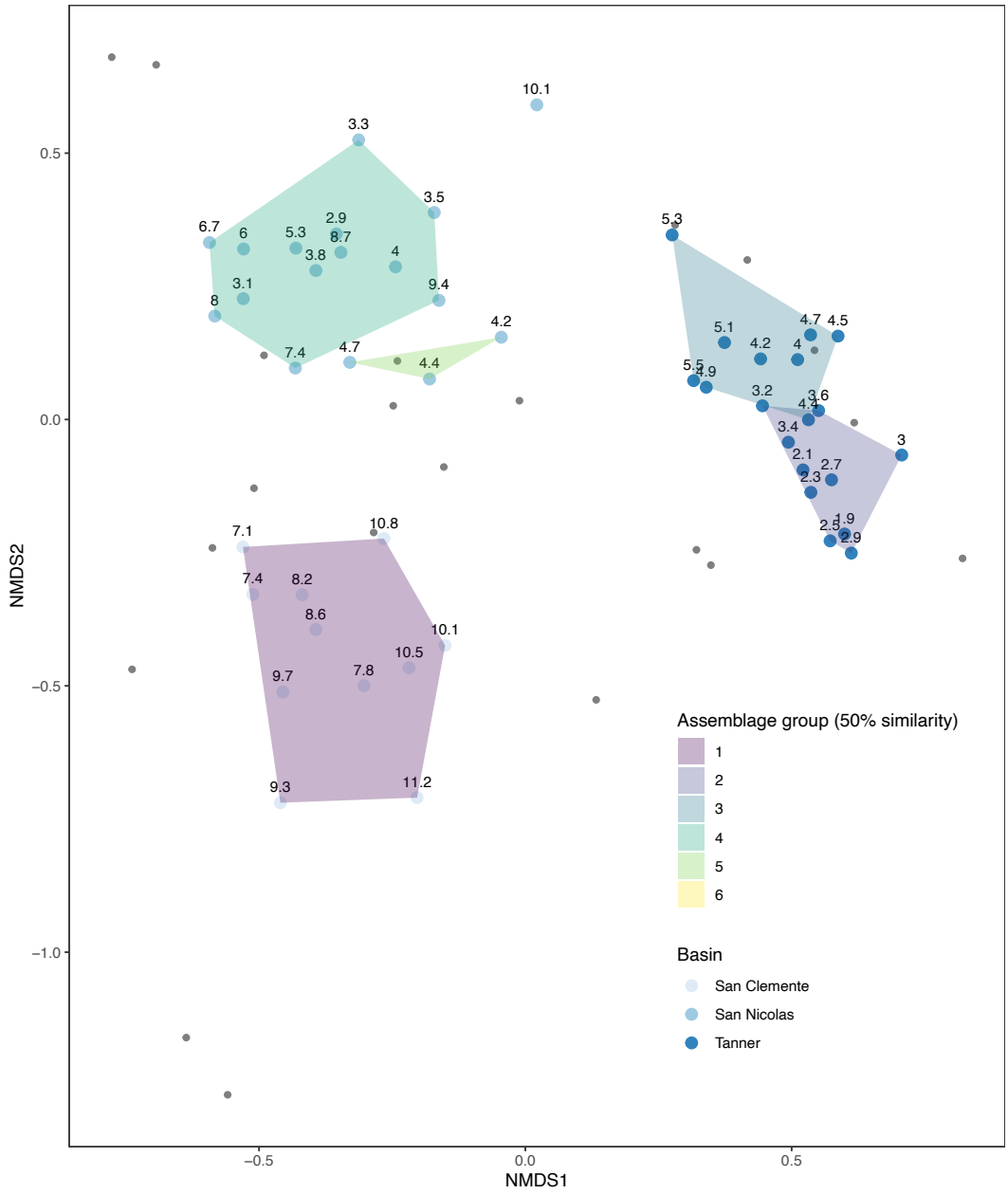

Figure S2. Non-metric multidimensional scaling plot of all benthic foraminiferal assemblages through time from three cores. Species are plotted as small gray dots. All other points represent assemblages at each interval through time at each of the three cores. Label is age in thousands of years before present. Colored dots represent each basin: Tanner= dark blue, San Nicolas = medium blue, San Clemente=light blue. Clusters show assemblages with 50% similarity, calculated using cluster analysis; five clusters are represented.

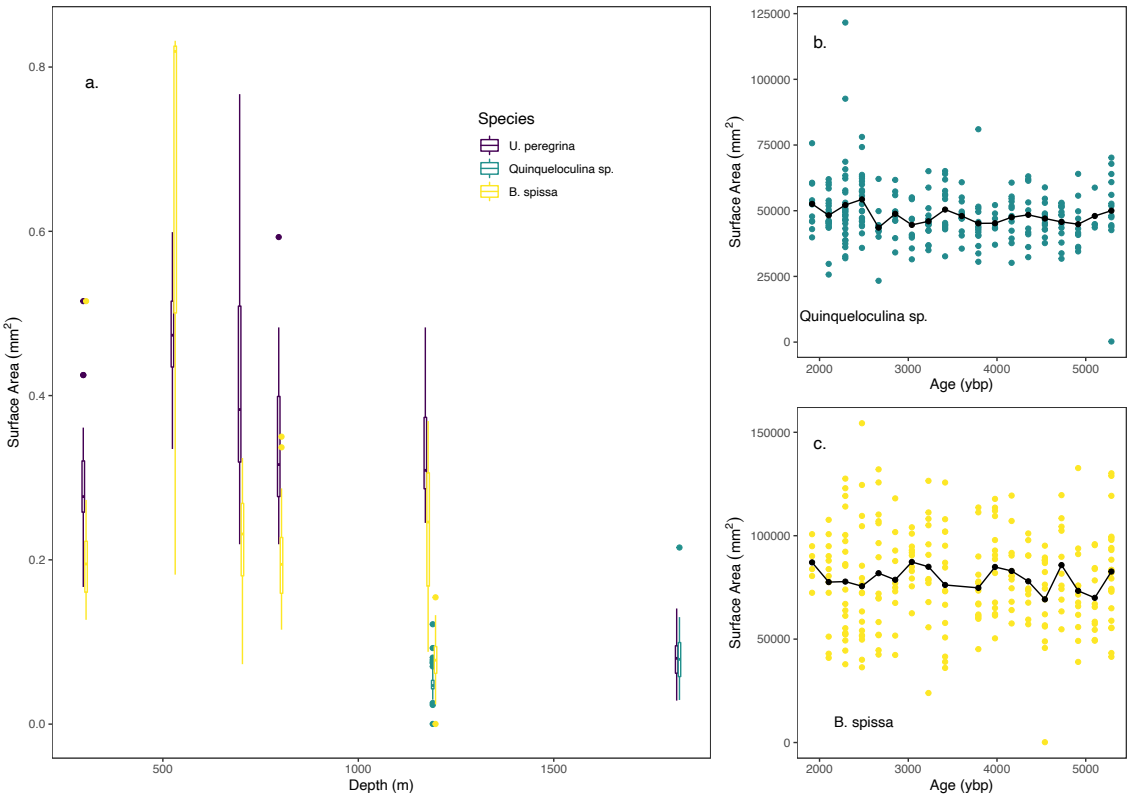

Figure S3. Shell surface area (mm^2) vs. water depth (m) at all points in time (a.). Data shown here indicate all points in time from each water depth. Colors represent species: U. peregrina = purple, *Quinqueloculina* sp. = green, *B. spissa* = yellow. Surface area of *Quinqueloculina* sp. (b.) and *B. spissa* (c.) vs. time in years before present from Tanner Basin.

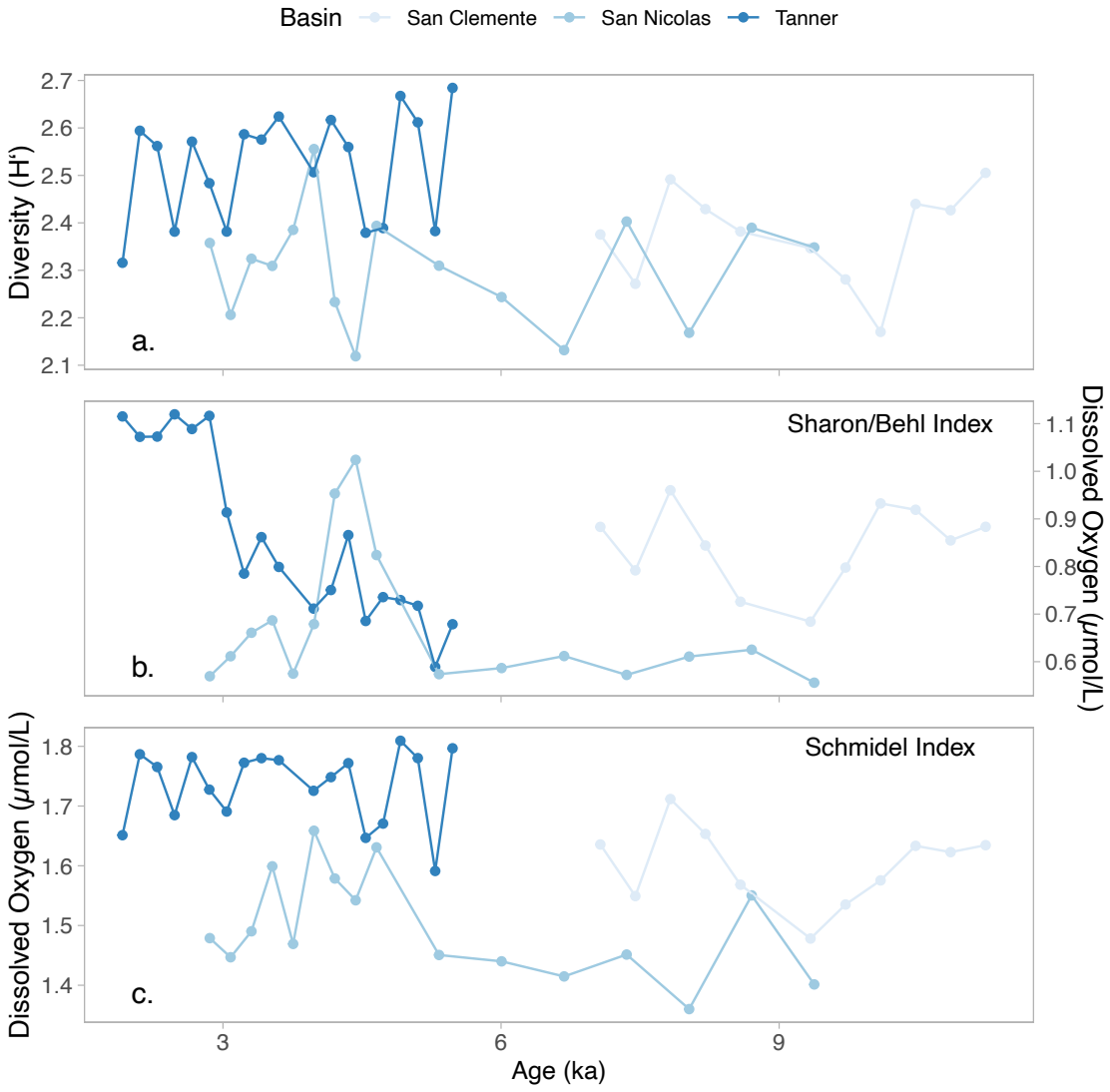

Figure S4. Diversity (Shannon Index, a.), reconstructed dissolved oxygen concentration using Sharon-Behl Index (b.), reconstructed dissolved oxygen concentration using Schmidel Index (c.) for three cores (Tanner= dark blue, San Nicolas = medium blue, San Clemente = light blue) vs. age in thousands of years before present.

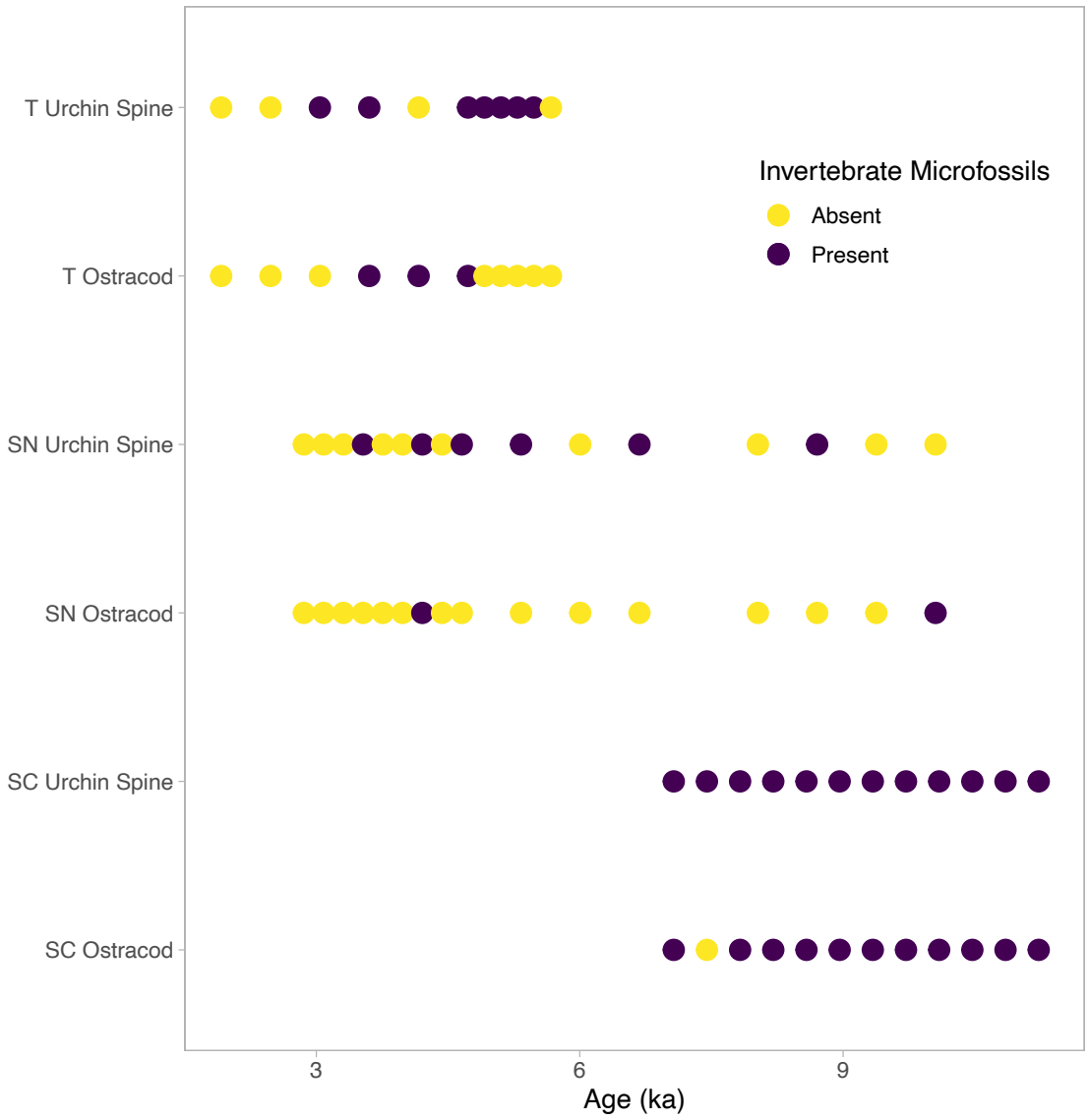

Figure S5: Presence and absence of metazoan microfossils (urchin spines and ostracods) through time (age in thousands of years before present) for each basin (Tanner (T), San Nicolas (SN), and San Clemente (SC)). Presence is purple, absence is yellow.

Basin	**Core**	**Sample Interval**	**Source**	**Age** (^{14}C years)	**±**	**1σ minimum calendar age**	**1σ maximum calendar age**	**Age** (years before present)	**Sed rate** (cm kyr^{-1})
Tanner	EW95 04-09	8-10 cm	Stott et al., 2000	1950	50	2619	2712	2666	10.67
Tanner	EW95 04-09	38- 40 cm	This paper	5290	30	5433	5521	5477	10.25
Tanner	EW95 05-09	104-106 cm	Stott et al., 2000	10790	60	11778	12051	11915	
San Nicolas	EW95 04-08	38-40 cm	Stott et al., 2000	6780	50	7062	7198	7130	8.89
San Nicolas	EW95 04-08	74-76 cm	This paper	10330	35	11130	11225	11178	16.48
San Nicolas	EW95 04-08	76-78 cm	Stott et al., 2000	10460	70	11200	11359	11280	16.48
San Nicolas	EW95 04-08	120-122 cm	Stott et al., 2000	12870	160	13193	14603	13898	
San Clemente	EW95 04-08	40-42 cm	Stott et al., 2000	8550	60	8882	9039	8960	5.29
San Clemente	EW95 04-08	60-62 cm	This paper	11430	40	12690	12789	12739	7.21
San Clemente	EW95 04-08	108-110 cm	Stott et al., 2000	16650	50	19575	19207	19391	

Table S1. Radiocarbon ages and age model for all three cores examined here.

Species	Oxygen Classification	Modified from Sharon-Behl	Citation for oxygenation affinity
Bolivina argentea	Suboxic		Sharon et al., 2021
Bolivina pseudoberyethes	Dysoxic		Sharon et al., 2021
Bolivina spissa	Suboxic		Sharon et al., 2021
Bulimina tenuata	Dysoxic		Sharon et al., 2021
Cassidulina sp.	Suboxic		Sharon et al., 2021
Chlistomella ovoidea	Suboxic		Sharon et al., 2021
Cibicides mckannai	Weakly hypoxic to oxic	Modified	Kaiho 1994
Cibicides sp.	Weakly hypoxic to oxic	Modified	Kaiho 1994
Elphidium sp.	Weakly hypoxic to oxic		Sharon et al., 2021
Epistominella exigua	Suboxic		Sharon et al., 2021
Epistominella pacifica	Weakly hypoxic to oxic	Modified	Cannarito and Kennett 1999
Fursenkoina sp.	Suboxic	Modified	Kaiho 1994
Globobulimina barbata	Suboxic	Modified	Ohkushi et al., 2013
Globobulimina ovata1	Suboxic	Modified	Ohkushi et al., 2013
Globobulimina ovata2	Suboxic	Modified	Ohkushi et al., 2013
Globobulimina pacifica	Suboxic	Modified	Ohkushi et al., 2013
Globocassidulina sp.	Suboxic		Sharon et al., 2021
Globocassidulina subglobosa	Suboxic		Sharon et al., 2021
Hansenisca soldanii	Weakly hypoxic to oxic	Modified	De and Gupta 2010
Hansenisca sp.	Weakly hypoxic to oxic		Sharon et al., 2021
Melonis affinis	Suboxic	Modified	Kaiho 1994
Nonionella stella	Dysoxic		Sharon et al., 2021
Oridorsalis umbonatus	Suboxic		Sharon et al., 2021
Other			
Pyrgo murrhina	Weakly hypoxic to oxic		Sharon et al., 2021
Quinqueloculina sp.	Weakly hypoxic to oxic		Sharon et al., 2021
Quinqueloculina sp2.	Weakly hypoxic to oxic		Sharon et al., 2021
Uvigerina peregrina	Suboxic		Sharon et al., 2021
Uvigerina proboscoidea	Suboxic		Sharon et al., 2021
Uvigerina sp.	Suboxic		Sharon et al., 2021

Table S2. Oxygen affinity for all species examined here and utilized in oxygen transfer functions.