

Supplementary Information for "Seasonal Modulation of Dissolved Oxygen in the Equatorial Pacific by Tropical Instability Vortices"

Y. A. Eddebbar¹ *, A. C. Subramanian², D. B. Whitt^{3,4}, M. C. Long³, A.

Verdy¹, M. R. Mazloff¹, and M. A. Merrifield¹

¹Scripps Institution of Oceanography, University of California, San Diego, La Jolla, CA 92037, USA

²Atmospheric and Oceanic Sciences, Colorado University, Boulder, CO 80309, USA

³Climate and Global Dynamics, National Center for Atmospheric Research, Boulder, CO 80305, USA

⁴NASA Ames Research Center, Moffett Field, CA 94035, USA

Contents of this file

1. Figures S1
2. Figures S2
3. Figures S3

Supplementary Figures

This document includes supplementary figures for the main manuscript.

*9500 Gilman Dr., La Jolla, CA

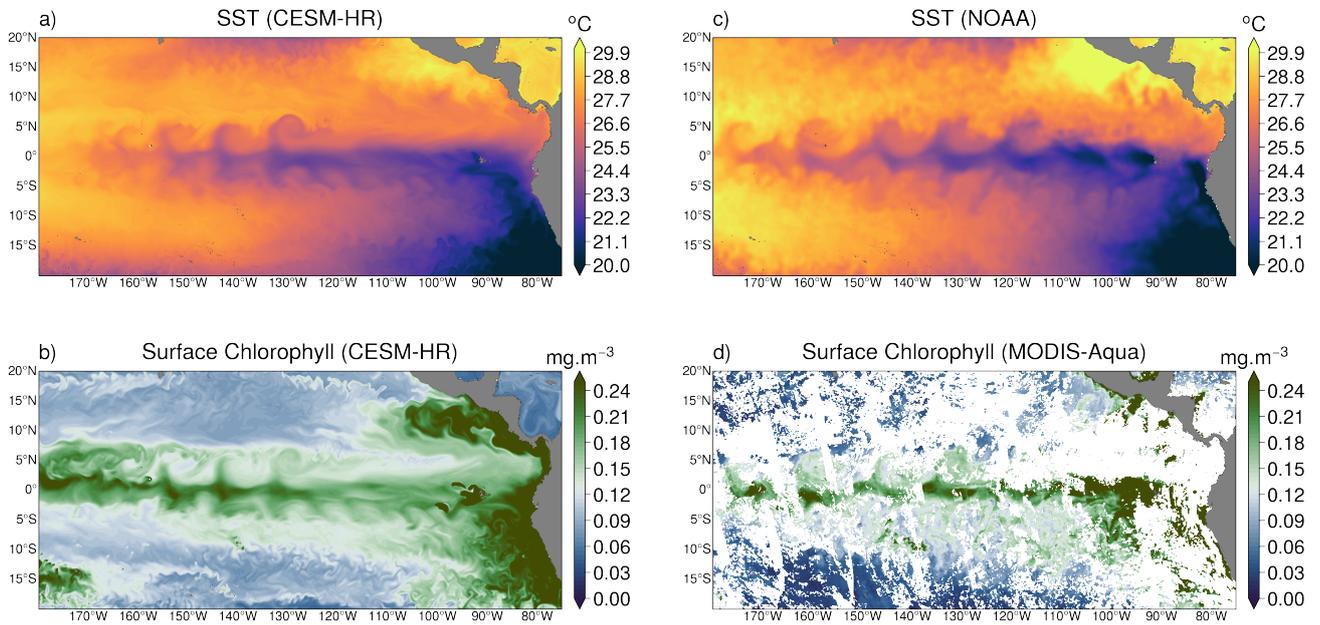


Figure S1. 5-day mean snapshot of SST and surface Chlorophyll in a) and b) for CESM-HR on 3 Oct, year 5, and c) and d) for the NOAA 0.25° Daily Optimum Interpolation Sea Surface Temperature (OISST) Analysis Version 2.1 product and MODIS Aqua (9km resolution) Level 3 product on 17 October, 2016. SST and Chlorophyll data were accessed and are freely available on the NOAA repository <https://psl.noaa.gov/thredds/dodsC/Datasets/noaa.oisst.v2.highres/sst.day.mean.2016.v2.nc> and NASA Ocean Color Data repository <https://oceandata.sci.gsfc.nasa.gov:443/opendap/MODISA/L3SMI> respectively.

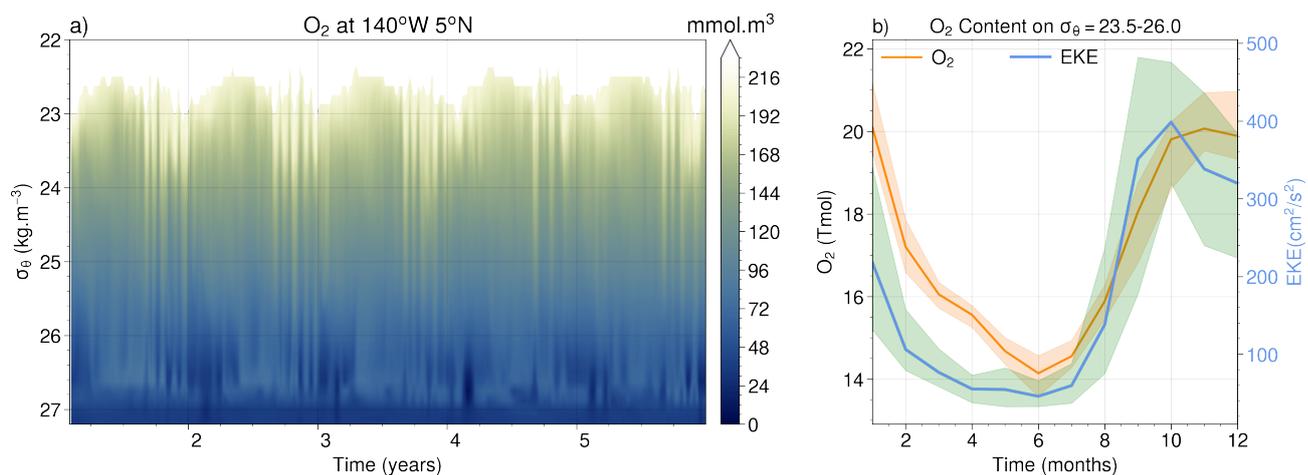


Figure S2. a) Hovmoller of O₂ on density coordinates at 140°W, 5°N for the full 5 year simulation of CESM-HR. TIV events are visible as oxygenated bands occurring from late summer through early winter. b) Climatological monthly means of the O₂ content (orange) integrated over the 23.5-26.0 potential density range along with 15m mean EKE (blue) over the TIV box region (120°W-160°W, 2°N-8°N). Shading bounds the minimum and maximum monthly mean values over the 5 year simulation.

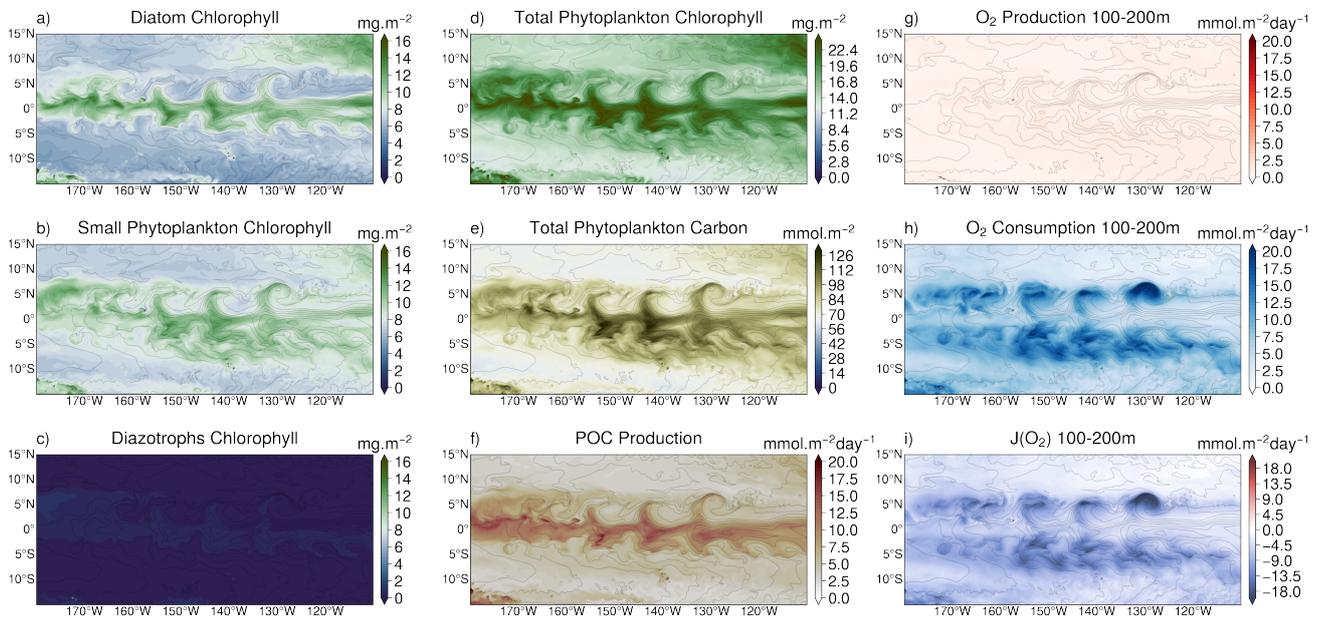


Figure S3. Biogeochemical signature of TIVs in a 5-day mean snapshot on October 3, year 5 of the CESM-HR simulation. Panels a)-c) show water column integrated chlorophyll content for diatoms, small phytoplankton, and diazotrophs. Panels d) and e) shows the total chlorophyll and total carbon from all three phytoplankton groups. Panel f) shows Particulate Organic Carbon (POC) production integrated over the upper 200m of the ocean. Panels g-i) show O_2 production, consumption, and their net balance integrated over the 100-200m depth range. SST contours are shown in thin line contours (contoured every $0.5^\circ C$) to outline the location of the TIVs.