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Supplement of

Contextualizing time-series data: quantification of short-term regional variability in the San Pedro Channel using high-resolution in situ glider data

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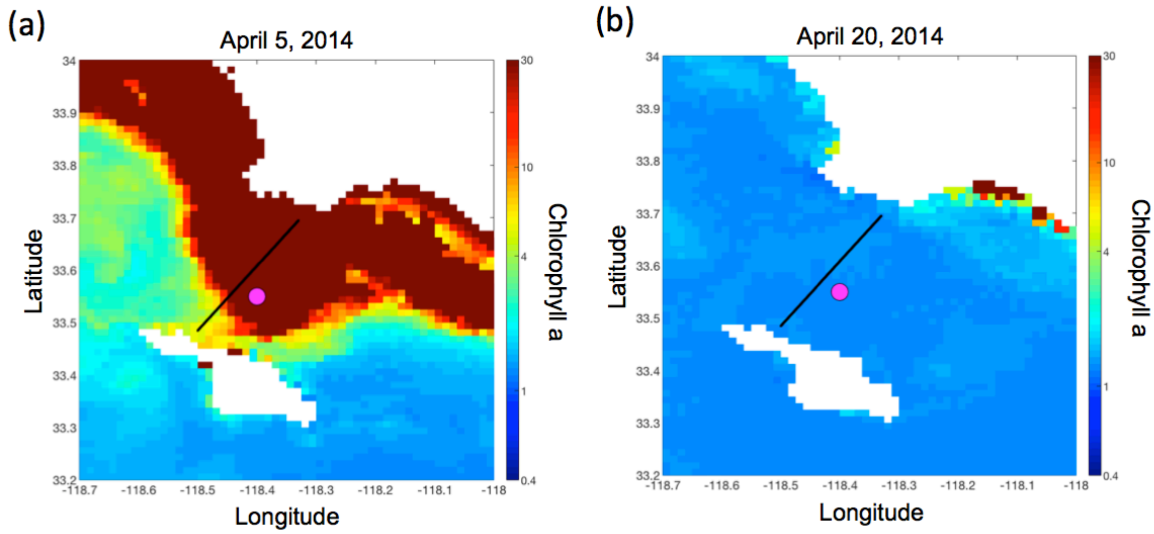
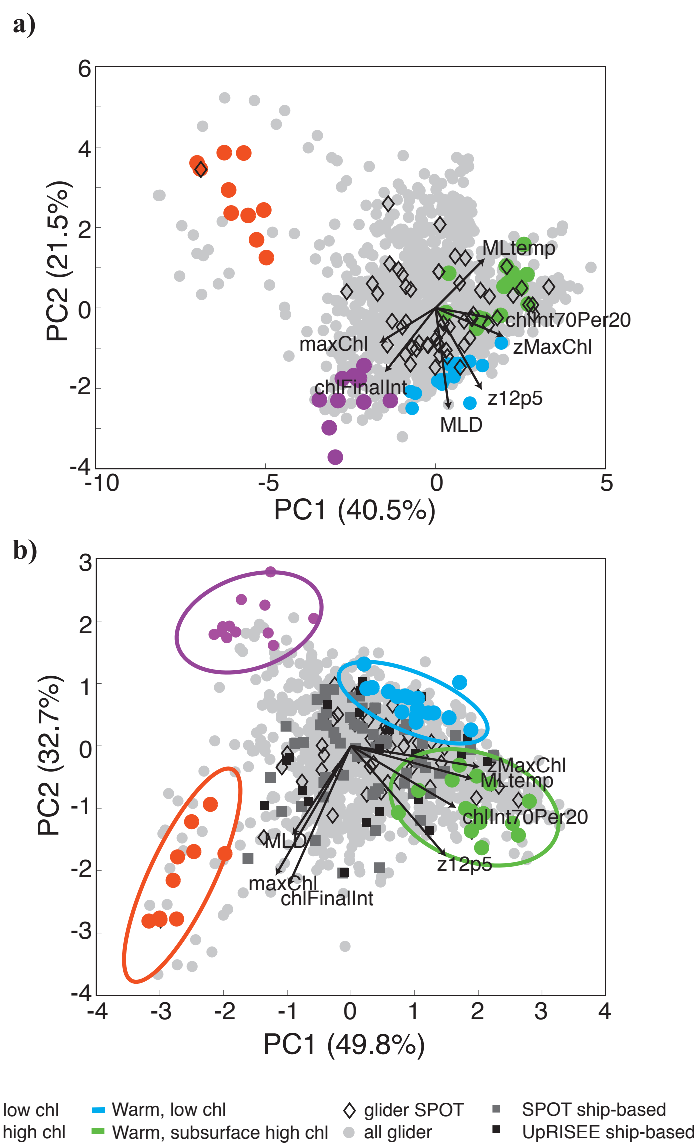
Supplemental Table S1: Ideal profile characteristics. End-member profile types, early upwelling, surface bloom, subsurface chlorophyll maximum, and offshore water intrusion, were selected numerically according to the following selection criteria. MLTemp refers to mixed layer temperature; MLD refers to the mixed layer depth; maxCHL is the maximum value of calibrated chlorophyll a fluorescence in micrograms per litre along a single profile; zMaxChl is the depth at which the maxCHL was observed; ChlInt70 is the value of integrated chlorophyll a over the top 70 meters of the water column; ChlInt70Per20 is a ratio of the amount of integrated chlorophyll in the top 20 meters of a profile compared with the integrated chlorophyll in the top 70 meters of the profile. And z12p5 is the shallowest depth at which the water temperature was below a value of 12.5˚C and is associated with sub-thermocline, nutrient-rich waters. For each water type, between 4 and 6 selection criteria (labelled #1-#6) were used to distinguish the water mass type.

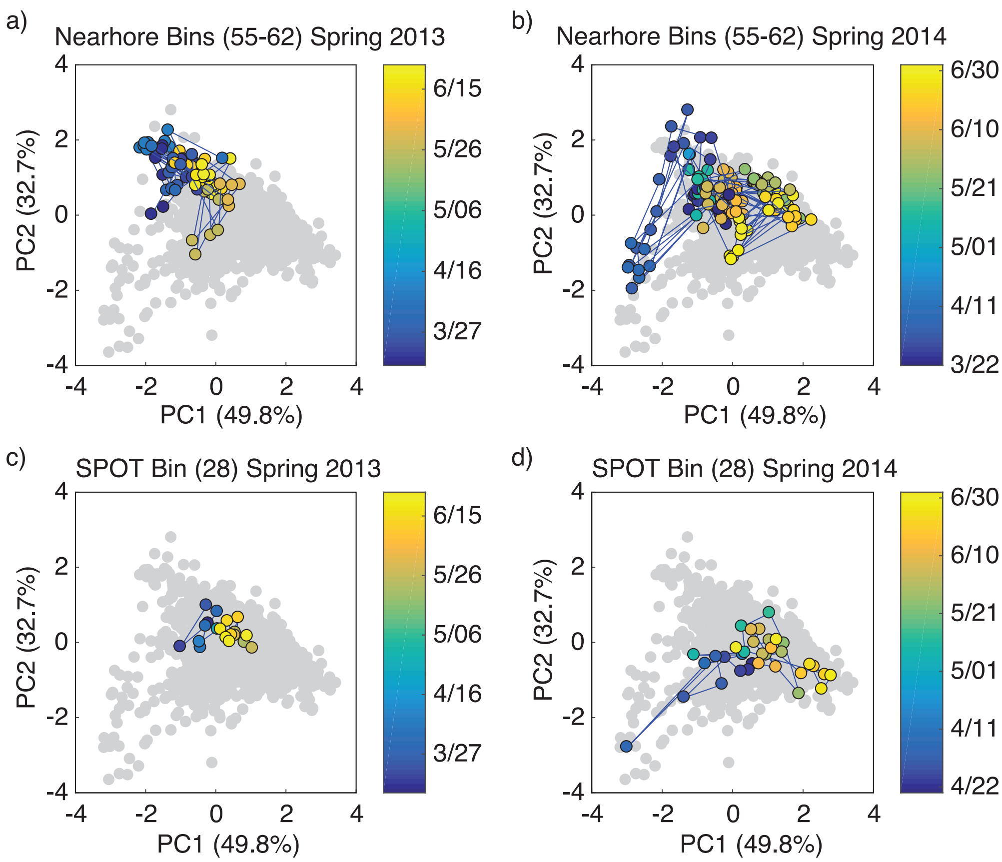
Water Type	MLTemp	MLD	maxCHL	zMaxChl	ChlInt70	ChlInt 70Per20	z12p5
Upwelling *n = 12*	**#1** <12.5		**#3** <20	**#4** <45	**#2** <85		
Surface Bloom *n = 10*	**#4** >12.9 & <17	**#5** >10	**#6** >10		**#2** >150 & <450	**#1** <2	**#3** >20
Subsurface Chl Max *n = 15*	**#1** > 17		**#5** >4		**#3** > 120	**#4** >20	**#2** > 35
Offshore influence *n = 17*	**#2** >18	**#3** <12			**#1** <80	**#5** >5 & <15	#4 <40



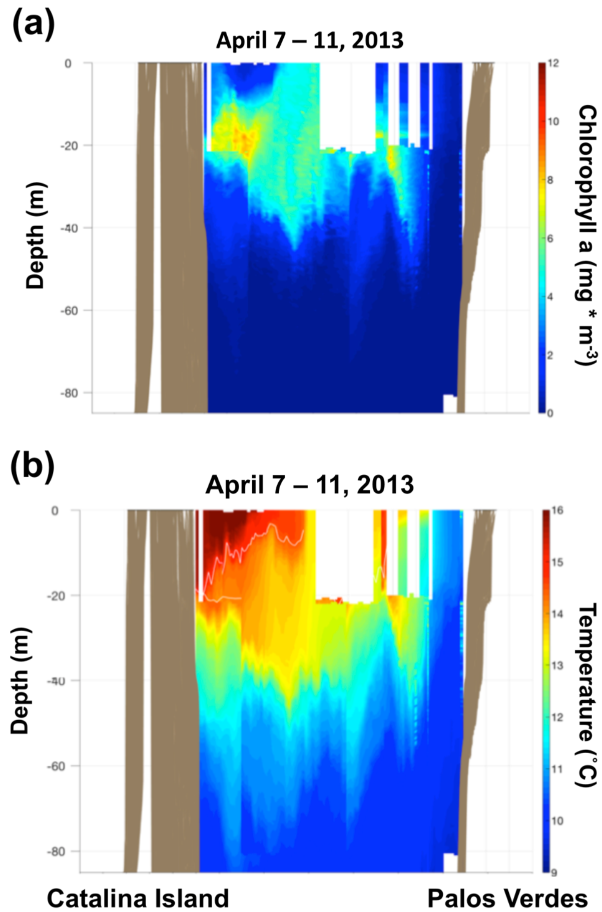
Supplemental Figure S1: Satellite chlorophyll variability within April 2014. MODIS Aqua daily 1 km chlorophyll a imagery was used to display two extreme oceanographic states within the San Pedro Channel (SPC) within a single month: (a) a strong surface phytoplankton bloom on April 5th and (b) a relatively oligotrophic surface signature on April 20th. The pink dot represents the location of SPOT. Black line shows the cross-channel mean glider transect used within this study. This strong intra-monthly variability within surface chlorophyll would most likely not have been detected with the monthly sampling scheme at the San Pedro Ocean Time Series (SPOT) site. Our findings also suggest that the satellite integrated chlorophyll and the satellite chlorophyll-derived primary production estimates may be underestimated in both of these oceanographic cases due to subsurface dynamics below the first optical depth.



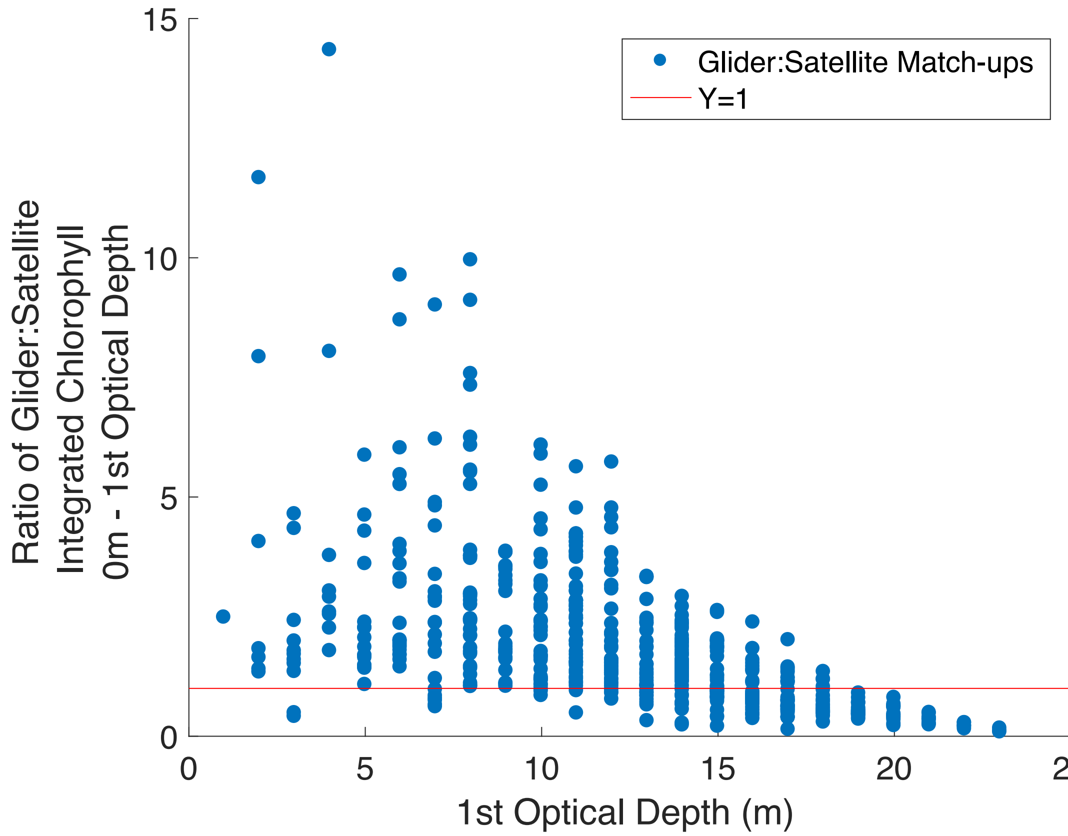
Supplemental Figure S2: Principal Component Analysis of glider profiles. The original PCA (a) and structured PCA (b) are shown. The four end-member water column profile used to create the structured principal compo- nent axes are indicated on both plots. All glider profiles collected in 2013 and 2014 are also shown (grey dots). Glider profiles from the SPOT location are shown in black diamonds and compared against ship- based profiles (grey and black squares). The loadings of the secondary profile characteristics onto the PCA axes are shown as black vectors.



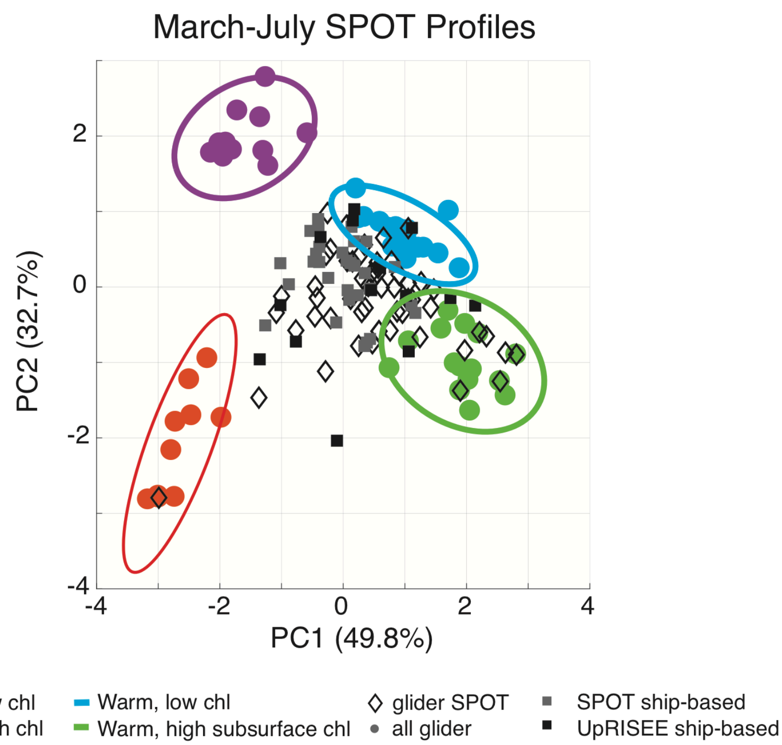
Supplemental Figure S3: Temporal variation at SPOT and coastal locations. Time-series of individual locations along the transect are projected onto the PC axes. Panels (a) and (b) show nearshore bins (55-62) and panels (c) and (d) show the SPOT bin (28). Though SPOT and the nearshore bins displayed a different temporal evolution during the course of each deployment, there appeared to be a cross- over point for both groups in mid-April in both 2013 and 2014. This cross-over point can be visual- ized as a movement from more coastal profile characteristics (negative PC1) to more offshore characteristics (positive PC1).



Supplemental Figure S4: Glider curtain plots of active upwelling**.** Glider data for chlorophyll a (a) and temperature (b) from April 7th to 11th, 2013 is plotted along a transect between Catalina Island (left) and Palos Verdes Peninsula (right). Glider profiles showed strong coastal upwelling of colder subsurface water near Palos Verdes Peninsula during this time period. While tilted isotherms extended across the San Pedro Channel, the low-chlorophyll and low-temperature upwelled waters only reached the surface near Palos Verdes itself.



Supplemental Figure S5: Glider-satellite mismatch in integrated chlorophyll over the first optical depth. MODIS Aqua *chlorophyll a* data and calibrated glider *chlorophyll a* fluorescence were compared using integrated chlorophyll values between the surface and the first optical depth (OD1). Integrated chlorophyll over OD1 was generally 3-5x higher when estimated from the glider data as compared to the satellite estimate. This discrepancy was likely caused at least in part by deviation in fluorescence to chlorophyll ratios between phytoplankton in-situ and phytoplankton used for fluorometric calibrations. The glider chlorophyll fluorometer was calibrated with a mixture of locally relevant phytoplankton cultures to minimize this error, but the dominant phytoplankton species and related fluorescence to chlorophyll ratio almost certainly varied during the course of these deployments. More important, no correlation was observed between glider and satellite derived integrated chlorophyll. This disagreement was particularly pronounced during periods with extremely shallow optical depths such as those typically associated with surface blooms. This mismatch was likely exacerbated by temporal and spatial discrepancy between these datasets, since glider data were collected continuously with 500 m resolution while satellite data were collected once daily at 1km resolution. Due to these mismatches, further analyses were based solely on the glider-to-glider chlorophyll comparisons.



Supplemental Figure S6: Structured Principal Component Analysis of glider and ship-based profiles. The four end- member water column profile types were used to create principal component axes. Physical variability was associated with PC1 (49.8% of total variance) and biological variability was associated with PC2 (32.7% of total variance). Glider profiles from the SPOT location (black diamonds), SPOT ship-based profiles from March - July (grey squares), and UpRISEE ship-based profiles from March - July (black squares) are shown.