Climatological Context for the 2018 North Pacific EXPORTS Field Campaign

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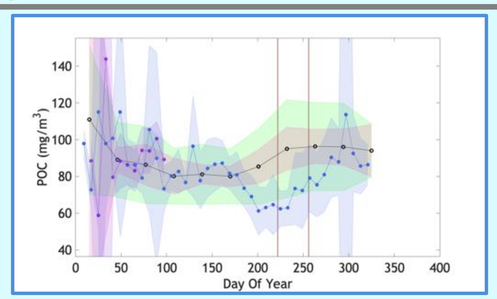
Satellite (MODIS Data): 2018 Data; 2019 Data; Spatial Standard Deviation n ≅ 2,025; Temporal Standard Deviation n ≅ 38; Climatology [2009 – 2019]

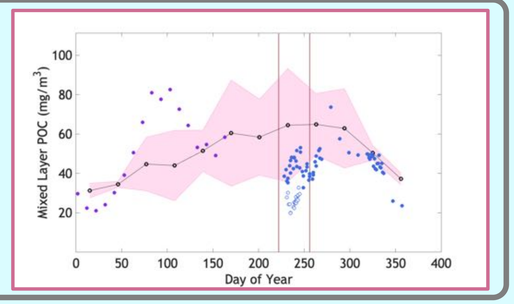
Float (Argo Data): 2018 Data (Float 0949); 2018 Data (Float 0948); 2019 Data (Float 0949); Climatology [2008 – 2019]

Mooring (NOAA OSP Data): Climatology [2009 - 2015]

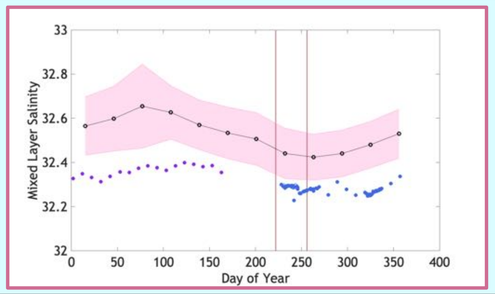
EXPORTS Field Campaign Time Period

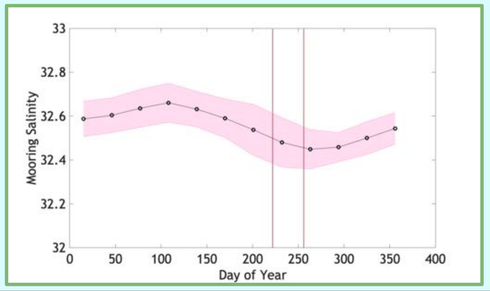
Particulate Organic Carbon



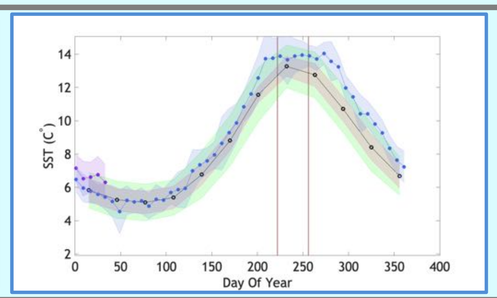


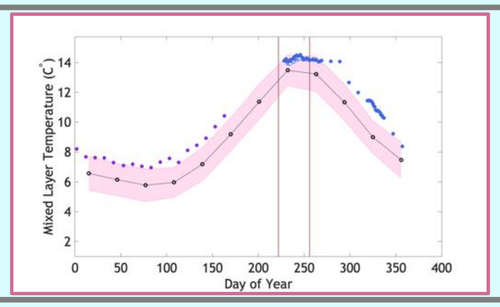
Salinity



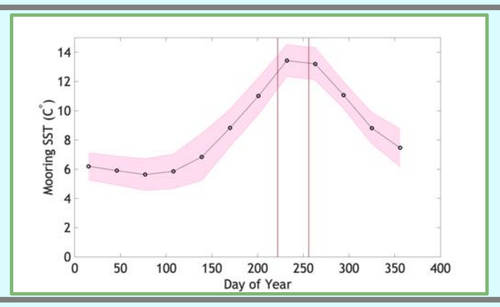


Temperature

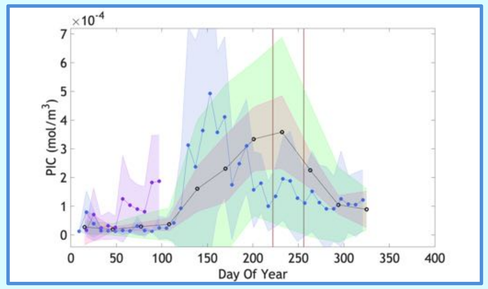




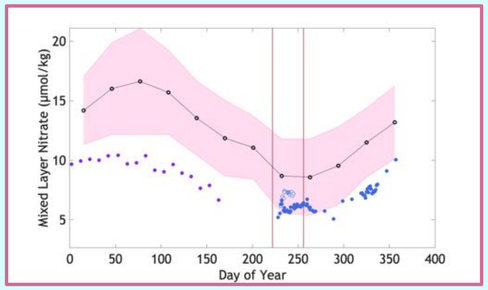
Remote sensing, biogeochemical (BGC) profiling float (Argo), and mooring observations are used to develop climatologies of the upper ocean near Ocean Station Papa (OSP), providing broader context for the August 2018 NASA EXPORTS field campaign.



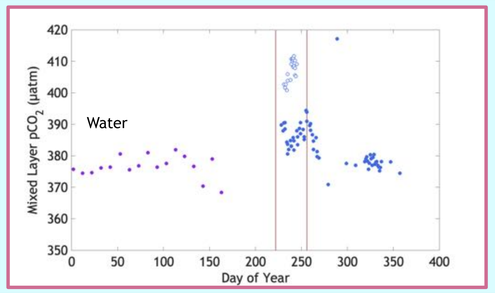
Particulate Inorganic Carbon

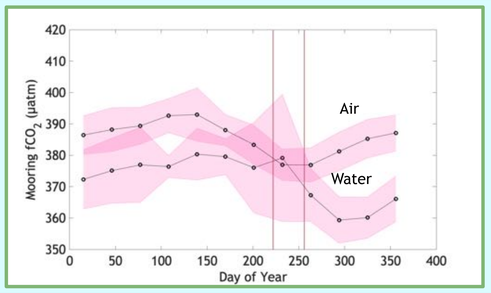


Nitrate



pCO_2





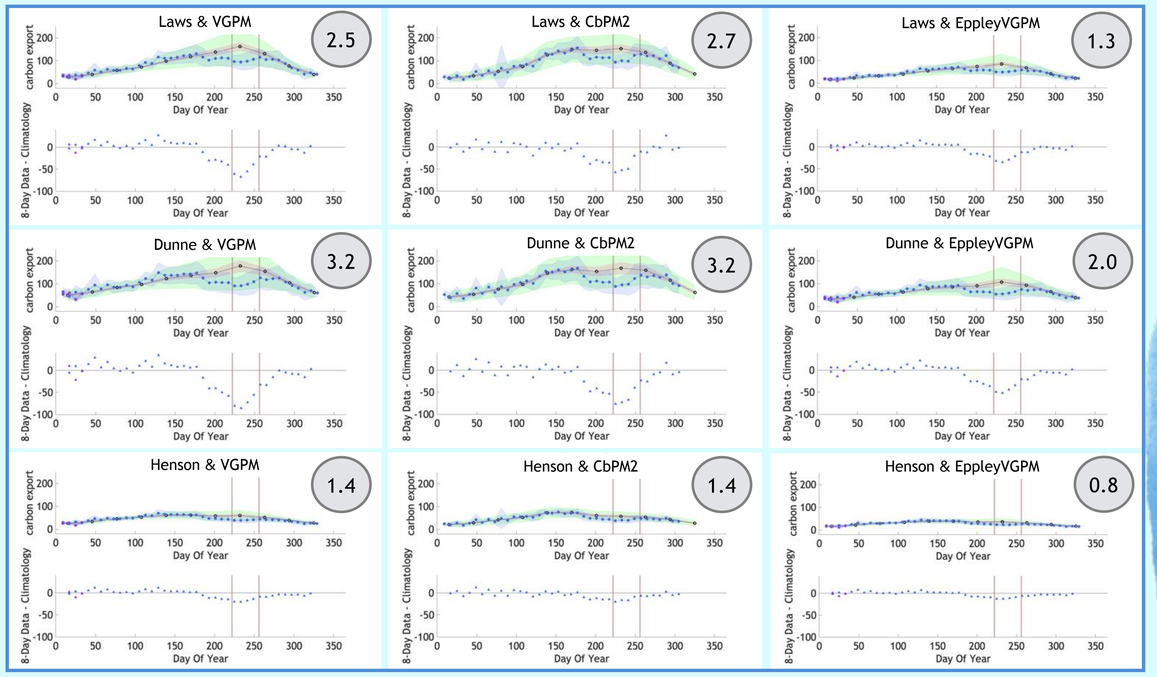
Carbon Export - 9 ways (mg m^{-2} d^{-1})

export = e-ratio x NPP

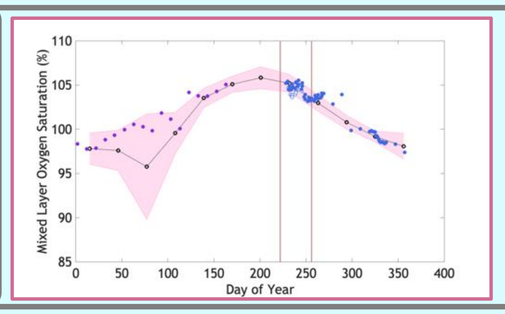
e-ratios calculation: Henson et al., 2011, Dunne et al., 2005, and Laws et al., 2011

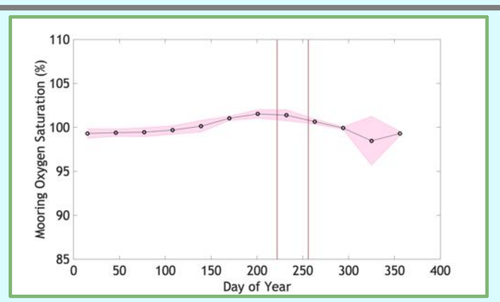
NPP algorithms: CbPM2, VGPM, and Eppley VGPM

◯ = Annual export (mol C m^{-2} yr^{-1})



Oxygen Saturation

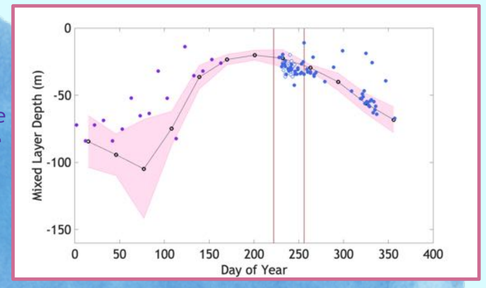


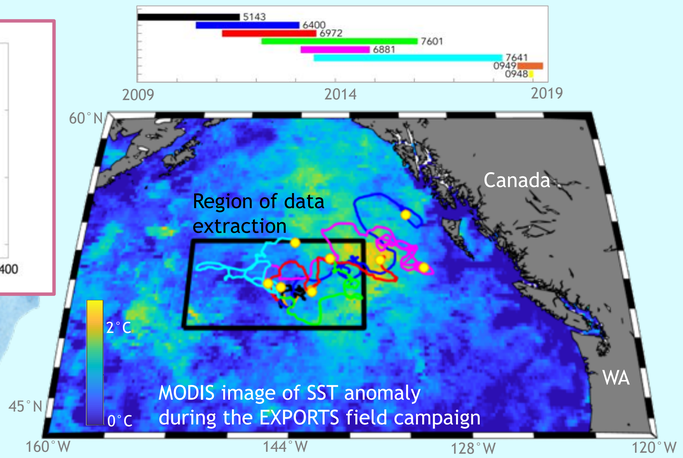


In summary, ocean conditions during the 2018 EXPORTS cruise had anomalously...

- High SST
- Low POC & PIC
- Low Salinity
- Low NO_3
- High pCO_2
- Low export in all derivations

And near-average oxygen saturation and mixed layer depth





MODIS satellite data retrieved from NASA Ocean Color (https://oceancolor.gsfc.nasa.gov/). e-ratio: Dunne et al., 2005 (doi:10.1029/2004GB002390); Henson et al., 2011 (doi:10.1029/2011GL046735); Laws et al., 2011 (https://doi.org/10.4319/lom.2011.9.593). NPP: (CbPM) Westberry et al., 2008 (doi:10.1029/2007GB003078); (VGPM/EppleyVGPM) Behrenfeld and Falkowski, 1997a (https://doi.org/10.4319/lo.1997.42.1.0001). NPP data retrieved from OSU Ocean Productivity Group (http://www.science.oregonstate.edu/ocean.productivity/index.php). Mooring data retrieved from NOAA/PMEL (https://www.nodc.noaa.gov/archive/arc0051/0100074/5.5/data/0-data/).