



Supplement of

Living and nonliving particulate iron in the subtropical North Pacific Ocean

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Supplemental Methods: Multiple linear regression of Fe uptake rates with *Prochlorococcus* and picoeukaryotes

A multiple linear regression model of *Prochlorococcus* and picoeukaryotes (cells mL⁻¹) with Fe uptake rates (pM d⁻¹) was calculated using *fitlm* in MATLAB. The resulting model equation was:

$$\text{Fe uptake rate} = -63.959 + 0.00045 \text{ *Prochlorococcus* } + 0.039445 \text{ picoeukaryotes.} \quad (\text{Eq. S1})$$

The model had an R² of 0.89 and p values < 0.05 for the coefficients of *Prochlorococcus* and picoeukaryotes.

Supplemental Figures and Tables

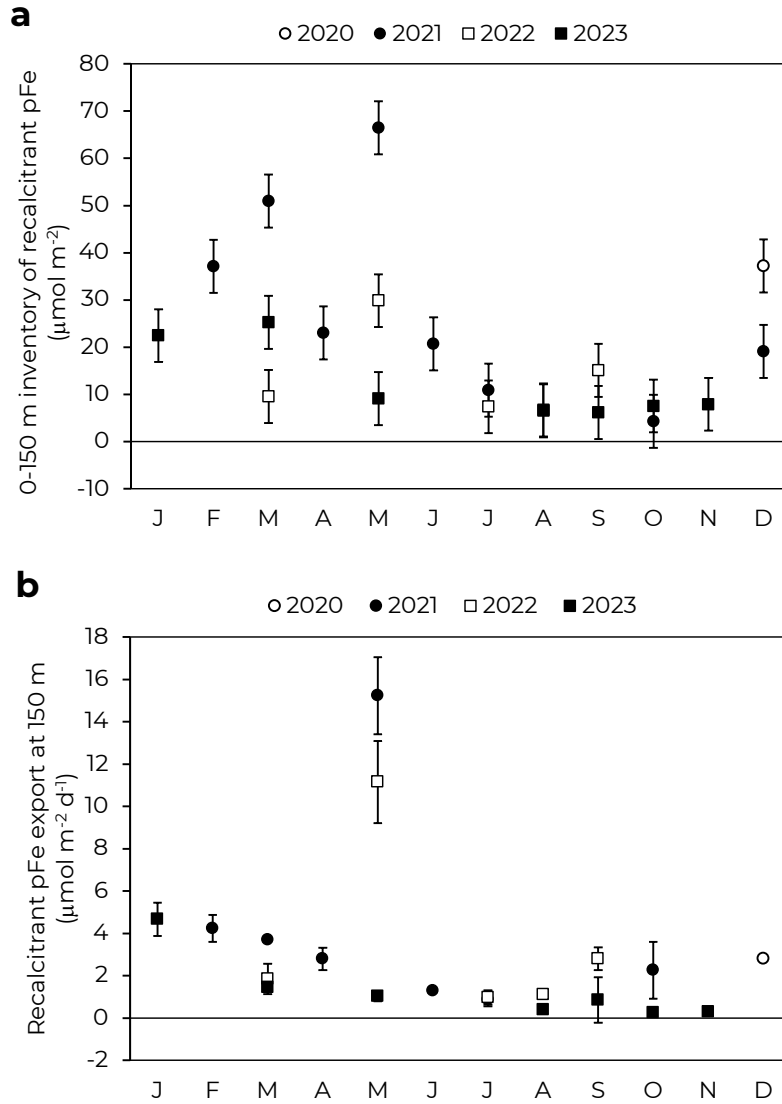


Figure S1. Seasonal and interannual variability in (a) 0-150 m inventory of lithogenic pFe and (b) export of recalcitrant pFe collected using sediment traps (Bates et al., 2025). Error bars in a represent uncertainty propagated from the standard deviation of multiple samples collected within the mixed layer. Error bars in b represent 1 standard deviation of 3 replicate sample traps

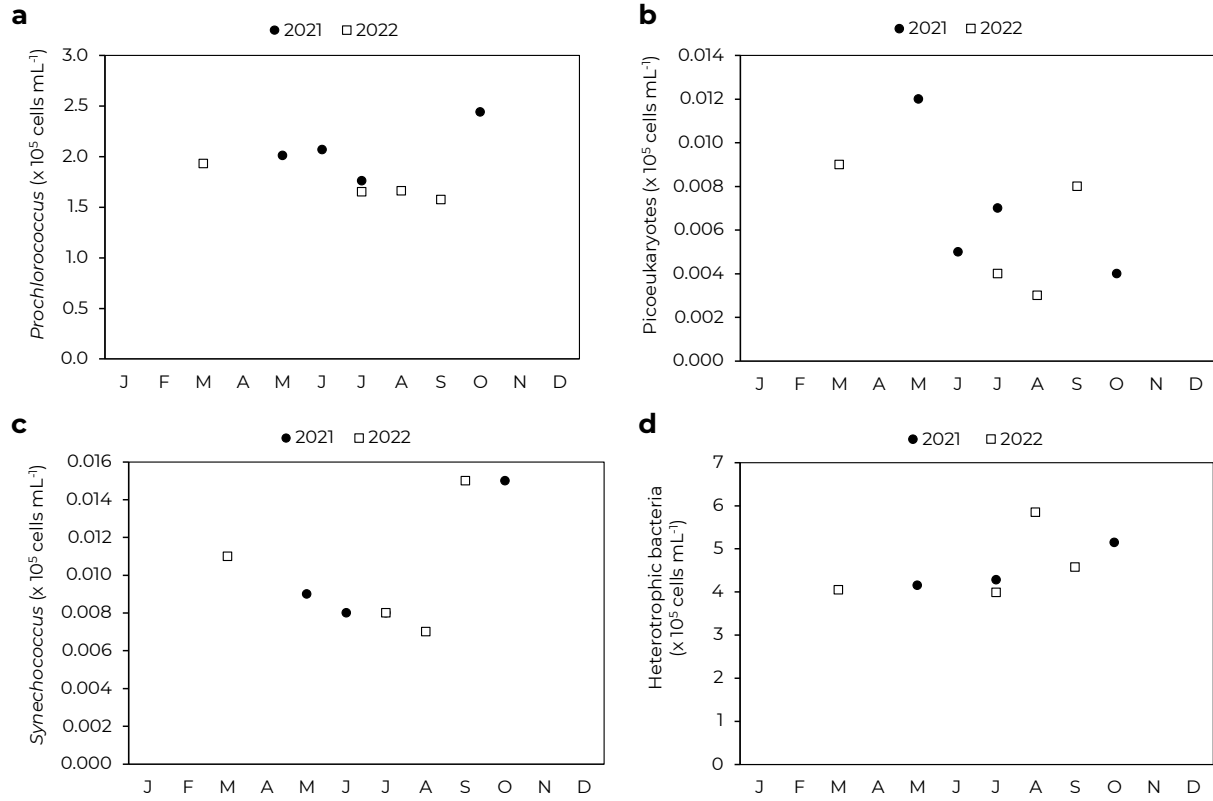


Figure S2. Cell counts for *Prochlorococcus* (a), picoeukaryotes (b), *Synechococcus* (c), and heterotrophic bacteria (d) at 25 m for cruises with Fe uptake data. Note these plots just include data for 2021-2022 for which flow cytometry data is available.

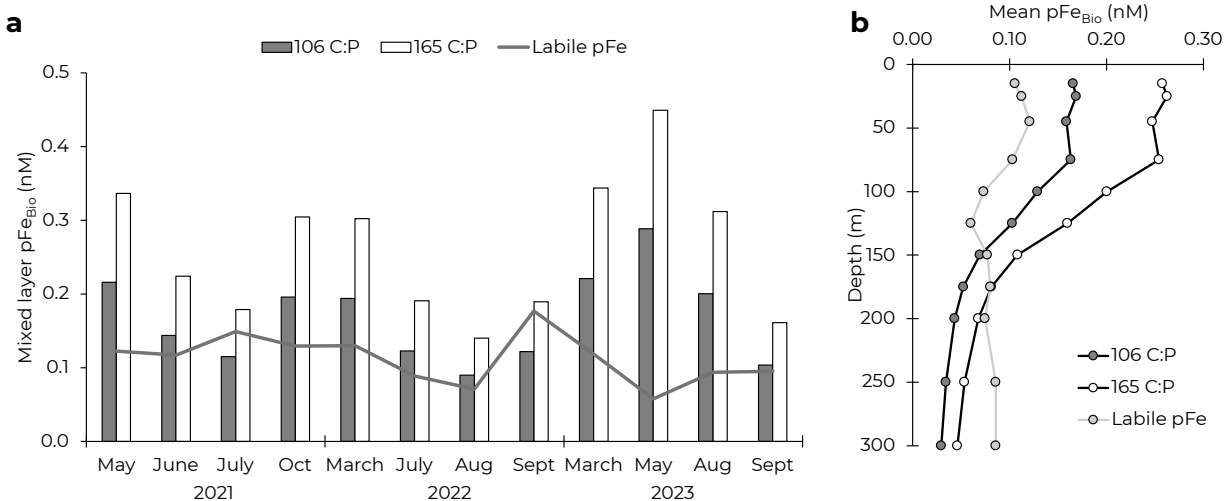


Figure S3. Particulate phosphorus approach to calculating pFe_{Bio} using the Redfield ratio of 106 C:P (Redfield, 1958). Note that while using the Redfield ratio results in better agreement with pFe_{Labile} than the C:P_{Phyto} of 165 mol:mol, it still on average overestimates pFe_{Bio} compared to pFe_{Labile} . Additionally, dissolved and particulate organic matter pools at Station ALOHA have been shown to exceed the Redfield ratio due to relative phosphate depletion (Björkman et al., 2000; Karl et al., 2001).

Table S1. Correlations with Fe uptake rate at 25 m. Parameters in red showed a negative correlation with Fe uptake rates.

Parameter (at 25 m)	Correlation with Fe uptake rate (R ²)
Dissolved Fe	0.03
Fe:C	0.92
Heterotrophic bacteria*	0.15
<i>Prochlorococcus</i> *	0.47
<i>Synechococcus</i> *	0.09
Picoeukaryotes*	0.41
Primary production	0.26
Particulate carbon	0.26
Recalcitrant particulate Fe	0.01
Labile particulate Fe	0.09
Total particulate Fe	0.03
Dissolved organic carbon	0.33

*Data not available for 2023

Table S2. Correlations with biogenic particulate Fe at 25 m. Parameters in red showed a negative correlation with Fe uptake rates.

Parameter (at 25 m)	Correlation with Fe uptake rate (R ²)
Dissolved Fe	0.12
Heterotrophic bacteria*	0.03
<i>Prochlorococcus</i> *	0.61
<i>Synechococcus</i> *	0.22
Picoeukaryotes*	0.15
Primary production	0.19
Particulate carbon	0.13
Recalcitrant particulate Fe	0.00
Labile particulate Fe	0.25
Total particulate Fe	0.03
Dissolved organic carbon	0.31
Fluorometric Chlorophyll <i>a</i>	0.06
HPLC Monovinyl Chlorophyll <i>a</i>	0.23
HPLC Divinyl Chlorophyll <i>a</i>	0.09
HPLC 19'-Butanoyloxyfucoxanthin	0.10
HPLC Fucoxanthin	0.02
HPLC 19'-hexanoyloxyfucoxanthin	0.01
HPLC Carotenes	0.00

*Data not available for 2023

Table S3. Correlations with labile nonliving particulate Fe at 25 m. Parameters in red showed a negative correlation with Fe uptake rates.

Parameter (at 25 m)	Labile nonliving particulate Fe (R ²)
Dissolved Fe	0.15
Fe uptake	0.12
Heterotrophic bacteria*	0.04
<i>Prochlorococcus</i> *	0.04
<i>Synechococcus</i> *	0.12
Picoeukaryotes*	0.01
Primary production	0.02
Particulate carbon	0.01
Recalcitrant particulate Fe	0.28
Labile particulate Fe	0.53
Total particulate Fe	0.47
Dissolved organic carbon	0.11
Recalcitrant particulate Al	0.19
Recalcitrant particulate Ti	0.31
Recalcitrant pAl export	0.04
Recalcitrant pTi export	0.02
Recalcitrant pFe export	0.02
Labile pFe export	0.00

*Data not available for 2023

References

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