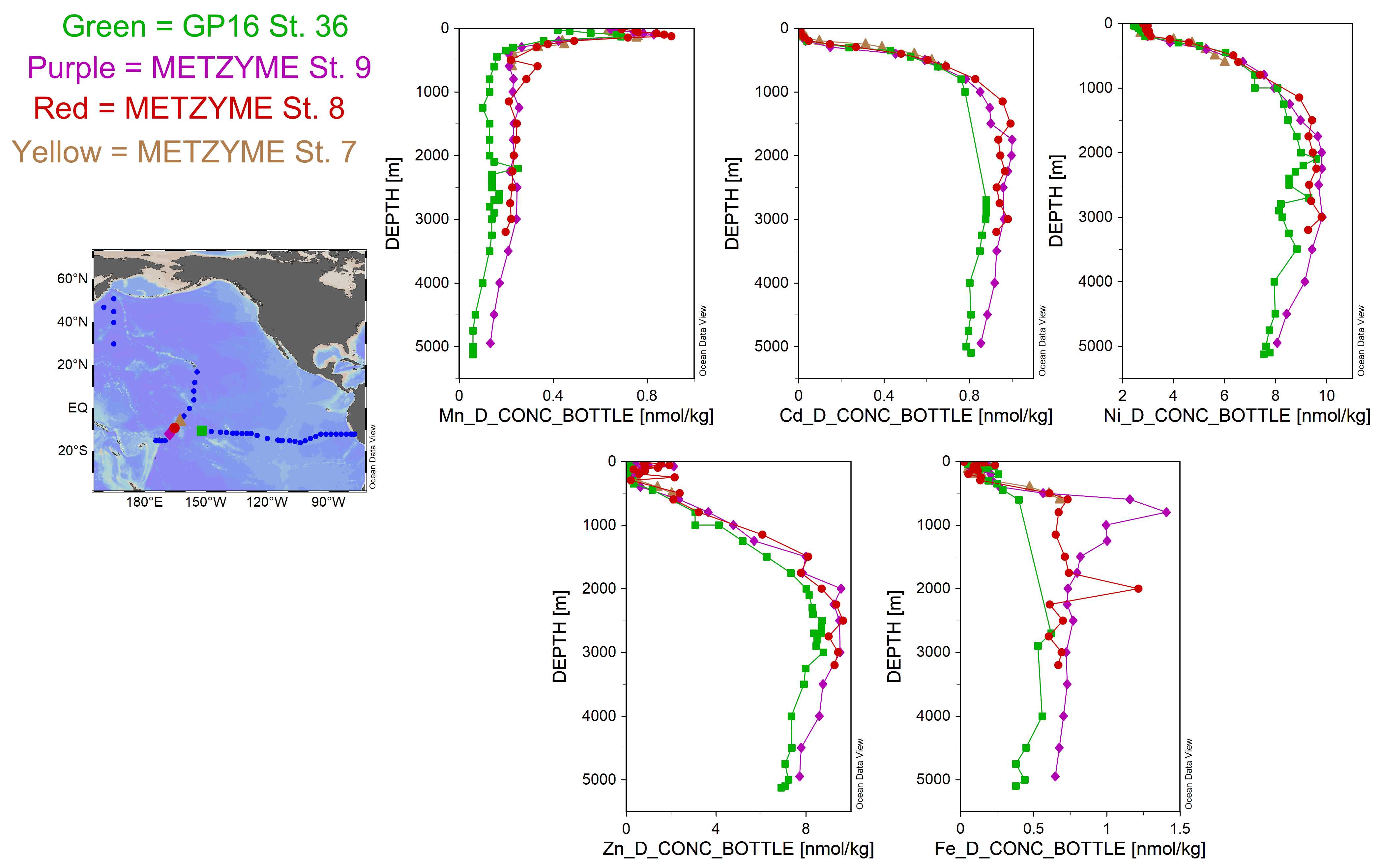
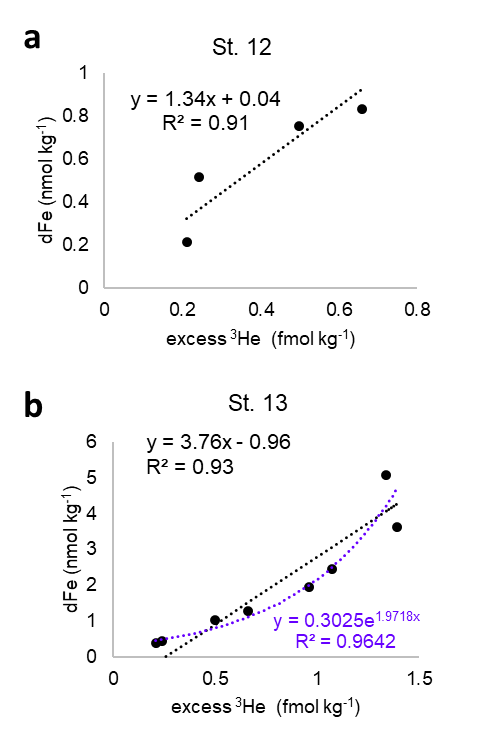
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Fe (nM)** | **Mn (nM)** | **\*Zn (nM)** | **Cu (nM)** | **Ni (nM)** | **Cd (nM)** |
| **LOD (n=12)** | 0.10 ± 0.11 | 0.006 ± 0.007 | 0.65 ± 0.39 | 0.11 ± 0.23 | 0.04 ± 0.02 | 0.0008 ± 0.0005 |
| **MQ Blank**  **(n=18)** | 0.14 ± 0.10 | 0.006 ± 0.005 | 0.47 ± 0.22 | 0.06 ± 0.08 | 0.04 ± 0.03 | 0.0006 ± 0.0003 |

**Table 2**. SeaFAST blanks and limits of detection determined by converting cps to nM, and correcting for matrix effects. MQ blank concentrations shown are averages across runs ± 1 standard deviation, with replicate blanks averaged within runs. The number of test sets (n) represents individual ICP-MS runs where blanks were preconcentrated alongside seawater samples and analyzed via ICP-MS. \*For Zn, high MQ blanks were observed in 4 runs, and these values were excluded from the blank averages and LOD shown.



**Supplemental Fig. 2**. Dissolved metal profiles obtained in this study compared to the closest station of the GP16 cruise, which sampled approximately 1,000 km east of the Metzyme transect in the South Pacific The profiles show overall similar distributions, with slight offsets at depth for Zn, Cd and Ni. Fe profiles are elevated at our St. 9 which we hypothesize is due to hydrothermal influence. The Fe and Cd concentrations are from John et al. (2017) and (2018) (https://www.bco-dmo.org/dataset/643809), and Zn, Ni, and Mn from the Bruland data set (<https://www.bco-dmo.org/dataset-deployment/643427>).



**Supplemental Fig. 6.** (**A**)Estimated relationship between dissolved iron and excess helium in the NE Lau Basin using δ3He reported in Lupton et al. (2004) at the same coordinates as Metzyme St. 12, and iron concentrations from St. 12. For comparison, the dFe:3He ratio obtained using Fe concentrations from St. 13 is shown in Fig 5C. A Type II linear regression is plotted (Glover et al., 2012). Total He and Ne concentrations were not available and were estimated for this region (Jenkins et al., 2019a).Upper water column 3He concentrations were extrapolated using historical data from Lupton et al. (2004). St. 12 has two Fe maxima, neither of which align with the 1,726 m 3He maximum, and therefore only the top of the profile is used in the regression. (**B**) The relationship between dFe measured at St. 13 and 3He from Lupton et al. (2004) shown in Fig. 5C alongside an exponential curve fit (in purple). Although the exponential fit is strongly supported by a high R2 value, it is largely driven by one data point.