

GEOTRACES Intercalibration Report

Cruise ID*: HLY1502

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Parameters to be intercalibrated*:

- Ho_D_CONC_FISH::tfxiei pmol/kg
- Yb_TD_CONC_BOAT_PUMP::3ntipi pmol/kg
- Sn_D_CONC_FISH::rc5nbn pmol/kg
- Tb_D_CONC_BOTTLE::8muviu pmol/kg
- Lu_D_CONC_BOTTLE::b0i7yh pmol/kg
- Sm_D_CONC_BOTTLE::drokap pmol/kg
- Cr_D_CONC_FISH::j9dj7v nmol/kg
- Fe_D_CONC_FISH::y8e2el nmol/kg
- Ho_D_CONC_BOTTLE::kppkgb pmol/kg
- Sm_D_CONC_FISH::wheali pmol/kg
- Ni_D_CONC_FISH::enkl8x nmol/kg
- Eu_D_CONC_FISH::qhaykk pmol/kg
- Cr_D_CONC_BOTTLE::uqdtta nmol/kg
- Er_D_CONC_BOTTLE::uomlxl pmol/kg
- Ce_D_CONC_FISH::4si6pa pmol/kg
- Ce_D_CONC_BOTTLE::awxzur pmol/kg
- Co_DL_CONC_BOAT_PUMP::gf1u7n pmol/kg
- Fe_D_CONC_BOTTLE::kifzto nmol/kg
- Y_D_CONC_BOTTLE::trggtc pmol/kg
- Dy_D_CONC_BOTTLE::i378o5 pmol/kg
- Pb_D_CONC_BOTTLE::i4na0j pmol/kg
- Cu_D_CONC_BOAT_PUMP::ck7ijw nmol/kg
- Tb_D_CONC_FISH::edjnx5 pmol/kg
- Zn_D_CONC_FISH::ir5pu3 nmol/kg
- La_D_CONC_BOTTLE::xswaw3 pmol/kg
- Cd_D_CONC_FISH::dqbtwr nmol/kg
- Mn_D_CONC_BOAT_PUMP::2nm9rj nmol/kg
- Ti_D_CONC_FISH::ntduge pmol/kg
- Sm_D_CONC_BOAT_PUMP::rk0nrk pmol/kg
- Zn_66_64_D_DELTA_FISH::g3lhv per mil
- Nd_D_CONC_BOTTLE::mglfy0 pmol/kg
- Ce_D_CONC_BOAT_PUMP::uuyine pmol/kg
- Dy_D_CONC_FISH::extaat pmol/kg
- Co_DL_CONC_FISH::lzzsxs pmol/kg
- Pr_D_CONC_BOAT_PUMP::fldqv8 pmol/kg

- La_D_CONC_BOAT_PUMP::xqzxoe pmol/kg
- Fe_56_54_D_DELTA_FISH::wrbvdp per mil
- Zn_D_CONC_BOAT_PUMP::ngi8i2 nmol/kg
- Eu_D_CONC_BOAT_PUMP::qmc5xl pmol/kg
- Mn_D_CONC_BOTTLE::1mzq8u nmol/kg
- Pb_D_CONC_FISH::c6jwb2 pmol/kg
- Co_DL_CONC_BOTTLE::3gtmxg pmol/kg
- Pr_D_CONC_BOTTLE::mlh3fr pmol/kg
- Gd_D_CONC_BOTTLE::ofrvjw pmol/kg
- Cd_114_110_D_DELTA_BOAT_PUMP::tfq9zw per mil
- Pr_D_CONC_FISH::mypzod pmol/kg
- Tm_D_CONC_FISH::hndqhw pmol/kg
- Pb_D_CONC_BOAT_PUMP::h8bloa pmol/kg
- Cd_D_CONC_BOAT_PUMP::htmr5y nmol/kg
- Cd_114_110_D_DELTA_BOTTLE::hzoojp per mil
- Gd_D_CONC_FISH::cebboc pmol/kg
- Zn_D_CONC_BOTTLE::pcrqaj nmol/kg
- Er_D_CONC_FISH::orcqve pmol/kg
- Cu_D_CONC_BOTTLE::z43fha nmol/kg
- Tm_D_CONC_BOTTLE::v95caj pmol/kg
- Ni_D_CONC_BOTTLE::pcaozt nmol/kg
- Zn_66_64_D_DELTA_BOAT_PUMP::9l1opj per mil
- Yb_D_CONC_BOTTLE::8ykca4 pmol/kg
- Fe_56_54_D_DELTA_BOAT_PUMP::da4n4o per mil
- Fe_D_CONC_BOAT_PUMP::rycfmj nmol/kg
- Cd_D_CONC_BOTTLE::zd8dwc nmol/kg
- Yb_D_CONC_FISH::pyhpll pmol/kg
- Lu_D_CONC_FISH::ama6pi pmol/kg
- Gd_D_CONC_BOAT_PUMP::6y7mgq pmol/kg
- Cd_114_110_D_DELTA_FISH::ucskfd per mil
- Y_D_CONC_FISH::ryknah pmol/kg
- Mn_D_CONC_FISH::3wwjj2 nmol/kg
- La_D_CONC_FISH::9efkaf pmol/kg
- Nd_D_CONC_FISH::gaiszt pmol/kg
- Zn_66_64_D_DELTA_BOTTLE::i6ay6z per mil
- Eu_D_CONC_BOTTLE::zb3bss pmol/kg
- Cu_D_CONC_FISH::xcukdw nmol/kg
- Ni_D_CONC_BOAT_PUMP::niuxvg nmol/kg
- Fe_56_54_D_DELTA_BOTTLE::uudhui per mil
- Nd_D_CONC_BOAT_PUMP::zkkda1 pmol/kg

***Once generated, these headings must not be changed or altered.**

Please fill in as many sections as possible.

1. Did your lab participate in an intercalibration exercise (<http://www.geotraces.org/sic/intercalibrate-data/intercalibration-exercises>)? If so, please provide a relevant figure or table, describe the results of the intercalibration, identifying your laboratory, and provide a reference for the intercalibration exercise, if published.

Our methods have been intercalibrated for [Fe], [Zn], [Cd], $\delta^{56}\text{Fe}$, $\delta^{66}\text{Zn}$, and $\delta^{114}\text{Cd}$ for inclusion in the 2017 Intermediate Data Product, and are summarized in the Mawji et al. 2017 IDP manuscript.

2. Did your sampling method at sea follow the GEOTRACES cookbook (available at: <http://www.geotraces.org/cookbook>)? Please give a brief description of your sampling methodology (e.g., what bottles were used, what type and size of filters were used, how the samples were treated at sea, etc.).

Yes, all samples were collected using standardized protocols.

3. Briefly outline the analytical methodology used in your laboratory, and provide associated metadata and references, as appropriate.

Methods for Fe, Zn, and Cd stable isotope and concentration analyses have been described in detail in previous manuscripts: (Conway et al., 2016, 2013; Conway and John, 2014a, 2014b; T.M. Conway and John, 2015; Tim M Conway and John, 2015; John et al., 2018a, 2018b)

Concentration measurements were made using an offline adaptation of the seaFAST-pico metal extraction system (Elemental Scientific Inc.) as described in Lagerstrom et al. (2013). Briefly, using the seaFAST, 10 mL aliquots of seawater were extracted onto Nobias PA1 chelating resin at pH ~ 6.5 with an ammonium acetate/acetic acid buffer, then eluted in 10% v/v nitric acid (HNO_3). Metal concentrations were measured on a Thermo Fisher Element 2 HR-ICP-MS. Fe, Zn, Cd, Ni, Cu, and Pb concentrations were measured by isotope dilution. Recoveries for Ni were used to adjust the final concentrations of Mn and REEs. The accuracy of our analytical procedure was verified by analysis of a seawater reference material (GEOTRACES 2008 GS), for which good agreement with the reported consensus values were obtained.

4. Report your blank values and detection limits, and explain how these were defined and evaluated.

The procedural blank was determined by preconcentrating 10 mL of ultrapure water (milliQ) adjusted to pH = 2 with HNO_3 using the seaFAST system.

Element	Blank	Element	Blank
Fe	<0.06 nM	Eu	<0.1 pM
Zn	<0.03 nM	Sm	<0.2 pM
Cd	<0.1 pM	Gd	<0.3 pM
Ni	< 0.01 nM	Tb	<0.5 pM
Cu	< 0.01 nM	Dy	<0.1 pM
Pb	<0.6 pM	Ho	<0.1 pM
Ce	< 0.9 pM	Er	<0.1 pM
La	<0.3 pM	Tm	<0.1 pM
Nd	<0.2 pM	Yb	<0.5 pM
Pr	<0.2 pM	Lu	<0.1 pM

No detection limits are reported (all data above detection limits).

5. Report how you monitored the internal consistency of your data (e.g., through replicate analyses of samples).

All data was monitored by replicate analyses of MTEL internal standard (surface seawater collected at station ALOHA in 2016).

6. Report the external consistency of your data (e.g., results from analyses of certified reference materials and/or consensus materials).

All data compared to international SAFe standard and the GEOTRACES 2008 GS reference material.

7. If you occupied a crossover station, include a plot and a table that show relevant data and their level of agreement, and explain any significant discrepancies (e.g., where discrepancies may reflect differences in the depth of isopycnal surfaces between occupations). If possible please also include a profile of Temperature & Salinity.

We did not occupy a crossover station.

8. If you did not occupy a crossover station, report replicate analyses from a different laboratory, or if there were no replicate analyses (e.g., due to large volumes or short half-lives), explain how your data compare to historical data including results from nearby stations, even though they may not be true crossover stations.

We participated in an intercalibration effort using data from stations 1, 19, 30, 32, and 57, led by Jessica Fitzsimmons. Other participants included Jessica Fitzsimmons (Fe, Mn, Cd, Zn, Ni, Cu, Co, Pb, and Mn), Mariko Hatta (Fe and Mn), Neil Wyatt (Zn), Robert Rember (Pb) and Edward Boyle (Pb).

Rare earth element data has not yet been intercalibrated.

9. If not already included in your responses to the questions above, please provide a representative vertical profile or report the range of values, for the parameter(s) that are addressed in this intercalibration report.

Once completed, please upload the report here:

<https://geotraces-portal.sedoo.fr/pi/>