Dissolved Iron – values in nmol/kg
Consensus values (± 1 std. dev.) for North Atlantic GEOTRACES Reference Samples as of May 2013

GEOTRACES GS = 0.546 ± 0.046 nmol/kg

GEOTRACES GD = 1.00 ± 0.10 nmol/kg

The above concentrations are consensus values for the GEOTRACES reference samples as of May 2013. There does not appear to be a consistent difference between UV-oxidized and non UV-treated samples. Investigators need to be aware of the presence of Fe(II) in stored acidified samples with respect to their analytical method – even those using isotope dilution.

Labs participating in the analysis of the North Atlantic GEOTRACES reference samples to determine consensus values for dissolved Fe:

Ana Aguilar-Islas/Jingfeng Wu (UAF, U.S.):
Concentrated off-line with the $Mg(OH)_2$ coprecipitation method (Wu and Boyle, 1997) and analyzed by isotope dilution ICP-MS. Blanks were quantified using 50 ul of sample instead of 1.6ml. A single co-precipitation step was carried out followed by dilution of the precipitate with 4% HNO_3.

Jingfeng Wu (UAF, U.S.):
A double co-precipitation with Mg(OH)2 and isotope dilution ICP-MS (Wu, 2007).

Maeve Lohan (Plymouth Univ., U.K.):
Flow injection using the NTA-type resin and DPD catalytic enhancement of the UV-Vis absorption signal (Lohan et al., 2006).

Yoshiki Sohrin (U. Kyoto, Japan):
Off line concentration using an EDTriA-type chelating resin with subsequent analyses by ICP-MS using the method of Sohrin et al. (2008).

Michael Ellwood (Australian National U, Australia):
Dissolved Fe was concentrated by solvent extraction (Bruland et al.,1979) and analyzed by ICPMS. 100 g seawater samples were buffered to a pH of 4.5 with purified ammonium acetate buffer. Purified ammonium pyrrolidinedithiocarbamate (PDC) and sodium diethyldithiocarbamate (DDC) were added to the samples which were then extracted twice by shaking following the addition of purified chloroform. The two chloroform extracts obtained were combined, acidified with nitric acid, shaken for 1 min and then diluted with purified water.

Peter Croot/Peter Streu (IMF/GEOMAR, Germany);
Samples were analyzed according to the method described in Kremling and Streu (2001). 300–500 g portions of the samples were subjected to a dithiocarbamate–freon extraction modified from the procedure by Danielsson et al. (1978) implying maximum concentration

factors of 500. The final extracts with the metals were measured by electrothermal atomic absorption spectrometry with Zeeman background correction (ETAAS; Perkin-Elmer Model 4100 ZL).

Dondra Biller/Ken Bruland (UCSC, U.S.):

Off-line concentrations using an EDTri-A-type chelating resin with subsequent analyses by ICP-MS (Biller and Bruland, 2012) based upon the method of Sohrin et al. (2008). The method entailed an eight column manifold enabling eight separate 40 mL samples.

Angie Milne/Bill Landing (FSU, U.S.):

Off-line extraction using IDA Toyopearl AF-Chelate-650 M resin followed by analysis using isotope dilution ICP-MS (Milne et al. 2010). Prior to extraction the samples (12 mL) were buffered to pH ~6.2.

Geoff Smith/Ken Bruland (UCSC, U.S.):

On-line flow injection analysis of 4 ml of sea water using an EDTA-type chelating resin (Sohrin et al., 2008) at pH 6 utilizing purified ammonium acetate buffer and eluting analytes with 1.5 M HNO_3 followed by detection with ICP-MS

Jun Nishioka (Hokkaido Univ., Japan):

Flow Injection with chemiluminescence detection

Ed Boyle (MIT, U.S.):

100-bead NTA resin separation on small samples together with isotope dilution and ICP-MS detection (Lee et al. 2011).

Andy Bowie (Tasmania, Australia):

F low injection analyses with chemiluminescence detection (Sedwick et al., 2008).

Pete Sedwick (ODU, U.S.)

Flow injection analyses with chemiluminescence detection (Sedwick et al., 2008).

Kathy Barbeau (SIO/UCSD, U.S.):

Flow injection analysis with the Fe(II) luminol chemiluminescence method using sulfite reduction and NTA resin preconcentration, as described in King and Barbeau (2007).

Kristen Buck (BIOS, Bermuda):

Adsorptive cathodic stripping voltammetry of UV oxidized samples using the method of Rue and Bruland (1995).

Christa Pohl (Warnemunde, Germany):

Samples were analyzed according to the method described in Kremling and Streu (2001). The final extracts with the metals were measured by electrothermal atomic absorption spectrometry.

Patrick Laan/Maarten Klunder/Hein de Baar (NIOZ, Netherlands)

Flow Injection with chemiluminescent detection (Klunder et al., submitted) using IDA Toyopearl AF-Chelate-650 M resin.

Veronique Schoemann/Jeroen de Jong (U. Libre de Bruxelles, Belgium):

Off-line batch preconcentration of 50 mL of acidified sample with NTA-type resin and analyzed by isotope dilution MC-ICP-MS on a Nu Plasma instrument (de Jong et al. 2008). Iron was analyzed in low-resolution mode with a desolvating sample introduction system (Cetac Aridus 2). Concentrations calculated using the ratios between ^{57}Fe or ^{56}Fe and the added ^{54}Fe spike were internally consistent.

Maria Lagerstrom and Rob Sherrell (Rutgers University, US)

On-line flow injection with a modified seaFAST system, the Nobias PA-1 resin, isotope dilution and ICP-MS detection.

Rob Middag and Ken Bruland (UC Santa Cruz, US)
Off-line extraction with Nobias PA-1 chelating resin and analysis on an Element XR ICP-MS Middag et al., submitted).
Christian Schlosser and Eric Achterberg (Plymouth University, UK)
Off-line extraction using a WAKO chelating resin (Kagaya, 2009) followed by analysis on an Element XR ICP-MS. Samples were UV digested for 3 hours.
Ruifeng Zhang and Jing Zhang (SKLEC, East China Normal University, China)
The NTA resin bead method of Lee et al.(2011) and MC-ICP-MS.

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