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

SAFe S = 0.093 ± 0.008 nmol/kg

SAFe D2 = 0.933 ± 0.023 nmol/kg

SAFe D1 = 0.67 ± 0.04 nmol/kg

The above concentrations are consensus values of dissolved Fe for the SAFe reference samples as of May 2013. These consensus values on the SAFe reference samples for dissolved Fe are similar to those determined on board ship and reported by Johnson et al. (2007). 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 SAFe reference samples to determine consensus values for dissolved Fe:

Ana Aguilar-Islas/Jingfeng Wu (University of Alaska Fairbanks, 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 (University of Miami, U.S.):
A double co-precipitation with Mg(OH)2 and isotope dilution ICP-MS (Wu, 2007).

Maeve Lohan (Plymouth University, 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 (University of Kyoto, Japan):
Off line concentration using an EDTA-type chelating resin with subsequent analyses by ICP-MS using the method of Sohrin et al. (2008).

Michael Ellwood (Australian National University 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). For the analysis of Cd, Co, Cu, Fe, Ni, Pb and Zn, 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 (UC Santa Cruz, U.S.):
Off-line concentrations using Nobias PA1, EDTri-A-type chelating resin with subsequent analyses by ICP-MS (Biller and Bruland, submitted) based upon the method of Sohrin et al. (2008). The method entailed an eight column enabling eight separate 40 mL samples (Biller and Bruland, 2012).

Angie Milne/Bill Landing (Florida State University, 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 (UC Santa Cruz, 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.

Bill Hiscock/Chris Measures (University of Hawaii, U.S.):
Use of 8-hydroxyquinoline chelating resin off-line with subsequent analysis by isotope dilution ICP-MS.

Matt Hurst (Humboldt State University, U.S.):
On-line flow injection using IDA Toyopearl AF-Chelate resin with analyses by ICP-MS (Hurst and Bruland, 2008).

Pete Morton/John Donat/Bill Landing (Old Dominion University/FSU, U.S.):
Use of 8-hydroxyquinoline chelating resin off-line with subsequent analysis by ICP-MS.

Jun Nishioka (Hokkaido University, Japan):
Flow Injection with chemiluminescence detection (Obata et al., 1993).

Hajime Obata (University of Tokyo, Japan):
Flow injection with chemiluminescence detection (Obata et al., 1993).

Mike Gordon/Kenneth Coale (Moss Landing Marine Labs, U.S.):
Solvent extraction (Bruland et al.,1979) and analyzed by ICPMS.

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).

Pete Sedwick (ODU, U.S.)
Flow injection analyses with chemiluminescence detection (Sedwick et al., 2008).

Kathy Barbeau (SIO/UC San Diego, 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).

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.

Andy Bowie (Tasmania, Australia):
Flow injection analyses with chemiluminescence detection (Sedwick et al., 2008).

Jeff Mendez and Jess Adkins (Cal Tech (CIT), US)
$Mg(OH)_2$ precipitation with isotope dilution and ICP-MS.

Jay Cullen (Univ. Victoria, Canada):
Flow injection Fe(III)-luminol chemilumnescence detection after Obata et al. (1993) and de Jong et al. (1998) with Global FIA tapered columns and IDA resin.

Roy and Mark Wells (Maine, U.S.)
Used a siderophore-modified film analyzed by infrared spectroscopy (Roy et al. 2008).

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).

Tim Conway and Seth John (University of South Carolina, US)
Off-line extraction by batch extraction using Nobias PA-1 chelating resin and analysis on a Neptune multi-collector ICP-MS for isotope ratios and concentrations using a double spike isotope dilution.

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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