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# OCEANOGRAPHY: METHODS

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**Direct determination of iron in acidified (pH 1.7) seawater samples by flow injection analysis with catalytic spectrophotometric detection: Application and intercomparison**

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## Abstract

A sensitive flow injection method for determining iron in seawater developed by Measures et al. (1995) has been substantially modified to allow the direct preconcentration of dissolved iron in acidified seawater samples (pH 1.7) onto a nitrilotriacetic acid (NTA) chelating resin. This removes the need to adjust the pH and buffer samples before the preconcentration step, and the low pH eliminates potential interference from the presence of strong iron-bind- ing organic ligands. As part of an international intercalibration exercise for the Sampling and Analysis of Fe (SAFe), we investigated at sea the precision and accuracy of this flow injection method with its preconcentration step plus catalytic spectrophotometric detection with *N*,*N*-dimethyl-*p*-phenylenediamine dihydrochloride (FI-NTA-DPD). Acidified seawater samples analyzed using FI-NTA-DPD were shown to be in excellent agreement with other ship- and lab-based methods. The acidification of seawater samples to pH 1.7 is an important protocol if total dissolved iron in seawater is to be determined within hours of collection. A ship- and lab-based analytical intercomparison of two flow injection methods (FI-NTA-DPD and FI-NTA-ICP-SFMS) for the determination of total dissolved iron in seawater was carried out on SAFe samples collected from surface waters and at 1000 m depth from the North Pacific Ocean. For the two methods, total dissolved iron concentrations in surface samples were 0.101 ± 0.009 and

0.098 ± 0.009 nM, respectively, and in samples from 1000 m, 0.93 ± 0.04 and 0.92 ± 0.08 nM. No statistical difference between the FI-NTA-DPD and FI-NTA-ICP-SFMS methods was observed (*P* = 0.05).