

Informations on trace metal concentrations measurement method for Cd, Cu, Co, Ni, Pb, and Zn .

Dissolved total trace metal (Cadmium (Cd), Cobalt (Co), Copper (Cu), Nickel (Ni), Plumb (Pb) and Zinc (Zn)) concentrations were determined in the clean laboratory of the GEOMAR in Kiel using the graphite furnace atomic absorption (ETAAS, Perkin-Elmer Model 4100ZL) method after pre-concentration by simultaneous dithiocarbamate-freon extraction from seawater (100-250 g) (Grasshoff et al., 1983; Danielsson et al., 1978). Note that the samples were not UV irradiated prior to analysis, recent work has shown that this is important for determining total Co concentrations (Shelley et al., 2010; Milne et al., 2010). The accuracy of the method was evaluated by measuring SAFe and GEOTRACES intercalibration samples.

A few samples for dissolved Mn, as a comparison to the direct analysis on Corsica, were analyzed by graphite furnace atomic absorption (ETAAS, Perkin-Elmer Model 4100ZL) in the clean laboratory in Kiel after solvent extraction modified after (Klinkhammer, 1980). SAFe reference seawater D1 was determined as $0.423 \pm 0.05 \text{ nmol L}^{-1}$ (consensus value $13 (0.35 \pm 0.06 \text{ nmol L}^{-1})$).

References cited

Danielsson, L.-G., Magnusson, B., and Westerlund, S.: An improved metal extraction procedure for the determination of trace metals in sea water by atomic absorption spectrometry with electrothermal atomization, *Analytica Chimica Acta*, 98, 47-57, DOI 10.1016/S0003-2670(01)83237-2, 1978.

Grasshoff, K., Kremling, K., and Ehrhardt, M.: *Methods of seawater analysis*, Verlag Chemie, 10 Weinheim, 1983.

Klinkhammer, G. P.: Determination of manganese in sea water by flameless atomic absorption spectrometry after preconcentration with 8-hydroxyquinoline in chloroform, *Analytical Chemistry*, 52, 117-120, DOI 10.1021/ac50051a028, 1980.

Milne, A., Landing, W., Bizimis, M., and Morton, P.: Determination of Mn, Fe, Co, Ni, Cu, Zn, Cd and Pb in seawater using high resolution magnetic sector inductively coupled mass spectrometry (hr-icp-ms), *Analytica Chimica Acta*, 665, 200-207, DOI 10.1016/j.aca.2010.03.027, 2010

Shelley, R. U., Zachhuber, B., Sedwick, P. N., Worsfold, P. J., and Lohan, M. C.: Determination of total dissolved cobalt in UV-irradiated seawater using flow injection with chemiluminescence detection, *Limnol. Oceanogr. Meth.*, 8, 352-362, DOI 10.4319/lom.2010.8.352, 2010