

Information on Compilation of N. EPR Vent Fluid Temperatures, Chloride, pH and Min. Mg Values - K.L. Von Damm, J.G. Bryce, M.F. Prado

Analytical and sampling methods for fluids reported in this data set are described in more detail in Von Damm et al. (1985), Von Damm (2000) and Von Damm (2004).

Fluid samples were collected in either 755 mL titanium syringe bottles (majors) or in titanium gas tight bottles using *DSV Alvin*. Samples were taken either with an individual bottle (gas tight) or in the case of the majors bottles they were sampled in pairs (Von Damm, 2004). The NOAA manifold sampler was also used for a few samples (Massoth et al., 1988). The vent exit temperatures were measured either with the *Alvin* high temperature probe, with the temperature probe on the manifold sampler or with inductively coupled link (ICL) temperature probes which are mounted directly to the major pair snorkels (Von Damm, 2004). The high temperature probe and ICLs were all calibrated to an RTD using an IEEE calibrated oven at 50°C intervals from 50°C to 350°C and then at 15°C intervals until 405°C prior to the first dive of each cruise. A linear regression was then used to get calibration curves for every probe. Exit temperatures are considered minimum temperature measurements as conductive cooling and entrainment of seawater at depth or during sampling could lower hydrothermal fluid temperatures.

This installment of the Von Damm vent fluid data set includes pH, minimum Mg and chloride measurements. The pH values are from shipboard methods carried out at 25°C 1 atm. Typically, at least four samples were taken at each vent site during each discrete sampling time. The minimum Mg reported is therefore, simply the lowest measured Mg value of the samples taken for that time period. The minimum Mg is used as an indication of how much seawater may have been entrained as a sampling artifact. Chloride was measured by potentiometric titration ($\pm 0.05\%$ precision).

End member calculations were made under the assumption that vent fluids lose almost all seawater magnesium to the formation of magnesium oxy-hydroxides. Any excess magnesium measured in vent fluid samples is therefore a mixture between vent fluid Mg (~ 0 mmol kg⁻¹) and seawater Mg (52 mmol kg⁻¹) (Bischoff and Dickinson, 1975). For any given element or species where end member values are reported a least squares linear regression was fit versus Mg and weighted to go through seawater Mg. The end member values were then extrapolated to a zero Mg “end member” (Von Damm et al., 1985).

References

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