Geophysical Research Abstracts, Vol. 7, 02191, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02191

Is temperature a good proxy for sulphide in hydrothermal vent habitats ?

N. Le Bris (1), P.-M. Sarradin (1), C. Le Gall (1), P. Rodier (1), R. Vuillemin (2)

1. Ifremer, Departement EEP, France, (2) Ifremer, Departement TMSI, France

(nlebris@ifremer.fr / Fax: +33 298 224 757 / Phone: +33 298 224 085)

Physico-chemical factors are considered as prime biodiversity determinants in hydrothermal habitats, at the mixing interface of warm vent fluids with cold bottom seawater. Sulfide provided by the vent fluids likely exerts a main control on vent biological communities, both being a principal electron donor for chemoautotrophic primary production and a potent poison for aerobic organisms.

Determination of sulfide concentrations at spatial and temporal scales relevant of the organisms exposure levels is still a challenging issue. Since temperature is more readily recorded at depth, it has been widely used to characterise vent fluid contribution in vent habitats and comparisons of their chemical features have been inferred from these data. The correlation between temperature and sulphide concentration was however rarely assessed on a quantitative basis.

From a large set of studies dedicated to various habitats of the mid-Atlantic Ridge and East Pacific Rise, we have shown that *in situ* analysis is the most consistent way to assess this correlation in such highly variable media. The data revealed that chemical and thermal conditions in an habitat do not simply reflect the conservative mixing the hydrothermal end-member fluid at one site with seawater. They rather reflect the dilution of a local fluid source displaying unique properties, that result of a combination of subsurface geochemical and biogeochemical processes. This generates a large variability of the sulphide-temperature relation: between similar habitats at different sites distant of a few hundred of meters, as well as, between different types of habitats less than a few meters apart at a single site. Discrepancies can even be observed within a single habitat, as a consequence of biological activity. In addition, non-linear and

highly diverse behaviours should be expected for sulphide species distribution which drives the biological impact of this chemical compound.

From these results we can conclude that temperature is *not* a good proxy to compare sulphide levels experienced by the organisms, unless its correlation with total sulphide concentration and other factors affecting sulphide chemistry is previously assessed in the habitats considered.