



## **Stabilization of dissolved trace metals at hydrothermal vent sites: Impact on their marine biogeochemical cycles**

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Hydrothermal vents have long been neglected as a significant source of several bioactive trace metals as it was assumed that elements such as Fe, Mn, and Cu etc., precipitate in extensor forming poly-metallic sulfide and oxy-hydroxy sediments in the relative vicinity of the emanation site. However, recently this paradigm has been reviewed since the stabilization of dissolved Fe and Cu from hydrothermal vents was observed [1, 2] and increased concentrations of trace metals can be traced from their hydrothermal source thousands of kilometres through the ocean basins [3]. Furthermore several independent modelling attempts have shown that not only a stabilization of dissolved hydrothermal Fe and Cu is possible [4] but also that hydrothermalism must be a significant source of Fe to be able to balance the Fe-biogeochemical cycle [5].

Here we present new data that gives further evidence of the presence of copper stabilising organic and inorganic compounds in samples characterized by hydrothermal input. We can show that there are systematic differences in copper-complexing ligands at different vent sites such as 5°S on the Mid Atlantic Ridge, Brother Volcano on the Kermadec Arc, and some shallow hydrothermal CO<sub>2</sub> seeps in the Bay of Plenty, New Zealand and the Mediterranean Sea. Quantitative and qualitative voltammetric data convincingly indicates that inorganic sulphur and organic thiols form the majority of the strong copper-complexing ligand pool in many of these hydrothermal samples. On average, the high temperature vents had a significantly higher copper binding capacity than the diffuse vents due to higher inorganic sulphur species concentrations.

### References:

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