Organic, mineral and gas geochemistry of hydrothermal fluids from the Wallis and Futuna area: Comparison with vent fields in ridge context

C. KONN[1], J.P. DONVAL[1], V. GUYADER[1]

[1]Ifremer, Laboratoire de Géochimie et Métallogénie, F-29280 Plouzané, France. (cecile.konn@ifremer.fr)

Mineral and gas geochemistries of hydrothermal fluids have been studied ever since hydrothermal vents were discovered in the late 1970's at the Galapagos Spreading Center. A more recent interest has grown for hydrothermal organic geochemistry mainly driven by the origin of life question. However, organic molecules may be key compounds in a variety of processes in hydrothermal environments. (1) Small molecules like acetic acid or amino acids are used in the metabolism of some hydrothermal microorganisms [1]. (2) Organic compounds may be excellent ligands for metals and thus impact their bioavailability and transportation mechanisms [2] [3]. (3) Organics may also be present in the hydrothermal plume and thus be dispersed in the ocean. (4) Dissolved organic molecules in hydrothermal fluids could also fuel hydrothermal ecosystems, and play a major role in the carbon and metal cycles. Many thermodynamic and experimental studies on possible abiogenic hydrothermal reactions have been carried out. Unlike very little data on the organic content of hydrothermal fluids is available [4-8] with all samples collected on the Mid-Atlantic Ridge.

We would like to report here on our results of the organic geochemistry of hydrothermal fluids collected (2010 & 2012) in the back arc settings of the Wallis and Futuna region. Comparison with fluids recently (2013 & 2014) collected on the Mid-Atlantic Ridge in both ultramafic and mafic environments (Rainbow, TAG, Snake Pit, Menez Gwenn and Lucky Strike) will be done. The corresponding mineral and gas contents of these fluids has also been studied and may help understanding the origin and fate of organics in hydrothermal environments.

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