

## **Organic geochemistry of fluids from 4 ultramafic-hosted hydrothermal systems of the Mid Atlantic Ridge**

*C. Konn\*, J.L. Charlou, J.P. Donval, N.G. Holm, F. Dehairs, S. Bouillon*

Ultramafic-hosted hydrothermal sites are characterized by mantle outcrops. On the Mid-Atlantic ridge, the Eurasian and American plates are moving apart resulting in the oceanic crust to tear up and to let the mantle rocks outcrop. Circulation of seawater, along the faults, within the mantle alters the periodites via the serpentinisation process, which produces a large amount of H<sub>2</sub>. Notably, H<sub>2</sub> is a great source of energy for further chemical reactions. Besides, a high CH<sub>4</sub> concentration in the water column is associated with ultramafic hydrothermal activity. This methane has been suggested to be abiogenic and to be formed via a Fisher-Tropsch synthesis ( $3\text{H}_2 + \text{CO} \rightarrow \text{CH}_4 + \text{H}_2\text{O}$ ). The isotope-ratio values support the later hypothesis. This has led to the idea of abiogenic formation of larger organic compounds such as hydrocarbons or key molecules for the origin of life issue. Both thermodynamics and laboratory work support this idea, but field data had not been studied yet. During the EXOMAR and the SERPENTINE cruises conducted by IFREMER, France; hydrothermal fluids from the MAR have been collected at different hot vent sites (Rainbow, Lost City, Logachev, Ashadze). Innovative and efficient techniques have been developed, used and improved to concentrate, isolate and extract compounds from the fluids by SPE (Solid Phase Extraction)-GC-MS and SBSE (Stir Bar Sorptive Extraction)-TD (Thermal Desorption)-GC-MS analyses. Mainly hydrocarbons, but also oxygen- and nitrogen-compounds were clearly identified by comparison of recorded mass spectra with library data. As for the analysis process, a particular attention is now paid to carboxylic acids and hydrocarbons as well as volatiles (C1-C8).

This work is carried out partly within the MoMARnet (Monitoring deep sea floor hydrothermal environments on the Mid-Atlantic Ridge: A Marie Curie Research Training network') framework.

*\*Presenting Author: département Geosciences Marines, DRO/GM-IFREMER C/Brest, Plouzané, France*