Preliminary geochemical data of high Cu deep-sea hydrothermal sediments from the TAG area

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The EU-FP7 Blue Mining project encompasses the research of deep-sea mineral resources and their future exploitation in a sustainable way. Within the project efficient resource exploration technologies have been tested in the TAG area (26°N) of the Mid-Atlantic Ridge during the RV Meteor expedition M127 (May-June 2016).

The TAG hydrothermal field has been studied for many years and consists of presently active low and high-temperature zones and several relic deposits [1]. During the M127 expedition, 35 gravity cores were attempted regionally and recovered 22 sediment cores, from which 317 sediment subsamples were collected. Of the 22 sediment cores, 12 had visible indications of hydrothermal influence while the others are carbonate ooze, some with minor geochemical anomalies

During the cruise, rapid mineralogical and geochemical studies (minutes/hours) of collected samples where performed using portable instruments (XRD spectrometer - Rigaku Miniflex II; XRF NITON Ultra XL3t), enabling the identification of high Cu concentrations in hydrothermal sediment layers (up to 20% Cu; up to 0.38% Zn) and important primary and secondary Cu and Fe sulphide minerals (chalcopyrite, pyrite, sphalerite and chalcocite). These hydrothermal sediments are distal to the known active hydrothermal mound and the relict deposits.

The results obtained on-board are being compared with analyses performed in full-fledged laboratory on-shore to refine the data collected with portable instruments and to complement it with additional information. The high Cu contents confirm the importance of ship-based analytics for efficient resource explorations.

[1] Rona et al. (1993) *Econ. Geol.***18**, 1987-2013.

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