

Copper isotope systematics of hydrothermal sediments from TAG and Snake Pit fields, Mid-Atlantic Ridge

YANNICK DJEDJROH¹ OLIVIER ROUXEL¹, CECILE CATHALOT¹, LUCIE PASTOR², FLORIAN BESSON¹, YOAN GERMAIN¹, AUDREY BOISSIER¹, LEATITIA LEROY¹, SANDRINE CHERON¹, EWAN PELLETER¹, MARIE ANNE CAMBON³

¹ Ifremer centre de Brest, REM/GM/LCG

² Ifremer, centre de Brest, REM/EEP/LEP

³ Ifremer centre de Brest, REM/EEP/LMEE

Seafloor Hydrothermal systems play an important role in the biogeochemical cycles of metals in deep sea environments. Although copper (Cu) is an important base metal in seafloor sulfide deposits, the contribution of hydrothermally-sourced Cu to oceanic budget is still poorly known.

Our goal is to apply Cu isotope systematics to understand the fate of Cu in seafloor hydrothermal systems, from its input from hot springs and export in the water column, to precipitation in metalliferous sediments.

Three fundamental questions will be addressed:

- (1) Is there significant variability of Cu isotope composition in hydrothermal fluids and sulfides which could inform us about the origin of Cu in metalliferous sediments, and the distinction between plume-derived Cu and Cu eroded from nearby sulfide mounds?
- (2) Is there significant fractionation of Cu isotopes during hydrothermal sediment diagenesis and aging of sulfide minerals at the seafloor?
- (3) Is there significant benthic flux of Cu from metalliferous sediments, resulting in significant contribution of Cu biogeochemical cycling in the deep sea?

To shed light on all these questions, we present Cu isotope and major/trace element composition of sediments cores and hydrothermal fluids which were collected in the Mid-Atlantic Ridge, at TAG and Snake Pit hydrothermal fluids during the BICOSE 2 cruise (DOI 10.17600 / 18000004).