



Sulfide *in situ* measurements in deep-sea environments: actual and future tools

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Investigating the interactions between the chemical and biological components of deep-sea chemosynthetic environments is crucial for the understanding of these ecosystems. The development of experimental platforms in the context of deep-sea observatories requires high resolution autonomous sulfide sensors to monitor mid and long term environmental changes associated with biological processes. Sulfur cycling is of major biogeochemical importance in these environments where sulfide is not only a key electron donor for chemosynthetic primary production but also a potent poison for organisms.

Sulfide sensors using different analytical techniques have been applied for short-term studies in various deep-sea environments. Continuous flow analyzers using colorimetric detection have been used for the characterization of hydrothermal vent fauna habitats (Le Bris *et al.*, 2006). An *in situ* ultraviolet spectrophotometer has also been adapted for bisulfide measurements (Johnson and Coletti, 2002). Electrochemistry offers a variety of methods for determining specific sulfur species in natural waters (Kuhl *et al.* 2000). Some of them have been applied *in situ* at great using potentiometry (Gundersen *et al.*), amperometry (De Beer *et al.* 2006), or voltammetry on Au/Hg electrodes (Luther *et al.*, 1999).

In this presentation, we will review the performances and limits of these sensing principles for measuring sulfide in various deep-sea environments and discuss their potentialities for medium to long-term autonomous measurements. Preliminary results obtained in deep-sea ecosystems with newly developed electrochemical sensors will

be presented.

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