

Porewater composition of cores from Palinuro sea mountain, Italy

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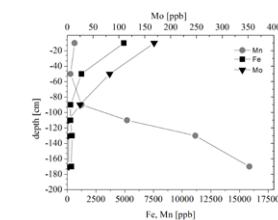
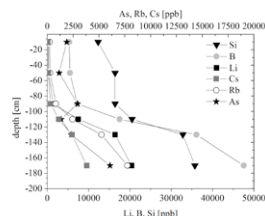
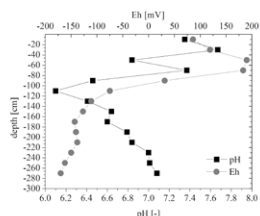
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During RV Meteor cruise M73/2 (14-30 August 2007), cores were sampled from a submarine hydrothermal vent site at the Palinuro volcanic complex in the southeastern Tyrrhenian sea, Italy. Pore water samples were taken from the sediment cores using rhizon-samplers. Results from one of the cores are presented showing a distinct pattern for certain elements.

The redox potential changes from 100-200 mV in the upper one meter to strongly reducing conditions (-170 mV) at a depth of 280 cm. The pH has a minimum of 6.1 at a depth of 110 cm. While Fe and Mo show their highest concentrations in the upper parts of the profile, Mn increases with increasingly reducing conditions.



Si, B, Li, Cs, Rb, and As show the same behavior as Mn. While this is expected for As, it is quite surprising for all the other elements which are not redox-sensitive. Major cations and anions as well as electrical conductivity do not change significantly over depth. Arsenic speciation showed a predominance of arsenate and arsenite to a depth of 80 cm. At 90 and 110 cm, mono- (10%), di- (18%), and trithioarsenate (25%) were detected besides arsenate (34%) and arsenite (14%). At 110 cm, trithioarsenate was the predominant species with 64% of total As, followed by 28% dithioarsenate. The geochemical pattern is an indication for upwelling geothermal water and mixing with ocean water in the upper part where Fe and Mo is released from sediment under slightly oxidizing conditions.

Time-resolved emission of iodine from seaweed measured with a new on-line mass spectrometric technique

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Molecular iodine and iodocarbons are released by macroalgae and phytoplankton into the atmosphere. These volatile iodine-containing compounds are involved in the tropospheric ozone depletion and the marine new particle formation. Recent studies suggest that biogenic emissions of molecular iodine rather than iodocarbons are the dominant source of reactive iodine atoms in the marine boundary layer [1]. Especially during low tide, when the seaweed is exposed to atmospheric air, increased levels of I₂ were detected at different measurement sites [2],[3]. In this work we present a new application of the time-of-flight aerosol mass spectrometer for the determination of I₂ in real-time. ToF-AMS were developed for the measurement of non-refractory atmospheric aerosols with high sensitivity [4]. In order to use the high sensitivity of the ToF-AMS for I₂ measurements, I₂ has to be converted from the gas phase into the particle phase by α-CD/NH₄Br particles inside a 0.5 L flow tube before entering the ToF-AMS. LOD of 300 ppt was achieved for 1 min time resolution and could be improved to 60 ppt for 30 min time resolution. Additionally this method was compared to a recent developed method that combines denuder sampling of I₂ and GC-MS analysis. The newly developed ToF-AMS method was used to explore the time-resolved emission of I₂ by various seaweed species from the eulittoral und sublittoral zone of Helgoland (North Sea, Germany). For our measurements entire seaweed species were removed from sea water, shaken free of excess water and introduced into a 4 L chamber made of glass to simulate low tide conditions. Additional stress was applied to the seaweed by flushing a continuous flow of ozonated (20-150 ppb) synthetic air through the chamber to investigate the influence of ozone on the emission of I₂. Furthermore, volatile iodocarbons were quantified by TD-GC-MS and compared to I₂ measurements.

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[3] Huang *et al.* (2010) *Atmos. Chem. Phys.* **10**, 4823–4833.
[4] DeCarlo *et al.* (2006) *Anal. Chem.* **78**, 8281–8289.