



EAG-GS Outreach Program 2013

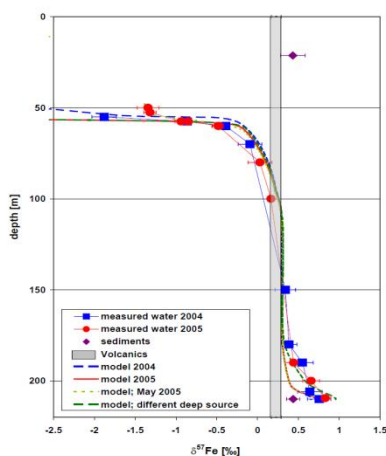
Seminar Abstract:



Stable isotope techniques for analysing geochemical processes

Bernhard Wehrli, Swiss Federal Institute of Technology, ETH Zurich and Eawag, Swiss Federal Institute of Aquatic Science and Technology, Switzerland. wehrli@eawag.ch

Significant progress has been made over the last decade in exploring the use of isotopic variations of transition metals. Such isotopic signatures allow constraining the sources of element in the environment and to elucidate the biogeochemical processes which affect their distribution and fate. Iron is an exciting candidate for such studies because it has a significant role in the redox cycles at oxic anoxic boundaries in soils, sediments and aquatic systems. After a short introduction of the principles of isotopic analysis for the metallic elements the seminar will focus on a case study performed in Lake Nyos, Cameroon. This volcanic lake builds up CO_2 in its deep water. A gas eruption in 1986 killed more than 1700 people. Today a degassing program is venting excess CO_2 into the atmosphere. The process induces an unusual iron cycle which allows performing detailed studies of the microbial iron reduction process in the water column. By using modern mass spectrometry the isotopic shift of dissolved iron from the dissimilatory reduction process could be quantified on natural water samples. The large negative shift corresponds well with data obtained in the laboratory. This modern analogue is therefore helpful to interpret historical records in sedimentary iron deposits such as the banded iron formations.



Isotopic signature of dissolved Fe in Lake Nyos (Teutsch et al. 2009.) Lake Nyos, Cameroon.

Teutsch N., Schmid M., Müller B., Halliday A., Wehrli B. 2009. Large iron isotope fractionation at the oxic-anoxic interface in Lake Nyos. *Earth Planet. Sci. Letters* 285, 52-60.