Coupled cycling of Fe and C_{org} in submarine hydrothermal systems: an ocean biogeochemistry perspective.

CHRISTOPHER R. GERMAN[1], LOUIS LEGENDRE [23], SYLVIA G. SANDER[4], NADINE LE BRIS[56] AND SCOR WORKING GROUP [135]

[1]Woods Hole Oceanographic Institution, Woods Hole, USA (cgerman@whoi.edu)
[2]Université Pierre et Marie Curie 6, Laboratoire d'Océanographie de Villefranche, France (legendre@obs-vlfr.fr)
[3]CNRS, Laboratoire d'Océanographie de Villefranche, France (legendre@obs-vlfr.fr)
[4]University of Otago, Dunedin, New Zealand (sylvia.sander@otago.ac.nz)
[5]Université Pierre et Marie Curie Paris 6, Observatoire Océanologique de Banyuls sur Mer, France (lebris@obs-banyuls.fr)
[6]CNRS, Observatoire Océanologique de Banyuls sur Mer, France (lebris@obs-banyuls.fr)

Submarine hydrothermal venting was first discovered in the late 1970s. For decades the potential impact that vent-fluxes could have on global ocean budgets was restricted to consideration of processes in hydrothermal plumes in which the majority of chemical species are incorporated into polymetallic sulfide and/or oxyhydroxide particles close to the ridge-crest and sink to the underlying seafloor. This restricted view of the role that hydrothermal systems might play in global-ocean budgets has been challenged, more recently, by the recognition that there might also be a significant flux of *dissolved* Fe from hydrothermal systems to the oceans that is facilitated through organic complexation. In this paper we review field-based and modeling results, including investigations that we have carried out under the auspices of SCOR-InterRidge Working Group 135, that reveal potential relationships between C_{org} and Fe in hydrothermal plumes, and indicate that hydrothermal systems may play significant roles in both the global biogeochemical Fe cycle and the global ocean carbon cycle.

Vulnerability of soil carbon release with increasing temperature in tropical montane forests

F. GERSCHLAUER*, K. BUTTERBACH-BAHL AND R. KIESE

Karlsruhe Institute of Technology, IMK-IFU, 82467 Garmisch-Partenkirchen, Germany (*correspondence: friederike.gerschlauer@kit.edu, klaus.butterbach-bahl@kit.edu, ralf.kiese@kit.edu)

Changes in terrestrial ecosystems due to shifts in climate occur in many dimensions, and include changes in the biogeochemical cycle of carbon (C) amongst others. Tropical montane ecosystems and their supportive ecosystem processes are particularly vulnerable to global warming [1, 2]. Soils from tropical forests are known to have significant effects on the global carbon cycling and climate [3] but data of these feedbacks are still scarce, for Africa in particular.

In a long term incubation experiment we investigated how increasing temperature affects soil carbon release of four different montane forest ecosystems. The Lower montane, *Ocotea*, *Podocarpus* and *Erica* forests are located along an altitudinal gradient at Mt. Kilimanjaro, Tanzania, between 1900 and 3800 m a.s.l. Soils (0-10cm and 10-30cm) of the respective sites were incubated at 15 and 25°C and 60% water holding capacity over a year's period.

Prelimenary results demonstrate that at all sites at both temperatures soil from 0-10cm released more CO_2 than from 10-30cm, with exception of the *Erica* forest where 0-10 and 10-30cm had equal production rates of CO_2 at 15°C. At the first weeks of incubation soils of all sites have been very active and magnitude of cumulative CO_2 release was highest in *Ocotea and Erica,* medium in the Lower montane and lowest at the *Podocarpus* forest. Comparing the release of soil carbon at temperatures approx. 10°C higher than site specific mean annual temperature revealed the same order. This indicats that the *Ocotea* and *Erica* forest are of higher risk in loosing soil carbon due to increasing temperatures with climate change.

[1] Laurence *et al* (2011) *Biol. Cons.* **144**, 548-557. [2] IPCC (2007). [3] Malhi (2010) Curr Opin in *Environ Sus* **2**, 237–244.

DOI:10.1180/minmag.2013.077.5.7