Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10760, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10760
EGU General Assembly 2008

Cold-Seep Carbonates and Cold-Water Corals from the Hikurangi Margin, offshore New Zealand (Cruise So191): Growth Structures, Fluid Pathways and first Isotope Geochemical Results

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Authigenic carbonates of cold-seep areas are potential high-resolution recorder of changes in vent activity and fluid composition through time. Crucial tools for the identification and the understanding of driving processes, mechanisms and sources of marine methane emanation are the investigation of age constrains of paleoactivity phases and the determination of related isotope geochemical signatures. Cold-seep carbonates are especially relevant for the reconstruction of marine methane emanation and the estimation of their contribution to the marine and global carbon cycle.

Cruise So191 provided outstanding large samples of carbonatized seafloor, e.g. one example measures 1.8 x 1.2 x 1 m, which were recovered with a video guided grab (TVG). Profiles through these blocks from different sampling sites provide a geochemical, mineralogical and structural view into carbonate precipitation processes at the seafloor and the development of the feeding fluid system through time.

In addition, on these samples dead and living cold-water corals were observed and carefully recovered in order to extend the geochemical approach to archives which monitored chemical changes and the recent status in the bottom water at the specific cold-seep environment.

Such an archive combination may provide a correlation between cold seep activity and its direct impact on the bottom water chemistry. Therefore, the recovered living

corals are significant for geochemical calibration procedures of marine environmental proxies in cold-seep areas.

First isotope geochemical investigation of the underlying hard-substrate is characterized by significantly light δ^{13}C signatures between -35 and -47 (‰ vs. PDB), implying a characteristic microbial mediated precipitation, dominated by light biogenic carbon sources.

Large cross-cuts through the carbonate blocks provide new insights into fluid pathway and growth structures of these cold-seep related precipitates and will be presented accompanied by actual results of on-going isotope geochemical investigation.