Marine osmium isotopic records in the Triassic-Jurassic deep-sea sediments of Panthalassa

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Attention has been focused on relationships between massive volcanic eruptions and major environmental perturbations [1]. The Triassic-Jurassic (T-J) transition at c. a. 200 Ma marks one of the five biggest extinctions in the Phanerozoic when a substantial proportion of marine and terrestrial species became extinct. It also marks extensive magmatic activities associated with the emplacement of Central Atlantic Magmatic Province (CAMP). Massive eruption has been implicated as a possible forcing mechanism for the climatic and biotic changes at the T-J boundary. However, the mechanism triggering the T-J mass extinction is still controversial.

Since seawater Os isotopic composition varies in response to change in relative rates of Os supply from continental crust, mantle and cosmic dusts [2], Os isotopic record from hydrogenous fraction of marine sediment has been thought to be a valid tool for reconstructing temporal changes in relative supply rates of Os from these sources. Although Os isotopic ratios across the T-J boundary have been reported from British sites [3], no data has been reported from Pacific (Panthalassa) pelagic basin. We present a high-resolution Os isotopic record across the T-J boundary, extructed from a bedded chert succession deposited on a Panthalassa deep basin (Inuyama Chert [4]). Our new dataset shows a gradual decrease through the Rhaetian, and subsequent stepwise increases across the T-J boundary. The gradual decrease in Os isotopic composition through Rhaetian suggests an increase in relative supply rate of unradiogenic Os from the CAMP, and the subsequent stepwise positive shifts may have been caused by a rapid increase in relative supply rate of radiogenic Os due to an enhanced continental weathering. In the presentation we will discuss paleoenvironmental implications of the Os isotopic changes.

[1] Kuroda *et al*. (2007) *EPSL* **256**, 211–223. [2] Peucker-Ehrenbrink & Ravizza (2000) *Terra Nova* **12**, 205–219. [3] Cohen & Coe (2007) *Paleo-3*. **244**, 374–390. [4] Hori *et al*. (2007) *Paleo-3*. **244**, 391–406.

Diversity hidden in the dark – Microbial communities involved in carbonate mineralization in the Blessberg Cave, Germany

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Caves provide a unique habitat for investigating belowground biodiversity and the potential role of microbes in carbonate mineral formation. The Blessberg Cave (developed along the south fault of the Thuringian Forest in triassic limestone) in eastern Germany was discovered in 2008 and transiently available for scientific investigation in 2008 and 2009. This hidden habitat was the focus of microbial diversity investigations and characterization of minerals and bacterial biomineralization.

Mineral composition of stalagtite and cave sediment material was investigated using X-ray diffraction (XRD), verifying the presence of quartz, kaolinite and micaceous minerals. Visualization by confocal laser scanning microscopy (CLSM) revealed low cell numbers within and on the stalagtite surface. Clone sequences are being analyzed to explore the diversity of stalagtite bacterial communities. Bacteria isolated on oligotrophic and carbonate precipitating medium from sediment samples were members of ubiqitious bacterial groups, e.g. β- and γ-Proteobacteria, Actinobacteria and Bacteroidetes. The carbonate-precipitating capability of isolates was tested in liquid carbonate-precipitating medium. Two isolates, identified as *Arthrobacter* and *Rhodococcus* sp. produced precipitates and were visualized by scanning electron microscopy (SEM) and CLSM. Mineral composition, analyzed by XRD and energy dispersive X-ray analysis (EDX), showed a poorly crystalline material, not identified as calcite. Analysis of 16S rDNA of the *in situ* bacterial communities revealed a great, yet unexplored diversity in the Blessberg Cave. The α-, β-, γ- and δ-Proteobacteria subgroups, as well as the phyla Bacteroidetes, Acidobacteria, Nitrospirae, Chloroflexi, Planctomycetes, Verrucomicrobia, Actinobacteria and Firmicutes were detected. A high number of the clones was affiliated with uncultured bacterial clones described from diverse environmental samples, e.g. karstic groundwater, cave wall biofilms, oligotrophic sea sediment. This study gave insight into the structure of the indigenous cave bacterial communites, harboring potential for biomineralization.