Geophysical Research Abstracts,
Vol. 11, EGU2009-11215, 2009
EGU General Assembly 2009

Coral reef microbialites as contemporaneous framework component (deglacial, Tahiti)

H. Westphal (1), K. Heindel (1), M. Brandano (2), J. Peckmann (1), and G. Cabioch (3)

(1) Universität Bremen, Department of Geosciences, Bremen, Germany (hildegard.westphal@uni-bremen.de), (2) Dipartimento di Scienze della Terra, Università di Roma "La Sapienza", Ple Aldo Moro, 5. I-00185 Roma, Italy, (3) IRD, Centre d'Ile de France, 32, Avenue Henri Varagnat, 93143 Bondy CEDEX, France

Marine microbialites associated with hermatypic corals are known from several intervals of Earth's history, including the latest deglacial from the Pleistocene to the Holocene. In contrast, in the modern world no such massive occurrences are known to form. Here, deglacial microbialites from Tahiti (IODP 310) are studied. The paradox of the co-occurrence of oligotrophic corals with microbialites that tend to form in more nutrient-rich environments has previously led to the assumption that the microbialites are considerably younger than the coral framework, and have formed in deeper storeys of the reef edifice; or that they represent a severe disturbance of the reef ecosystem. The present study in contrast demonstrates that microbialite encrustation occurred immediately after coral demise. Encrustation has taken place under photic conditions, even though the involvement of cyanobacteria or anoxygenic phototrophs in the microbialite precipitation remains elusive. The reason for the voluminous development of microbialites in the deglacial reefs of Tahiti (up to 80% by volume of the cores) remains an open question. High trophic conditions caused by fluvial or groundwater transport from the volcanic hinterland appears to be an unlikely cause, given that the corals and the microbialites developed in close vicinity, and that the coral community prospered continuously – no breaks in the development of the succession were detected. The fact, however, that voluminous deglacial reef microbialites are restricted to volcanic islands, implies that moderately, and possibly episodically elevated trophic conditions favor this type of microbialite formation. Clearly, the reef microbialites recovered in the IODP 310 cores did not develop after a serious disturbance such as drowning or suffocation by terrestrial material, and are no "disaster forms". Rather, their precipitation represents a continuous process in an ecosystem that was on the verge of its limiting conditions.