

## Bacteriohopanetetrol in deep subsurface sediments from Gulf of Mexico, IODP Exp 308 - Its potential as microbial life marker -

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A large fraction of prokaryotic biomass on the Earth is assumed to be in oceanic and terrestrial subsurface biosphere (Whitman et al., 1998). The presence of a subsurface biosphere is especially expected in areas where fluid circulation provides energy and carbon sources necessary for the survival of microbes. In the Gulf of Mexico, high sedimentation rates have been observed and high overpressure associated fluid flow were expected. We conducted bacterial biomarker analysis in the sediment samples from IODP Exp 308, Sites U1319 and U1324, Gulf of Mexico to investigate the relationship between bacterial distribution and fluid circulation in the subsurface. Bacteriohopanetetrol (BHT), which is one of pentacyclic triterpenoids synthesized by a variety of bacteria as cell membrane constituents, was detected in most of the sediment samples from Sites U1319 and U1324. The pore water cation ( $\text{Na}^+$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$  etc.) concentration profiles indicate that lateral fluid flow is restricted in the shallow subseafloor at Site U1319, while significant fluid flow occurs in the deep subsurface as well as in the shallow subseafloor at Site U1324 (Expedition 308 Scientists, 2005). The concentrations of BHT are higher in sediments from Site U1324 where fluid circulation is more active. These results show that the distribution of bacteria capable of synthesising hopanoids is closely related to the fluid circulation in the deep subsurface sediments at the Gulf of Mexico.

### REFERENCES

Whitman, W.B., Coleman, D.C., Wiebe, W.J. (1998) Prokaryotes: The unseen majority. *Proceedings of the National Academy of Sciences of the United States of America* 95, 6578-6583.

Expedition 308 Scientists. (2005) Overpressure and fluid flow processes in the deepwater Gulf of Mexico: slope stability, seeps, and shallow-water flow. *IODP Preliminary Report 308*. doi:10:2204/iodp.pr.308.2005.