# Intact polar lipids and diagenetic processes in sub-seafloor sediments in the Black Sea

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The Black Sea is the world's largest anoxic basin where the water column beneath 100 m depth as well as the underlying sediments are devoid of oxygen. FS Meteor cruise M84/1 (DARCSEAS) [1] investigated site GeoB 15105 in the SW Black Sea and obtained an 8 m-sedimentary record of complex Late Pleistocene environmental change due to the transition from a limnic to a brackish marine system. The resulting diagenetic regime in these sediments is unusual and exhibits signals of overlapping sulfate reduction, methanogenesis, and Fe reduction, coupled with variable concentrations of total organic carbon. This is consistent with evidence for abundant sulfate-reducing bacteria in the methanogenic zone [2]. Using a strongly improved set of methods for extraction, preparation and detection of microbial intact polar lipids (IPL), we examined signals of the sedimentary microbial communities in relation to the complex diagentic regime and sedimentary history as determined by pore-water analysis of electron donors and acceptors and sedimentological examination, respectively.

We found that IPLs were present throughout the whole sediment core with a maximum in a sapropel layer at around four meters. IPL concentrations were highly variable and archaeal glycolipids (e.g., mono- and diglycosidic glyceroldibiphytanyltetraethers) as well as bacterial phospholipids (e.g., diether based phosphatidyl-ethanolamines) were observed down to a depth of eight meters. Furthermore, varying ratios of archaeal to bacterial lipids between 0.1 and 0.6 revealed regional differences of microbial abundance and could also be related to methane oxidation processes. Our study provides new insights into the relationship of microbial communities, diagenetic processes and the sedimentary history in the Black Sea sediments.

[1] Zabel (2011) RV METEOR, *Cruise Report* M84/1 2011, DFG. [2] Leloup *et al*. (2007) *Env. Microbiol*. **9**, 131-142.

# Sediment traps in Lake Baikal reveal strong changes in productivity over the last decade

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## More than 10 years of monitoring

Lake Baikal is one of the largest lakes in the world and with a maximum water depth of ~1640 m also the deepest. This makes it unique and comparable to an ocean also since due to efficient vertical mixing oxygen concentrations are high throughout the water column.

We have moored sediment trapes which were recovered and renewed every year since 1999. Up to 18 traps were deployed over the whole water column. Organic carbon and nitrogen concentrations and isotopes as well as chlorin concentrations and chlorin indices were measured to estimate productivity and the composition of the organic material. C/N ratios between 10 and 13 hint to a strong authochthonous together with some allochthonous contribution to the organic material. $\delta^{13}$Corg values around -31 ‰ (rather light for freshwater systems) were described before by Qiu et al [1] and related to diatom blooms. Chlorin measurements showed very strong, i.e., up to 5-fold variations in productivity. Chlorin indices [2] varied from 0.5 to 1.5 indicating differences in organic material freshness over the years.

[1] Qiu *et al*. (1993) *Geology* **21**, 25-28. [2] Schubert *et al*. (2005) *Geochem. Geophys. Geosyst*. **6**, Q03005, doi:10.1029/2004GC000837


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