A multicorer is lowered into the Mediterranean Sea during cruise Meteor 84-1 to sample sediments 3000 m below sea surface.

Photo: J.S. Lipp

Ecosystems under the oceans:

Exploring the deep biosphere using microbial lipid signatures

Fluxes of matter (e.g., organic carbon, carbon dioxide) on the surface of our earth are also in contact with processes within the sediments under the oceans, **forming cycles** of geological timescales. **Microorganisms** who are adapted to the extreme conditions within those subseafloor sediments (high pressure, low energy supply) **mediate important processes** controlling those greenhouse gases and nutrients.
There are strong hints that **Archaea** - a third domain of life besides Bacteria and Eukarya - is playing a **key role** in these processes. As Archaea often resist to be cultivated, composition and abundance of the microbial communities in subsurface sediments **still remain unclear**.

In my PhD project in GLOMAR I track microbial activity in the sediments by their molecular signatures, using **specific lipids** contained in the microbial cell wall as **biomarkers**. As the established analysis of those biomarkers still faces frontiers (e.g., high matrix effects, small amounts of lipids), I work on **optimization of lipid analysis** by improving existing methods and sample clean-up protocols and implementing state-of-the-art instrumentation.

With advanced knowledge of the lipid signatures of Archaea I hope to **contribute to a better understanding** of the deep biosphere itself and it´s role in the **global system**.

Jan Schröder, *GLOMAR PhD student*