Marine Environmental Archives
Core field, Master of Marine Geosciences

Torsten Bickert
MARUM, University of Bremen
Tilo von Dobeneck
Geosciences, University of Bremen
Marine Environmental Archives

The Problem

instrumental records of marine environmental parameters cover only the last 140 years
=> period of industrialisation, environment influenced by human activity
Strategy in marine paleoenvironmental research

- Sampling
- Deposition
- Microorganism or other particle records environmental parameters
- Marine sediments as paleo environmental archive

Marine Environmental Archives
Marine Environmental Archives

Suitable archives
Reconstructing the physical environment

- ocean temperature faunal assemblages, $U^\text{37}_\text{k}$, TEX 86, Mg/Ca, Sr/Ca
- salinity, ice volume $\delta^{18}\text{O}$ - paleotemperature, Li/Ca
- ocean circulation $\delta^{13}\text{C}$, Cd/Ca, radiogenic isotope tracer (Nd, Pb, Hf), $\Delta^{14}\text{C}$, $^{231}\text{Pa}$, $^{230}\text{Th}$
- atmospheric circulation supply and mineralogy of dust, magnetic parameters
- precipitation $\delta^{D}$ on plant waxes, proxies for river input

Reconstructing the carbon and nutrient cycles

- productivity particle flux, Corg, barite
- nutrient utilization $\delta^{13}\text{C}$, Cd/Ca, $\delta^{15}\text{N}$
- alkalinity, pH, carbonate Ba/Ca, $^{87}\text{Sr}/^{86}\text{Sr}$, $\delta^{11}\text{B}$, dissolution indices
- atmospheric CO2 $\delta^{13}\text{Corg} +$ paleoT, pH + ALK / DIC
Method training - winter semester

- stable isotopes and trace elements  T. Bickert
- marine ecosystems as environmental indicators  S. Mulitza
- environmental magnetism  T. von Dobeneck
- terrigenous signals  M. Zabel, E. Schefuss

Application of methods - summer semester

- marine environmental archives project  G. Mollenhauer et al.
- stratigraphical methods (litho-, cyclo-, magnetostratigraphy, radiometric dating)
Marine Environmental Archives

Start

Wednesday, Oct 17, 2018, 14:00 h, GEO 3010

Exams

Winter semester:

one written exam on selected topics out of the four courses

Summer semester:

report on archives project