

How to Disentangle Terrestrial Archives

Two Specialized Geoarchaeological Laboratories for Topoi

HF-POLLEN LAB

Our new pollen laboratory was established in July 2009. It was specially designed to use Hydrofluoric (HF) acid to achieve the best results when extracting pollen grains and spores from various types of terrestrial archives to obtain information on former land-use and climatic conditions. HF is also used to prepare total digestions of specific samples (f.e. to analyze the composition of ancient ceramics). In addition, our laboratory has the facilities required to gather botanical remains like fruits and seeds from sediments. Acting as a service supplier, we offer our capabilities to every Topoi project that possesses appropriate archives and artefacts. Projects like A-I-1, A-I-2, A-I-9 and A-I-10 are already being provided with sample preparation for pollen analyses. Other projects like A-I-17 and research area A-III are interested in future cooperation. Several projects (e.g. A-I-10 and research area A-III) are in need of total digestion capabilities.

Workflow pollen preparation:

More than a dozen steps and two days of conditioning are necessary to prepare a sediment sample of 1 ml to produce a suitable microscopic preparation:

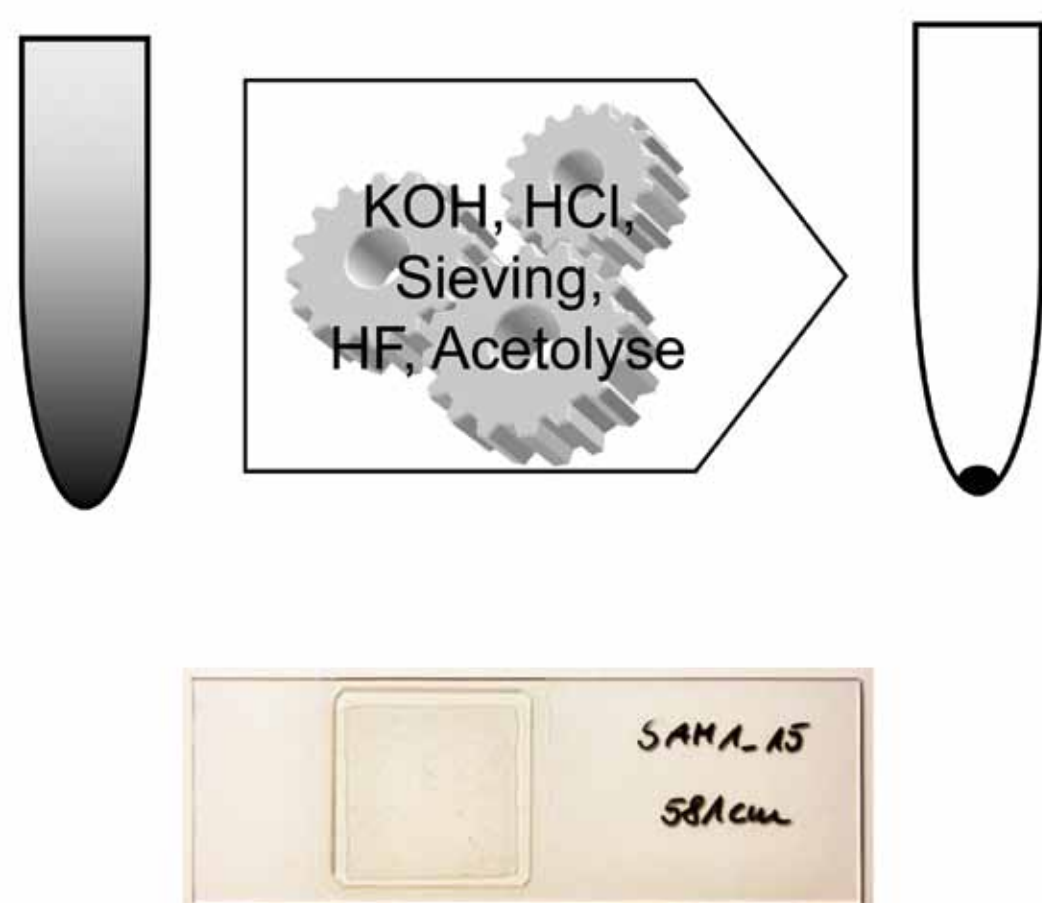


Fig. 1: After preparation the samples are analyzed at 500 – 1000 x Magnification. This may take ca. 1-4 d/sample

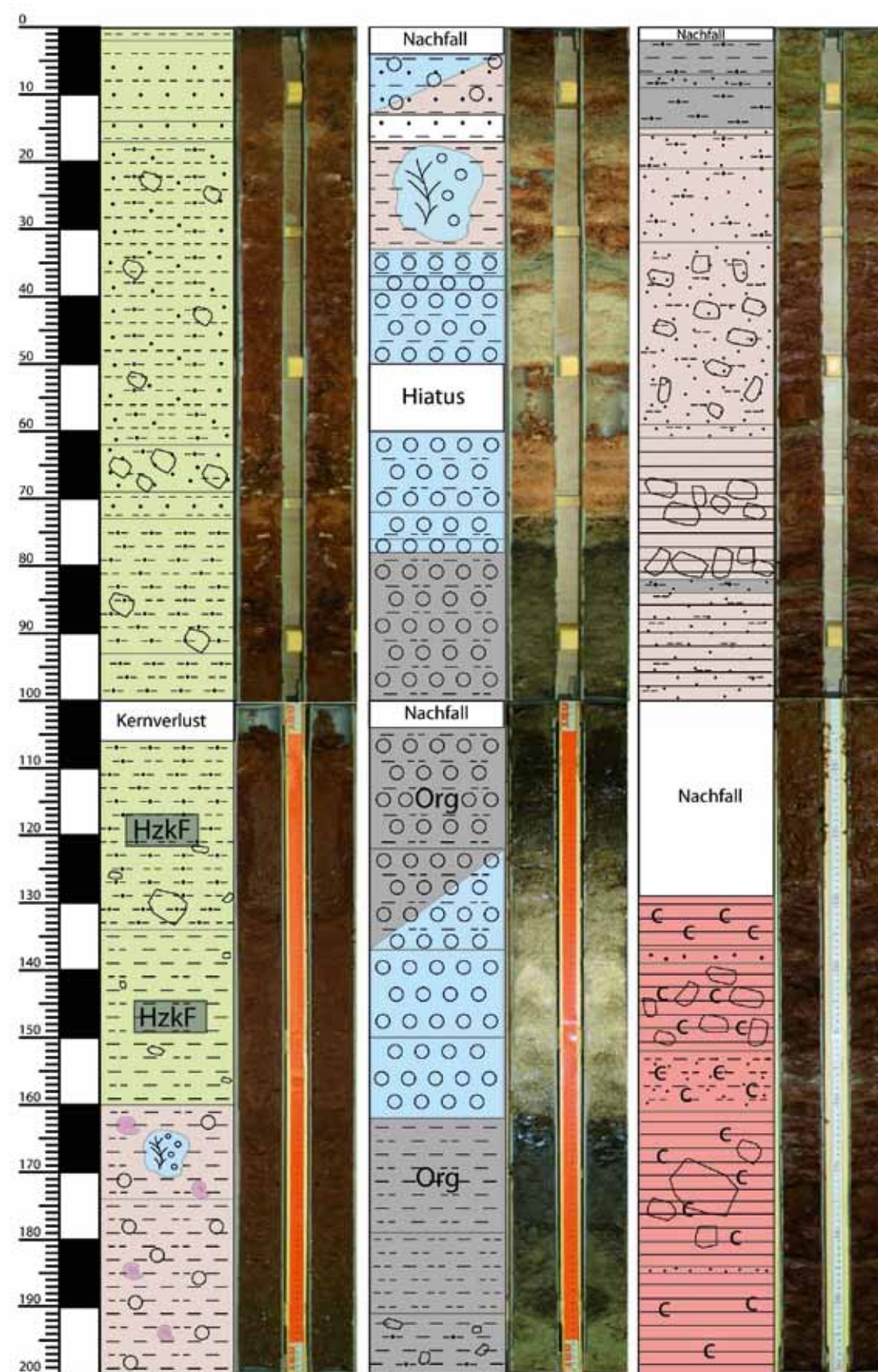


Fig. 2 and 3: Drilling core SB03 (above) from the Harz-Foreland (Project A-I-10) with Holocene and Late Pleistocene sediments and an Analytical flowchart (below)

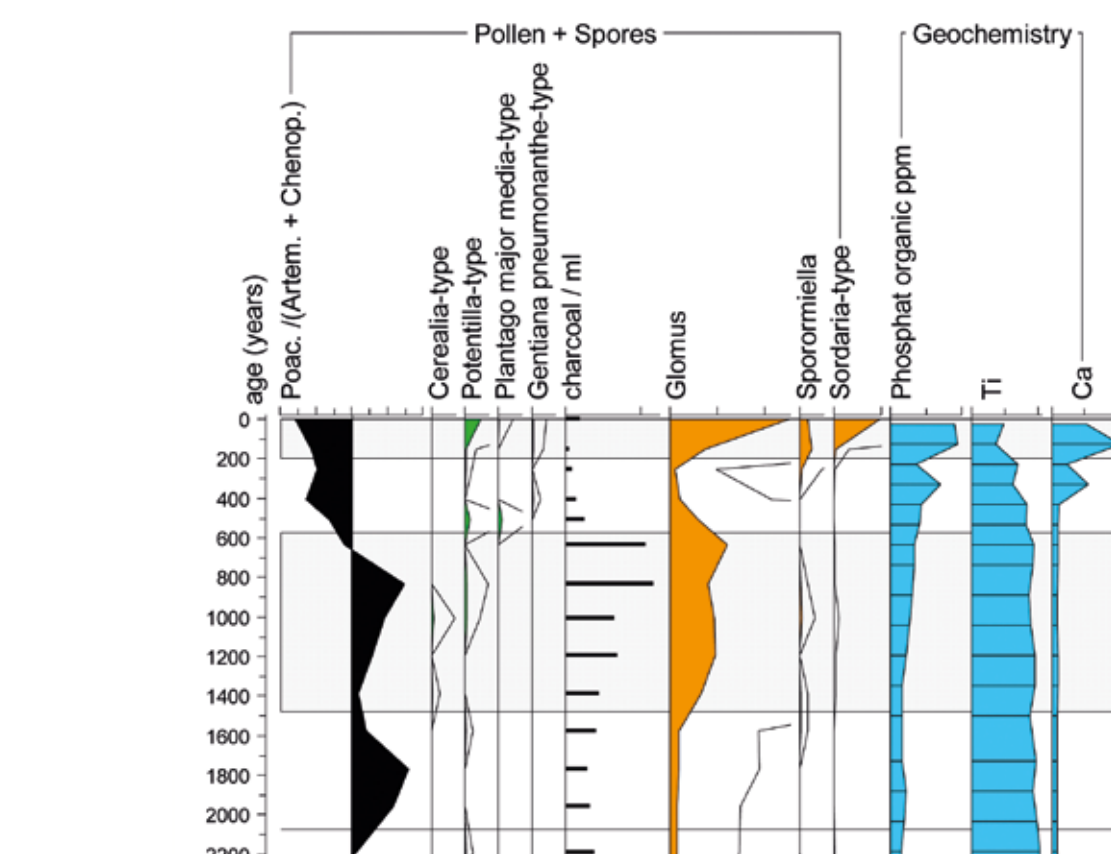
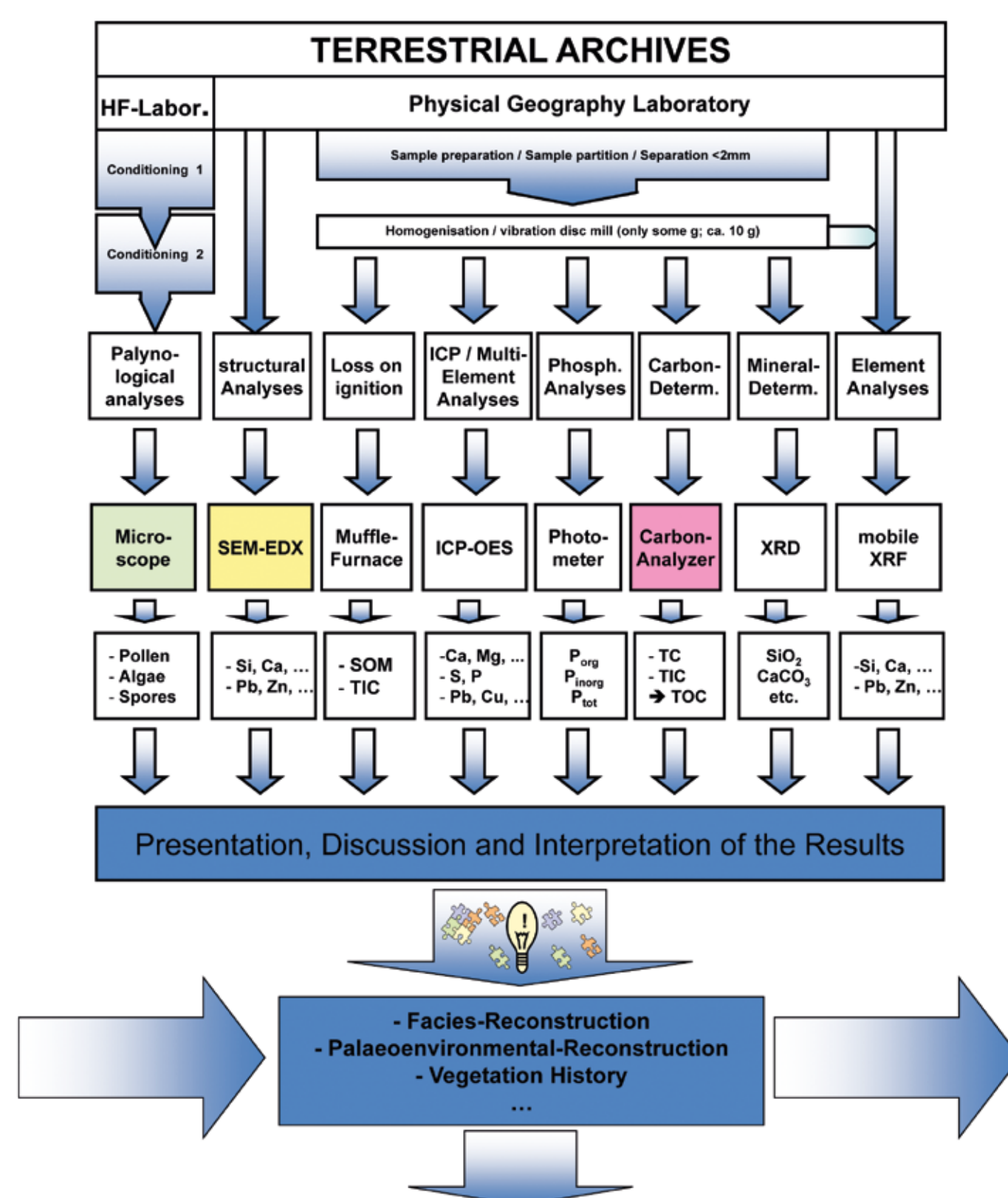


Fig. 4: Data from both preparation lines will be combined into multi-proxy diagrams (example data: L. Shumilovskikh, Th. Felauer)

PHYSICAL GEOGRAPHY LAB

The laboratory for Physical Geography is a well established laboratory which specializes in the analysis of sediment samples from terrestrial archives such as sections, drillings (Fig. 2), test pits, etc. All necessary sample preparation techniques (e.g. drying, separation, sieving, homogenization, digestion etc.) are available in the lab (Fig. 3). The lab is equipped with the following analytical equipment:

- ICP-OES for element (Ca, Mg, P, etc.) quantification
- SEM-EDX for structural and material analyses (Fig. 5)
- XRD to determine the mineralogical composition
- Mobile XRF for element quantification
- Carbon Analyzer to determine carbon (Fig. 7)
- UV-VIS Photometer for element quantification.



Fig. 5: The Scanning-Electron-Microscope with Energy-Dispersive X-ray detection

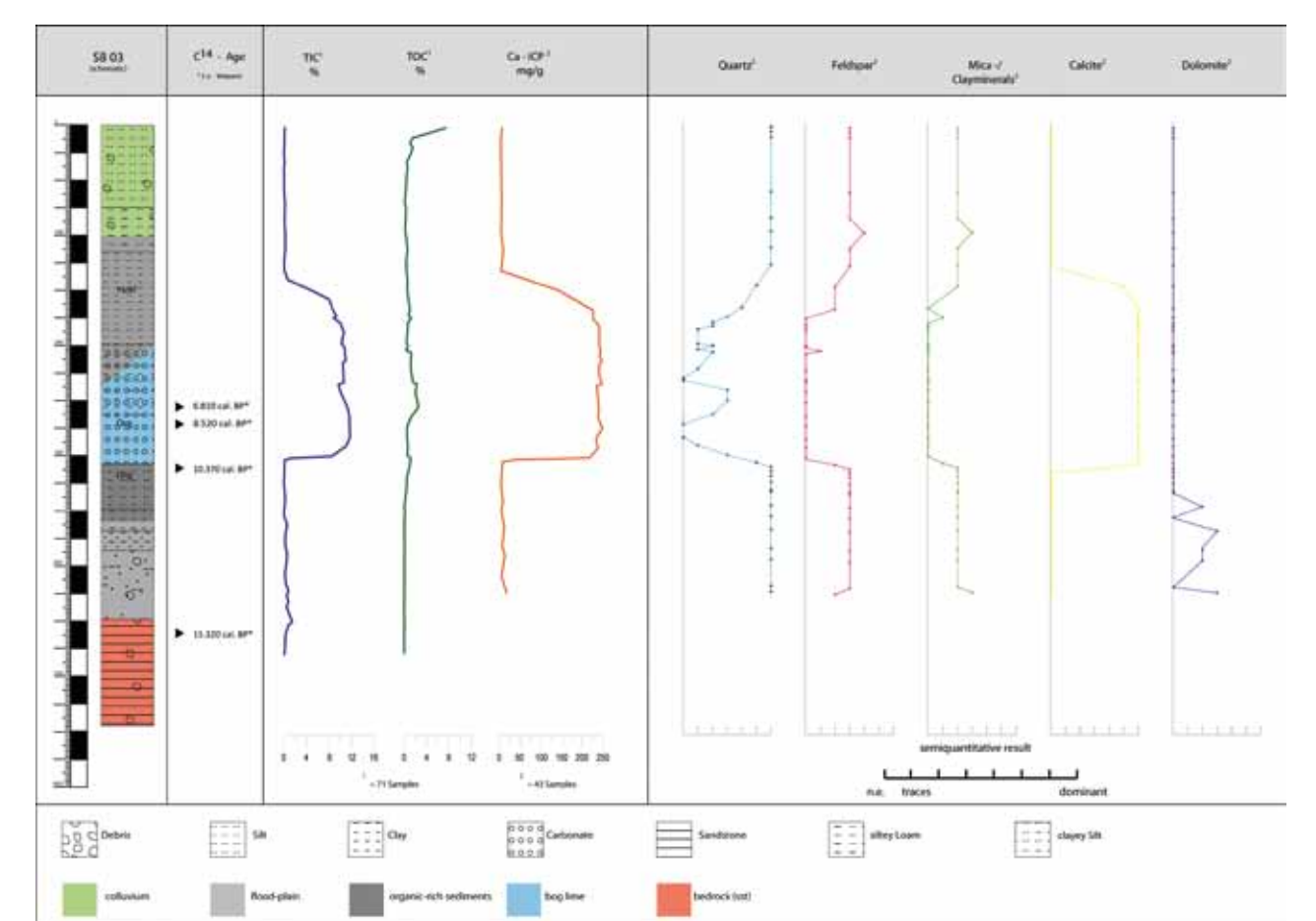


Fig. 6: Example of the geochemical and mineralogical results from drilling core SB03 from the Harz-Foreland (Project A-I-10)



Fig. 7: The Carbon Analyzer used in the determination of organic and inorganic carbon contents