The new Austrian Core Facility for Scientific Core Analyses: Introduction and first scientific achievements

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Since 2017, the new Austrian Core Facility at the University of Innsbruck operates the first research facility in Austria that provides state-of-the-art laboratory infrastructure for logging and scanning of cores obtained by drilling and coring. The lab is equipped with three scanners that all make use of non-destructive analysis techniques to provide high-resolution data for scientific core analyses: 1) a *Geotek* Multi-Sensor Core Logger measuring physical property such as P-wave velocity, gamma density, and magnetic susceptibility (downcore resolution 1 mm). 2) a *Smartcube* Camera Image Scanner for 1000 dpi photo-imaging split sediment cores and whole-round rock cores (360° scan). 3) a *COX Analytics* ITRAX XRF core scanner that collects radiographic images and element profiles of the core surface by X-ray Fluorescence in the range Si to U in downcore resolution of 50 and 200 micrometer, respectively.

This presentation aims at introducing the ACF to the Austrian Earth Science community and will present first results from a wide range of scientific applications that already used the new infrastructure to analyze:

whole rock drill cores from the Brenner Basis Tunnel to study how the metamorphic fabric of the Zentralgneiss links to anisotropy of p-wave velocity and deduce mechanical stratigraphy of the Zentralgneiss to Hochstegenmarmor transition for core-to-core correlation and paleogeography interpretations

plug-samples from drill cores for petrophysical characterization to deduce the depositional vs. diagentic properties of the Leitha limestones

peat bog cores from the Alps and the alpine foreland to link element profiles with data from pollen analyses for advanced palynological reconstructions and studies of past human-environment interactions

shallow-water lake cores from archeological lake-dwelling sites in the Mondsee-Attersee region, to use element data as chemical proxy for characterizing and analyzing cultural layers

sediment cores from the high-alpine Saldur Lakes to use element chemical data as proxy for lake – (glaciated vs non-glaciated) catchment interaction to decipher past climate change in high Alpine regions

sediment cores from several Alpine-valleys and perialpine lakes to physically and chemically characterize turbidite deposits as proxy for processed-based interpretation and distinction of past meteorological and/or geological extreme events such as floods, mass movements and earthquakes

Speleothem cores from the Conturines Cave for testing new applications of high-resolution chemo-stratigraphy for paleoclimate research applications.