Ortner, H. [Ed.] (2016): Abstract Volume of GeoTirol2016 - Annual Meeting of DGGV and PANGEO
Austria, 25-28. September 2016, Innsbruck.

GeoTirol 2016 37

POST-HIRNANTIAN (LATEST ORDOVICIAN-EARLY SILURIAN) ENVIRONMENTS IN ETHIOPIA: FIRST EVIDENCE FROM SEDIMENTOLOGY AND PALYNOLOGY

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First clear data of land-living plants in form of cryptospores in Gondwanan sediments dates well back into the Middle Ordovician. However, the earliest macroplant remains do not appear before the Mid Silurian. In the time between, plant evolution on terrestrial environments in Gondwana was severely hampered by the Hirnantian glaciation event. The nature of the plants remains mysterious. How did they survive the glaciation and how did they recolonise once glaciated areas? First answers to these questions are expected from fine-grained early postglacial continental or marginal marine sediments because of their promising potential for macroflora preservation. However, such deposits are rare in Gondwana with the fossil record highly biased towards marine sediments.

Recently discovered outcrops of cryptospore-bearing post-glacial Early Palaeozoic fine grained siliciclastics in northern Ethiopia represent such promising terrestrial or very marginal marine deposits. They contain cryptospores that form the first body fossil proof of Early Palaeozoic sediments in NE Africa. Together with co-occurring sporangia remains they have the potential to shed light on the early post-Hirnantian plant colonisation of terrestrial ecosystems in Gondwana.

The fine-grained sediments overlay glaciogenic sediments. They fill a relic glacial topography, either representing underfilled glacial troughs or sub-glacial channels. Missing bioturbation and the abundance of pyrite and siderite indicate a generally low-oxygen depositional environment. Truncation of the succession by cross-bedded sandstones that contain marine trace fossils document a post-glacial transgression coming from south of the Palaeotethys which flooded far interior regions of Gondwana.

In studied levels of the sections, the palynomorph assemblage is dominated by the land-derived cryptospores and algae of possibly freshwater origin. Typical open marine elements such as acritarchs and scolecodonts are extremely rare, chitinozoans are missing so far. Microscopically pyritized objects of unknown affinity but of probably primary organic origin likely reflect metabolic products during very early mineralization processes in anaerobic habitats or at oxic-anoxic interfaces. The very well-preserved cryptospore assemblages enables the dating of postglacial sedimentary sequences in northern Ethiopia to the late Ordovician/early Silurian for the first time. The detailed sampling in two continuous surface sections allows insights into the evolution of terrestrial plants in environments developing after the retreat of the glaciers.

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E2: Sedimentary records of events and environments Talk
Post-Hirnantian,