

## Neoproterozoic weathering crust of Baltic Basin

SOMELAR, P., KIRSIMÄE, K., LIIVAMÄGI, S., VIRZAVA, I. AND KIRS, J.

*Tartu University, Department of Geology, Ravila 14a, Tartu, Estonia. psomelar@ut.ee*

Understanding Precambrian palaeosol profiles provides important and direct evidence of the past climate (temperature, precipitation), atmospheric composition ( $p\text{CO}_2$ ,  $p\text{O}_2$ ) and (microbial)biota. The Neoproterozoic, ca 560–600 Ma old weathering crust is widespread under the Ediacaran-Phanerozoic sedimentary cover at the southern margin of the Baltic Shield, Baltic paleobasin. The palaeosol marks an unconformable contact of peneplained Palaeoproterozoic–Mesoproterozoic metamorphic-plutonic rocks and overlying unmetamorphosed Ediacaran sandstones–claystones. Palaeosol profiles were developed on apleo-Mesoproterozoic crystalline basements - rapakivi granites, sillimanite-cordierite and biotite-amphibole gneisses, amphibolites in the northern part and pyroxene and amphibole gneisses in the southern part of the area. Palaeosol is accessed in more than 100 drillcores where the thickness of the alteration profiles varies from few meters to exceptional 152 m on fractured-faulted sections of aluminous parent rocks. Palaeosol is preserved unmetamorphosed, but probably slightly modified by diagenetic illitization and uppermost part of most weathering profiles is partially eroded. Studied palaeosol profiles are characterized by three well-developed alteration zones starting from ca. 7 m thick reddish colored lateritic zone composed of kaolinite (~30-60wt %), Fe-oxyhydroxide and some residual quartz. Middle zone ca. 10-30m where the rock structures are preserved but primary minerals are replaced by secondary minerals is dominated by quartz, K-feldspar, micas, illite and illite-smectite. In the lowermost zone, where original rock structure is still preserved and weathering can be detected only in fractures, is dominated by parent rock amphibole–plagioclase assemblage. This kind thick, well preserved lateritic kaolinite-rich weathering profile with hematite/goethite rich duricrust is similar to modern oxisols and most likely formed in warm and humid climate.