Comparison of 2.45 b.y.-old paleosol with 1.34 b.y.-old one developed on granite and the estimation of PO2 in the atmosphere

Satoshi Utsunomiya[1], Masami Nakada[2], Takashi Murakami[1]

[1] Mineralogical Inst., Univ. of Tokyo, [2] Dep. Materials Sci., JAERI

The purpose of this study is to examine a paleosol (paleo-weathering soil) developed before 2.0 Ga with that after 2.0 Ga and to estimate oxygen levels at the two era. Samples are Pronto paleosol (2.45 Ga) and Enterprise paleosol (1.34 Ga), Ontario, Canada. The Pronto profile consists of fresh granite, chlorite-rich zone and sericite-rich zone towards the upper part, whereas in the Enterprise profile, a large amount of Fe-oxides and sericite exists and chloritized biotite is depleted at the upper portion. Fe/Ti decreases at the upper portion of the Pronto profile, whereas the ratio increases at the upper portion of the Enterprise profile. The compositions of the atmospheres are estimated to be $PO_2 < 0.3 \times PCO_2$ for the Pronto paleosol and to be $PO_2 > 32 \times PCO_2$ for the Enterprise paleosol.