

2.45 b.y.-old paleosol of mafic volcanics and the partial pressure of oxygen

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To estimate the oxygen level in the atmosphere and to elucidate the weathering process of mafic volcanic rocks in the Archean, we examined paleo-weathered rocks (paleosol) from Cooper Lake, Ontario, Canada. There are quartz, chlorite, pyrite and albite at the lower portion, whereas there is a large amount of sericite without chlorite, albite and pyrite at the upper portion. The bulk chemical composition shows that Ca, Mg, Fe decreased and K increased at the upper portion. The composition of atmosphere at 2.45 Ga is evaluated to be $PO_2 < 0.2 \times PCO_2$. If the maximum PCO_2 at 2.45 Ga is 0.04 atm by Rye et al. (1995), the maximum PO_2 is estimated to be 0.008 atm. The maximum PO_2 is about 4 percent the present value and higher than the maximum PO_2 given by Rye and Holmd (1998).