



Paleosols and composition of the late archean atmosphere

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The 2.77Gy old Mount Roe basalt paleosol at Whim Creek, Pilbara craton, Western Australia, is a reference weathering profile, used for constraining maximum concentrations of atmospheric oxygen and greenhouse gases (CO_2 , CH_4) during the late Archean. This paleosol is developed at the top of a vesicular, subaerial basaltic flow exposed along two km-scale horizons located about 5 km away from each other. It mainly consists of fresh foot-wall basalt progressively grading to a 5 meters thick brecciated chloritic-rich zone showing evidence of corestone weathering. The chloritic-rich zone is overlain by a 5 meters thick sericitic-rich zone. Bedded-parallel deposits of diaspore/pyrophyllite containing carbonaceous material were found in the sericite zone of the Mount Roe #2 horizon. These deposits have already been described roughly at the same stratigraphic level in the Mount Roe #1 horizon, about 5 km away. The origin of these deposits is not clear; however, field observations such as the occurrence of spherical diaspore/pyrophyllite zones within the sericite might suggest that they are preserved remains of a later metasomatic event. Micro-mineralogy and fluid inclusions analysis are in progress in order to test this hypothesis. Preliminary Raman spectroscopy analyses indicate that organic matter is well preserved and did not experience high remobilisation.