



Neogene weathering and terrestrial sedimentation in southern New Caledonia; inference on post-obduction tectonics and climate change

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Iron-rich sediments that fill up karst-like depressions and paleo-valleys in southern New Caledonia are mainly composed of re-sedimented laterite and saprolite. These fluvial sediments come from the erosion of an older regolith that developed upon peridotites and gabbros of the Peridotite Nappe during Late Oligocene times. At the bottom, conglomeratic facies fill incised valleys and contain some metre-size cobbles of ferricrete that record dissection of pre-existing weathering profiles and were deposited in alluvial fan environment. The basal conglomerate is overlain by sand, then dominantly silty fluvial sediments 40 to 50 m thick, with a few thin conglomerate channels. Brutal grain size reduction suggests that erosion was short-lived and followed by quiescence.

Multiple interbedded ferruginous duricrusts and rhizocretions made of goethite (and secondary hematite) and liesegang rings reveal iron mobility and several iron oxi-hydroxides concretion/ cementation episodes alternating with sedimentation, probably as a consequence of water table variations. The top of the succession is overlain by a weathering profile and capped by a nodular lateritic ferricrete.

Finally, reactivated erosion profoundly incised the fluvial succession and locally reached the bedrock which today crops out upstream along the main river beds.

In southern New Caledonia some ferricretes and ferruginous duricrusts have been dated at -25 Ma and -20 to -10 Ma by paleomagnetic method (in progress). They could be correlated to some warming events of the Late Oligocene and Early Miocene or to the Middle Miocene Climatic Optimum. Erosion that predates the accumulation of terrestrial sediments may be tentatively correlated to the uplift that accompanied the emplacement of the Saint-Louis and Koum plutons, and some internal dissection episodes could be related to the Lower Miocene post-obduction slab break off. The final erosion is most probably related to the southward tilt of New Caledonia due to Recent SW Pacific tectonics and to sea level drops during the Quaternary as well.