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Can we use the planation surface concept to reconstruct the morphogenesis of New Caledonia,? First low temperature thermochronological data

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Nickel ore deposits of New Caledonia are formed in thick laterites and ferricretes developed on peridotites. Formation of this regolith remains unclear but combines stable phases with weathering profile development and preservation and mobile phases with regolith dismantling and fluvial sediment deposition. Between the the Upper Eocene obduction of the Peridotite Nappe and today with still active weathering profiles, timing of of the weathering and erosion processes is not constrained.

Recent studies have proposed a geomorphologic classification of planation surfaces and inferred scenarios of vertical deformation and morphogenetic evolution by applying the planation surface concept, previously used for stable cratons (western Africa, Australia or Brazil-Guyana). However, considering the absence of absolute dating and continuous stratigraphic relationship in the new-caledonian regolith, and the geodynamic context of the Norfolk ridge close to a subduction zone, much less stable than the old cratons, the use of this concept appears unrealistic.

Therefore Apatite Fission Track and U-Th/He thermochronology has been applied on all available granitoids intruded into the Peridotite Nappe. Among 14 samples collected, only 5 yielded apatite crystals and 3 gave interpretable results. Given the analytical error, the thermochronological ages obtained for the Koum and Saint Louis post obduction granitoids are similar to their absolute radiometric ages, i.e. 30 to 25 Ma. This suggests a very rapid exhumation after their formation and thus an important uplift. Detailed study and datings of the new-caledonian regolith should further help to reconstruct its recent evolution and the morphogenesis of 'Grande Terre'.