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First Cenozoic ages from the Roraima's region landscape (Northern Brazil): insights from hematite and goethite (U-Th)/He dating

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Lateritic profiles result from weathering processes involving coeval warm temperature and high precipitation seasons rates in intertropical context. Through geological times, the laterite will develop and an indurated duricrust iron oxide enriched horizon may develop on the profile top. The duricrusts can be used as excellent lateritic surface markers, that can be preserved from erosion. Nevertheless, the relationship between the timing of their development, the geomorphology and the processes involved are still debated.

To this end, we have investigated duricrusts of the large Roraima plateau, in the Guyana shield, Northern Brazil, attributed to the "Gondwana" surface of purported "Jurassic-Cretaceous" age. Four duricrust samples have been collected from ~840 to 950 m.a.s.l in the same area, with both 1.9 Ga sandstone and 1.75 Ga gabbro as parent rock respectively. The duricrust samples exhibit different textures, including pisoliths and massive banded type textures.

Samples mineralogy have been characterized using classical methods such as optical properties, texture and DRX. Several generations have been finally identified. The SEM analysis revealed different porosities and microstructures. Each identified generation collected has been dated by the (U-Th)/He method using micrometric aliquots.

All the samples present quite homogenous dated generations, presenting mostly Paleocene/Eocene as well as early and late Miocene ages. In addition, oldest identified generations in the pisolithic sample suggest remaining of older Cretaceous weathering event. Our geochronological results are not directly correlated to the sample altitudes but more likely to the duricrust structure. Finally, the (U-Th)/He age distribution reveal that the Roraima landscape underwent several weathering episodes in the Cenozoic times and are younger than initially supposed.