

Dating Fe-duricrusts of Central Amazonia (Brazil) by (U-Th)/He and electron paramagnetic resonance methods

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Ferruginous, lateritic duricrusts represent landmark levels attesting major phases of weathering and erosion in geomorphological sequences of tropical landscapes. Their dating is an important task for the modeling of continental surface evolution, particularly in world-class areas such as the Amazon basin, where up to five planation surfaces have been recognized mainly through relative inferences. To improve the weathering/erosion chronology of this region, we focus on the dating of millimetric pisoliths from ferruginous duricrusts located in central Amazonia (Brazil), by coupling detailed mineralogy, geochemistry and two relevant dating methods: (i) the (U-Th)/He analysis of individual iron oxide pisoliths; (ii) the analysis of radiation-induced defects of kaolinites trapped in duricrusts. Three samples with different elevations in the landscape were selected. The goethite ages in the landscape range within $0.9 \pm 0.1 - 12.7 \pm 0.6$ Ma and consistently increase with elevation. The sample with the oldest age is heterogeneous and corresponds to several phases of formation. The ages for kaolinites are within $1.7 \pm 0.8 - 16.7 \pm 6.5$ Ma, which suggests a plausible scenario of laterite formation predating duricrust formation. The results allow discussion in terms of geodynamic and paleoclimatic events and show a general Miocene weathering episode, the youngest ages coinciding with the quaternary Paraguaçu planation period. In addition, data allow the calculation of erosion rates that can be compared to the previous estimates for the region or other continental surfaces.