

CHARACTERIZATION OF DURICRUST PALEOSURFACES WITH STABLE ISOTOPES AND PALEOMAGNETIC SIGNATURES

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Lateritic paleosurfaces of the Cayenne region (French Guiana) were investigated for their stable isotopes and paleo-magnetic properties. Three main surfaces were identified. The highest elevation paleosurface (unit 1) is readily distinguished from the two other surfaces in that it has bauxitic attributes. Unit 2 and 3 are ferruginous duricrusts which are mostly characterized by a high goethite content in unit 2 and a high kaolinite content in the lowest unit 3. Weathering goethite, hematite, gibbsite and kaolinite were microdrilled from a variety of pedogenic microfacies (matrix, nodules, cortex, cutane,...) for ^{18}O analysis. Calculated equilibrium ^{18}O values of mineral forming water at 25°C (present-day average climatic temperature) for all weathering minerals show consistent values in a same duricrust unit. Weathering minerals in unit 3 are formed from water isotopically identical to present-day meteoric water. Equilibrium waters of minerals in unit 2 and 1 are respectively depleted of 1-2 ‰ and 2-3 ‰. This is interpreted as reflecting a distinctly more moosonal nature of paleoclimate of the Guiana region. Paleomagnetic results are consistent with the results of isotopic and geomorphologic studies. Chemical remanent magnetization is systematically carried by hematite. The 3 duricrust units show distinct paleomagnetic directions, with unit 1,2 and 3 average directions indicating an hematite age ranging respectively around 40-50 Ma, 10-20 Ma and 5-10 Ma. Our results show that duricrust can be considered as closed systems preserving the original record of their formation conditions and can, thus, be used as paleoclimatic and geomorphologic proxies.