

PALEOMAGNETISM AS A TOOL FOR DATING AND QUANTIFYING WEATHERING PROCESSES ON THE GUYANA AND THE WEST AFRICAN SHIELDS

H. Théveniaut and P. Freyssinet BRGM, BP 6009 Orléans Cedex 2, France

A paleomagnetic and magnetostratigraphic study was carried out on distinct lateritic and bauxitic paleosurfaces identified in French Guiana (Cayenne area, 3 surfaces), Suriname (Moengo surface and Bakhuis surface) and in Guinea (Léro mine, 3 surfaces). These surfaces were characterized for their geomorphological, mineralogical and geochemical properties. The highest and thickest profiles are supposed to be the oldest while the lowest and thinnest profiles are supposed to be the youngest. Based on the fact that a chemical remanent magnetization is acquired by hematite during the weathering process, 500 samples were taken from sites and profiles of the different surfaces in South America and West Africa. The paleomagnetic results show that the South American duricrusts are magnetically marked by a polyphasing of the duricrust formation process that can be dated at around 60, 45, 10-20 and 5-10 Ma. The Guinean duricrusts are inversely dominated by mechanical reworking within the duricrust with no possibility of relative dating. However, the Léro mine saprolite profile preserved at the top a fossil magnetic signature estimated at 60-70 Ma whereas at the bottom part magnetic directions are recent (0-5 Ma). The magnetostratigraphic study of saprolite profiles allows the calculation of saprolitization rates ranging between 11 and 15 m/Ma which are consistent with known weathering rates in tropical environment. These results show paleomagnetism is a powerful tool for studying and dating lateritic weathering processes due to climate changes over the last 100 Ma.