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Influence of lithological variations on the origin of lateritic materials resulting in differentiated tropical landforms

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Spatial relationships between the ground surface topography and the boundaries of lateritic weathering horizons in profiles of south-eastern Senegal have been investigated using the electrical resistivity tomography (ERT) technique. The interpretation of the ERT images has been strengthened by field observations and analytical data obtained from boreholes close to the geo-electrical profiles. Particularly, the micro morphologic patterns of gold particles found in weathering profiles have been used to assess the origin of the lateritic materials.

The influence of distinct lithological settings on the origin of the lateritic weathering materials and on the differentiation of landforms is discussed. In the first investigated area, a post-tectonic granite batholith recovered by stepped lateritic glacis is surrounded by dominant relict relieves of a greenstones belt. The presence of contrasted lithological patterns on a rather small area led differentiation of erosion landforms with significant pronounced slope gradients. Most of ferricrete material capping the granite profiles is inherited from previous lateritic profiles developed on the greenstones, which have been denuded through past erosion processes. In the second investigated area, dolerite dykes, with limited thickness (1 to 10 m), intrude a large syn-tectonic granite massif that has allowed the flattening of a singlewide land surface during erosion periods. Therefore, the absence of well differentiated relieves has limited the lateral transportation and the lateritic profiles have been in situ developed by differentiated weathering processes of the two contrasted rocks. It is shown that the interactions between differentiated lithological patterns and past climatic changes

contribute to shape very contrasted landforms within a same climatic area.