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## LATE CENOZOIC AND PRESENT-DAY HILLSLOPE EROSION DYNAMICS IN A PASSIVE MARGIN CONTEXT: STABILITY OR INSTABILITY? CASE STUDIES IN NORTHEAST BRAZIL

**ABSTRACT:** PEULVAST J.-P. & BÉTARD F., *Late Cenozoic and present-day hillslope erosion dynamics in a passive margin context: stability or instability? Case studies in Northeast Brazil*. (IT ISSN 0391-9838, 2013).

Steep slopes form the marginal scarp of the semi-arid northern Brazilian «Nordeste», above depressions or corridors connected to a low erosion plain merging seaward with a coastal erosional-gradational piedmont. Dissected pediments and sparse debris fans visible at the base of some escarpments suggest recent erosive activity and possible slope retreat during the Late Cenozoic, although most of these forms are decoupled from major valleys. We describe the morphostructural patterns of chosen escarpments, in the crystalline basement as well as in the sedimentary cover, and the morphodynamic conditions of their evolution since the Miocene. Only a few scarps show strong structural control. Many of them are mainly inherited landforms, initiated during the Early Cretaceous rifting or the later margin uplift, a situation which suggests long-term stability. Later on, except in one case (the Araripe scarp), only slight or local backwearing took place, associated with downwearing on low surfaces and pediments, probably in diachronic ways. The Neogene clastic sedimentation on piedmonts and coastal areas mainly reflects the occurrence of dry periods inducing widespread stripping of deep soil horizons and erosion of bare rock slopes and surfaces. Dissection stages occurred in periods of more humid climate and/or low sea level. Marks of strong recent or present activity are mainly registered in the rims of the Chapada do Araripe, owing to favorable structural, hydrogeological and climatic conditions. The moderate volumes of Neogene clastic sediments imply overall low uplift and erosion rates until the Present, favorable to morphological and lithological resistance effects in the landscapes. However, slope instabilities are not uncommon, locally leading to well-characterized processes, landforms and deposits of gully-ing and mass wasting. Therefore, hazards related to slope processes

should never be neglected, although only small-scale events were recorded in recent times, and times of recurrence of larger events are probably much longer than the historic times.

**KEY WORDS:** Tropical geomorphology, Hillslope landforms and processes, Backwearing, Downwearing, Mass wasting, Morphological resistance, Brazil.

### INTRODUCTION

Steep slopes form the marginal scarp of the semi-arid northern Brazilian «Nordeste» and bound inner residual plateaus and ridges rising up to 800-1,200 m (fig. 1). They overlook a low composite surface (the so-called Sertaneja surface) merging seaward with a well-developed coastal erosional-gradational piedmont. Only a few of them coincide with geological contacts and/or fault zones. Their location, their straight or sinuous outlines, and the presence or lack of residual landforms in front of them give indications on their origin and evolution. Recent or active mass wasting landforms, dissected pediments and sparse debris fans visible at the base of some escarpments suggest recent and current erosive activity and possible slope retreat, although most of these forms are decoupled from major valleys. Therefore, the question arises of the age, origin, evolution and stability (or instability) of these scarps, and of the signification of the observed or inferred dynamics in relation with long term trends of evolution. Beyond the indications obtained on types of slope dynamics and on the factors that control their occurrence, this could throw light on duration and more general factors that can explain slope retreat (backwearing) and/or piedmont downwearing outside the main drainage axes, *i.e.* a fundamental issue in the understanding of planation processes and long-term landform evolution in tropical areas. In order to treat these issues in a context where various factors (lithology, neotectonics, climatic and eustatic changes) can be consid-

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*This work was made possible by various collaborations with colleagues from the Universidade Federal do Ceará (Fortaleza, Brazil), the Universidade Federal do Rio Grande do Norte (Natal, Brazil) and the Universidade Regional do Cariri (Crato, Ceará, Brazil). We warmly thank the anonymous referees who helped us to improve the manuscript.*