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The Quaternary Environmental Change in the Northeast of Quintana Roo, Mexico:The Paleopedological Proxies

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The Yucatán Peninsula, located in the southeast part of Mexico, is characterized to be an extended and low altitude platform constituted by calcareous rocks. These rocks are mainly limestones formed since Cretaceous under a marine shelf environment. In the northeast coast, the youngest sediments are found, as products of Quaternary sea level changes. We studied various profiles in quarries, following north-south transect in the Yucatan coast, near Cancún. In such profiles a sequence consisting of different kind of calcareous sediments and a soil in the surface were analyzed. The base of the sequence is constituted by a petrocalcic horizon (calcrete) that was formed during the last interglacial, 125,000 yrs. ago. Under the calcrete, a transgressive sequence appears with calcareous sediments of lagoon and reef facies. The uppermost part consists of dune-like sediments with crossed stratification overlied by another petrocalcic horizon, maybe formed during the Pleistocene-Holocene transition. Soils of the Yucatan Peninsula are very thin, rich in organic matter, neutral and well structured, and their image do not correspond to that found in tropical soils (deep, strongly weathered, leached). They are directly associated with the dune sediment dissolution because are infilling the “space” generated by rock dissolution. Calcrete is always in the uppermost part, but is broken and crossed by soil. This sequence reveals some aspects of the environmental dynamic during Late Pleistocene-Holocene. First, a dryer environment is assumed due to the presence of the calcrete in the base. During the glacial period, a transgressive environment prevailed and marine calcareous sedimentation started. During Last Glacial Maximum a regression occurred, the climate was drier and the formation of dune sediments and another calcrete occurred. In the Holocene climate changed shifting toward more humid conditions that produced the modern soil cover, under tropical conditions.