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Influence of soil forming conditions in the development of the ancient Maya civilization

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Maya civilization, one of the most developed prehispanic society of the Americas, flourished for over a thousand years in the tropical lowlands of southern Mexico before declining for still unknown reasons around A.D. 900, probably associated to climatic changes. However, no strong evidences have been provided to support such consideration. We studied two paleosol sequences located in the Maya region; one in the Yucatán Península, developed from limestones; and a second one, in a volcanic region in Chiapas state (Chichón area), southern Mexico. Although both localities have different site conditions, we selected two-storied profiles (polygenetic) in order to establish soil forming factors and their influence in Maya development. In Yucatán Península, a soil profile formed in the marginal part of the wetland, close to the upland forest, has signs of the overlapping of two different pedogenetic events. The upper unit, similar to wetland Calcisol, is superimposed on a Cambisol, which is typical for upland soil formation. We interpret it as a result of the extension of wetland area, affected by the regular floods towards the territories earlier occupied by the upland forest ecosystem. The timing of this environmental change is unknown. The driving force of this dynamic is also uncertain and could imply climatic change as well as groundwater table rising, related to sea level fluctuations. The data on the stratigraphy of paleosol-sedimentary sequences of the southern Maya Lowlands allows supposing that such changes occurred within the ancient Maya occupation period. In the Chichón area, the soil profile shows contrasting differences between its properties. The upper horizons constitute a pedocomplex, developed in a sequence of pyroclastic sediments formed from different eruptions occurred in 1982, and 550 yr. B.P. and 1250 yr. B.P. How-

ever, these sediments are not sufficient thick neither to separate individual soils, nor to bury the older ones deep enough to isolate them from actual pedogenesis. In this set we detected a typical assemblage of rapid pedogenetic processes, known to develop in the young volcanic sediments under humid climate. Contrary to the overlying unit, the lower horizons have properties related to an advanced humid tropical pedogenesis and weathering which are supposed to operate over longer periods. The set of the soil forming processes detected in both “stories” of this soil corresponds to humid forest ecosystems which thus are supposed to dominate over much longer period, than Late Holocene. In Yucatan area, we found evidences of environmental change, but we are uncertain when it occurred. In the volcanic region, we suppose climate remain more or less stable during the time of Maya occupation. However, it is probable that land use in this region produced a stronger effect to the ecosystem than natural environmental changes.