

QUATERNARY CALCRETE DEVELOPMENT IN THE MERSIN AREA, SOUTHERN TURKEY

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In the Mersin area, Quaternary calcretes are widespread and occur in a variety of forms. Several distinct calcrete profiles are recognized in the area, and subdivided into two major groups of mature and immature profiles. The mature calcrete profiles comprise a generally isolated calcrete horizon at the base and hard laminated crust at the top, and rarely pisolithic crust in the upper-most part. The immature calcrete profiles consist mainly of an isolated calcrete horizon which is rarely overlain by laminated crust in localised areas. In the field, calcrete forms represent three main stages of development: (i) a mottled or plugged horizon, comprising isolated calcrete forms such as powdery, nodule, tube, and fracture-fill; (ii) calcareous crusts, including laminar and hard laminated calcrete crusts; and (iii) a pisolithic crust which is very restricted. The plugged horizon, in which calcite precipitated from downward moving percolating water, reduces the permeability of the host-rocks or sediments. Later, the plugged horizon leads to the horizontal movement of percolating water so that calcareous crusts formed. Finally, a pisolithic crust forms by down-slope movement of the grains and their accumulation in troughs between dome-like structures. XRD, ICP–AES and SEM analyses show that calcrete samples are composed predominantly of calcite, and palygorskite is closely associated with them as a minor constituent. Calcite $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ isotope values of calcrete samples vary between -4.31 to -6.82 and -6.03 to -9.65 ‰ PDB, respectively which indicates formation from percolating meteoric water at or near the surface setting supporting a thin column of soil. Abundance of beta fabric constituents and negative calcite $\delta^{13}\text{C}$ values suggest a pedogenic origin for the calcretes.

Keywords: calcrete, hardpan, nodule, pedogenesis, Quaternary.