Microfaulting by early diagenesis of micritic continental carbonates - dilatant and compactive shear localization (Montpellier area, France)

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Microfaults formed in continental carbonates reveal poorly known mechanisms of shear localization induced by early diagenesis during compaction. These faults are characterized by sinuous shape, bed-controlled, pervasive distribution, no calcite precipitation, and mainly disaggregation processes. Two main sets were described: (1) The first set is composed by normal-sense, high-angle microfaults affecting the top of carbonate beds showing undulating pedogenic bed surface. They show porosity increase and are sometimes organized in polygonal patterns. Their occurrence seems related to overconsolidation of pedogenic surface and density inversion – phreatic loading – fluid expulsion processes in the surficial carbonate bed. (2) The second set is composed by low-angle compactive microfaults with large slickenlines and incipient shear-offset. Their organization within two conjugate systems (normal-sense set and strike-slip set) almost contemporaneous is consistent with a NS extension following the slope induced by the basin subsidence to the south. Their occurrence seems related to vertical loading below few meters depth and occurred by shear-enhanced compaction and incipient pressure-solution process. The presence of such structures gives news information concerning dilatant or compactive shear processes and rheological properties of micritic carbonates during early diagenesis.