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Chemostratigraphy in a Miocene Foreland Continental Basin: A New Appraisal of Timing, Preservation of Depositional Sequences

The lack of biostratigraphic data in nonmarine series brings scarce chronostratigraphic control. We propose to use a $\delta^{13}C$ chemostratigraphy of carbonate-rich paleosols as a new correlation and datation tool to link lacustrine environments, fluvial architecture and coastal plain deposits, distant of tens of kilometers. The studied area is located in the Digne Basin, Alpes-de-Haute-Provence, in south-eastern France. Time period spreads from Upper Oligocene to Middle Miocene, -24 to -11 Ma. The carbon isotopic record is well correlated to marine data with a resolution ranging from 560 Ka to 1.7 Ma for each interval and from 100 to 500 Ka for a single peak. Furthermore combination of isotopic records ($\delta^{13}C$ and $\delta^{18}O$) shows paleoenvironmental conditions characterized by coastal deposits slowly evolving towards inland deposits. In this context, alluvial facies architecture and paleoenvironmental results on several lateral sections help to identify a sequential stratigraphic approach. The chemostratigraphy allows precise correlations of major time-equivalent surfaces despite strong lateral facies variations. Exact timing of these surfaces as well as amplitude of the base-level variations show that the number of sequences identified is comparable to those from other European basins but that timing and amplitude are distorted by tectonic influence. Changes in subsidence rates in this foreland basin is strongly controlled by the alpine thrust sheet development.