

Clay Mineral Assemblages in Shallow Marine Platforms: A Comparison between the Mexican and the Provençal Platforms

Camilo Ponton
cpont001@fiu.edu

On shallow marine platforms, where carbonates predominate on the sediment, changes in clay mineralogy assemblages can provide insight into past environmental conditions, and could be used as a tool for paleoclimatic interpretations. Furthermore, clay assemblages also provide information about the provenance of the sediments and consequently, could have paleotectonic implications.

In NE Mexico, Barremian-Aptian (~120Ma) facies show intercalations of dark grey C_{org} -rich shales and marly limestones, with interbedded conspicuous red to purplish-colored carbonate-poor layers. X-ray diffraction analyses show that overall, the dominant clay is illite with 91 to 99% relative abundance. Low percentages of kaolinite (<2%) indicate arid climatic conditions in the region at the time of deposition, which is consistent with previous studies of the North American Cretaceous Seaway.

In SE France, the Early Aptian facies of the Provençal platform show a rhythmic intercalation of light to dark gray limestones and marly limestones. X-ray diffraction analyses show that the dominant clay mineral continues to be illite, but only with 49 to 58% relative abundance. In this case, kaolinite is fairly abundant with 31 to 39% relative abundance, followed by mixed layered clays (averaging 8%) and chlorite (averaging 5%). This clay assemblage indicates continentally derived sediments from the Massif Central, the major topographic feature of central France, uplifted around 450Ma. Besides provenance, the high kaolinite content indicates relatively humid conditions in continental France during the Early Aptian.

