Diagenesis of the Monte Soro unit (NE Sicily, Italy): complementary features from shales and associated sandstones

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Cretaceous Monte Soro unit (NE Sicily, Italy) consists of several slices, tectonically stacked, of turbiditic successions of alternated shales and sandstones, the former prevailing in the bottom of every sequence, the latter upwards. The composition and the diagenesis of the formation were studied by means of XRD analysis for the fine grained sediments and optical microscopy and SEM analysis for the coarser ones. The whole rock mineralogy of shales was obtained from random powders using the internal standard technique proposed by Srodon et al. (2001) and it's characterized mainly by clay minerals, quartz and feldspars; the clay-sized fraction (<2μm) was analysed performing a best-fit analysis resulting from a linear regression between experimental patterns and calculated profiles obtained by Newmod ©software (Reynolds, 1985); illite and mixed-layered I/S are dominating on chlorite and kaolinite. The <0.5 μm fraction provided fundamental insights for the diagenetic study: the analysis on the diffraction patterns point for the presence of I/S 80-90 with a R1-R3 'Reichweite' ordering index and this led to the suggestion of a high diagenetic grade. Sandstones of the Monte Soro unit can be classified as quartzarenites with quartz >90%; minor and accessory phases are feldspars, lithic fragments (mainly metamorphic) micas and heavy minerals (zircone, tourmaline, rutile). The intergranular fraction is made of quartz cements and clay mineral matrix with subordinate calcite cements (Figure 1A). SEM analysis was focused on cements and showed the absence of authigenic clay minerals which is in contrast exhibit a detrital texture (Figure 1B). Results obtained from the two lithologies point to the reaching of late diagenetic conditions as evidenced by the high illite content in the interstratified I/S and the ordering index in the shales and by the abundant quartz cements of the sandstones. SEM results will be evaluated to interpret the relationships between the shales-sandtones systems and how their interaction led to the actual diagenetic features.

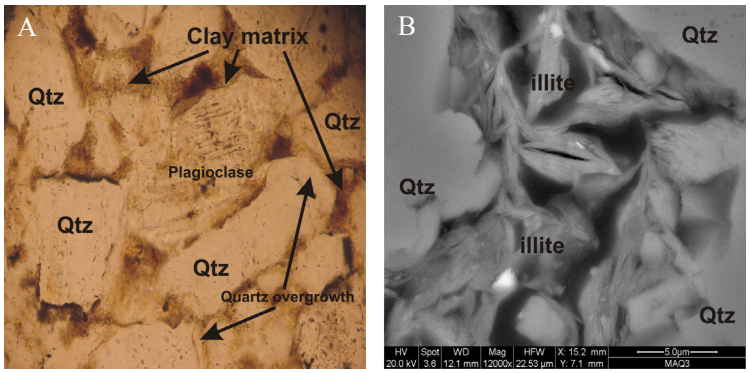

FIGURE 1.

References

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