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DIAGENETIC PATHS IN A LOW SUBSIDENT TRIASSIC BASIN: NW ZONE OF IBERIAN RANGE, SPAIN

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Triassic deposits in the Iberian Range consist of the classic Germanic facies (detrital Buntsandstein, dolomitic Muschelkalk and lutitic-evaporitic Keuper). In the Iberian Range, Triassic Basins are related to an intracratonic rifting phase that generated NW-SE trending troughs (*i.e.* Arche & López-Gómez, 1996). Buntsandstein facies consists of fluvial red-beds mainly deposited in alluvial fans systems developed along the troughs (Sopeña & Sánchez-Moya, 1997). During Buntsandstein deposition different rates of subsidence produces strong lateral variations in thickness of the sedimentary record. The more subsident troughs were filled up by more than 1000 m of clastic deposits. However, Buntsandstein is near 100 m in thickness at the western margin of the basin. Diagenetic processes in the more subsident troughs have been reported by several authors (*i.e.* Arribas, 1984, 1987; Marfil & Buendía, 1980). However, little is known about these processes in the low subsident marginal areas of the basin. Particularly this paper is concerned with the western margin of the Castellana branch of the Iberian Range, close to Albendigo and Palmaces de Jadraque localities (Guadalajara province).

In the study area, Buntsandstein deposits (80 m thick) are mainly composed by arkoses associated with conglomerates and siltstones. They are arranged in four lithostratigraphic units which boundaries mainly represent important tectonic reactivation events. These units can be associated to the tectonic system tract of Prosser (1993), and Sopeña & Sánchez-Moya (1997). Sedimentation took place in alluvial systems where stacking canalized conglomerates and sandstone facies correspond to low sinuosity braided deposits. In the upper lithostratigraphic units, channels evolve to meandering, exhibiting lateral accretion surfaces on top. Interbedded silty clays represent flood plain deposits, appearing associated with sandy overbank deposits and paleosols. Quarzofeldspatic petrofacies (mean of $Q_{m_{56}}F_{42}R_2$) of sandstones is related with the erosion of coarse grained rocks (granitoids and gneisses) from the Hesperian Massif. In addition, sedimentary (Permian) and metasedimentary rocks (pre-Hercynian basement) are deduced as contributors of pebble and sandy supplies (Ochoa, 2002).

The analysis of the diagenetic features in sandstones was followed mainly using common petrographic methods, cathodoluminescence and SEM petrography, and microprobe analysis.

The eodiagenesis is characterized by a mineral-diagenetic sequence that includes the following cements: (1) illite pore lining, (2) Fe-oxides, (3) kaolin pore filling, (4) K-feldspar overgrowth and poikilitic dolomite. The last two cements are widely developed on sandstones, whereas the formers are scarce and appear locally. This mineral succession represents a great variability of pore water nature during the early eodiagenesis, evolving finally to clear alkaline conditions during the latest eodiagenetic cements. Mechanical compaction acts on sandstones, reducing the intergranular volume when dolomite was not precipitated. Eodiagenesis can be associated in time to deposition of Muschelkalk, Keuper and probably early Jurassic, due to the marine (alkaline) character of pore waters. Mesodiagenesis is not intense and is characterized by (6) quartz overgrowth following by (7) scarce dolomite. Illite epimatrix from K-feldspar is also associated to deep burial during mesodiagenesis. Mesodiagenesis is probably related to Jurassic times. During telodiagenesis and uplift, influx of meteoric pore water produces several processes as: (8) dolomite and K-feldspar dissolution (9) kaolin pore filling and (10) dedolomitization and cementation of Fe-oxides. Dissolution was very intense mainly on sandstones from thick stacking-canalized bodies.

Paths in porosity reduction by compaction and cementation (COPL and CEPL of Luudegard, 1992; respectively) indicates four diagenetic stages: (1) Loss of porosity by early mechanical compaction; (2) Early cementation (K-feldspar and dolomite); (3) dissolution of cements and K-feldspar and (4) framework collapse by re-compaction. These stages are manifested by the presence of two types of sandstones. Type I sandstones maintain high values of intergranular volume that consists of cements and even secondary porosity. Type II sandstones are characterized by great compactional porosity loss, exhibiting low values of intergranular volume. Type II sandstones are the result of dissolution and re-compaction of type I sandstones. Thus, an intermediate telodiagenetic phase is deduced. This diagenetic phase is related to the sharp angular unconformity between Lower Cretaceous strata and underlying sediments. This unconformity is widely developed on a regional scale and represents the influx of meteoric waters in the Buntsandstein clastic record during Lower Cretaceous times, provoking drastic K-feldspar and dolomite dissolution. Thus, mechanically unstable framework collapsed during Upper Cretaceous compaction, generating type II sandstones. Finally, diagenetic patterns permit to establish relationships between marginal and depocentral areas of the Triassic Basin in the Iberian Range. The substantial difference between both areas is focused on the low intensity of mesodiagenetic processes that affect marginal sandstones.

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