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Triassic and Liassic Paleoenvironments during the Central Atlantic Magmatique Province (CAMP) Effusion in the Moroccan Coastal Meseta: The Mohammedia-Benslimane-El Gara-Berrechid Basin

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Abstract : During the Early Mesozoic, the northwestern part of the African continent was affected by initial fracturing associated with the early stages of the opening of the Central Atlantic (Atlantic Rift). During this rifting phase, the Moroccan Meseta experienced an extensive tectonic regime. This extension favored the formation of a set of rift-type basins, including the Mohammedia-Benslimane-ElGara-Berrechid basin. Thus, it is essential to know the nature of the deposits in this basin and their evolution over time as well as their relationship with the basaltic effusion of the Central Atlantic Magmatic Province (CAMP). These deposits are subdivided into two large series: The Lower clay-salt series attributed to the Triassic and the Upper clay-salt series attributed to the Liassic. The two series are separated by the Upper Triassic-Lower Liassic basaltic complex. The detailed sedimentological analysis made it possible to characterize four mega-sequences, fifteen types of facies and eight architectural elements and facies associations in the Triassic series. A progressive decrease observed in paleo-slope over time led to the evolution of the paleoenvironment from a proximal system of alluvial fans to a braided fluvial style, then to an anastomosed system. These environments eventually evolved into an alluvial plain associated with a coastal plain where playa lakes, mudflats and lagoons had developed. The pure and massive halitic facies at the top of the series probably indicate an evolution of the depositional environment towards a shallow subtidal environment. The presence of these evaporites indicates a climate that favored their precipitation, in this case, a fairly hot and humid climate. The sedimentological analysis of the supra-basaltic part shows that during the Lower Liassic, the paleopente after basaltic effusion remained weak with distal environments. The faciological analysis revealed the presence of four major sandstone, silty, clayey and evaporitic lithofacies organized in two mega-sequences: the sedimentation of the first rock-salt mega-sequence took place in a brine depression system free, followed by saline mudflats under continental influences. The upper clay mega-sequence displays facies documenting sea level fluctuations from the final transgression of the Tethys or the opening Atlantic. Saliferous sedimentation is therefore favored from the Upper Triassic, but experienced a sudden rupture by the emission of basaltic flows which are interstratified in the azoic salt clays of very shallow seas. This basaltic emission which belongs to the CAMP would come from a fissural volcanism probably carried out through transfer faults located in the NW and SE of the basin. Their emplacement is probably subaquatic to subaerial. From a chronological and paleogeographic point of view, this main volcanism, dated between the Upper Triassic and the Lower Liassic (180-200 MA), is linked to the fragmentation of Pangea and managed by a progressive expansion triggered in the West in close relation with the initial phases of Central Atlantic rifting and seems to coincide with the major mass extinction at the Triassic-Jurassic boundary.

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