Early Mesozoic detrital and evaporitic synrift series of the Mohammedia–Benslimane–ElGara–Berrechid basin (western Meseta, Morocco): sedimentary and palaeoenvironmental evolution and comparison with the basins of the northeastern American Margin

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In the early Mesozoic, the northwestern part of the African continent was affected by initial breakup associated with the early stages of opening of the Central Atlantic (Central Atlantic rifting). During this phase the Moroccan Meseta was subjected to an extensional tectonic regime. This extension has led to the opening of a set of rift basins including the Mohammedia–Benslimane–ElGara– Berrechid basin (MBEB), the focus of this study.

Sedimentological analysis, which is the objective of our work, has shown that during the synrift phase (Upper Triassic–Lower Jurassic) the MBEB basin is characterized by detrital and evaporite sediment filing. This study made it possible to characterize fifteen types of facies and eight architectural elements and facies associations. A gradual decrease of palaeoslope over time led to the evolution of paleoenvironments during this filling from a proximal alluvial fan system to braided rivers, and then to an anastomosing system. These environments eventually evolve to an alluvial plain associated with a coastal plain where playa lakes, mudflats, and lagoons developed. The pure and massive halitic facies at the top of the series probably indicates evolution of the depositional setting towards a shallow to deep subtidal environment. The presence of evaporites indicates a hot and arid climate that favored their precipitation.

This work allowed a comparison of the sedimentary series of this basin with those of the northeastern North American margin. With respect to sediment-filling history, the southern and central parts of the North American basins resemble the Moroccan Atlasic basins as well as the basal detrital formations of the Mesetian and Moroccan Atlantic margin basins. These basins are characterized by continental sedimentation during the Upper Triassic (fluvial deposits interbedded with lacustrine and playa deposits). The North American basins also have similarity with our study basin and other basins of the Moroccan Atlantic margin in the presence of evaporites.

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