Triasic Rupture And Liasic Marine Invasion In The Lusitanian Basin (Portugal) – A Shift From Tectonic To Thermal Subsidence

R.P. Pena dos Reis[1], N.L.V. Pimentel[2], and A.J.V. Garcia[3]
[1] Dep.Ciências Terra, C.Geociências FCT, U.Coimbra. Lg. Mq. Pombal, 3049 Coimbra
[2] Dep. e Centro Geologia, FCUL. Campo Grande C-6. 1749- 016 Lisboa
[3] Núcl.Est.Rec.Nat./D.E.A., Univ. Federal de Sergipe, Aracaju-SE

The Lusitanian Basin is a peri-atlantic basin, related to the opening of the Northern Atlantic. The first rifting phase is related to the beginning of crustal stretching and Pangaea break, initiated on Upper Triassic (Carnian) along late-variscan basement fractures, oriented mainly NNE-SSW. Several listric fault movements defined multiple grabens and semi-grabens filled up by alluvial clastics, laterally digitating with clayey and evaporitic deposits.

The first triasic sequence is composed of coarse deposits of fans and ephemeral rivers, grading to silts and clays deposited at shallow lacustrine and evaporitic environments, defining a retrograding succession. The second sequence is composed of coarse to fine sands, deposited by braided rivers in a broad alluvial plain, grading upwards to pelitic and thin dolomitic facies, wich present an overall onlap geometry. Thickness variations of these two sequences suggest lateral shifting of depocentirc areas and geometries of basement onlaping by the triassic deposits.

A third sequence is initiated by a thin flux of siliciclastics, rapidly passing to clays with evaporitic layers and dolomitic limestones with an Hetangian poor fauna. In some depocentric sectors of this basin, with shallow lagoons and peri-tidal sabkhas, hundreds of meters thick evaporitic deposits with gypsum, halite and clays were accumulated.

These deposits have been covered by tens of meters of dolomitic limestones with marly intercalations and a rich marine fauna of Sinemurian age, associated to the beginning of the post-rift subsidence. A low-energy carbonate ramp has been installed thereafter, rapidly opening to a deep marin influence in the Pliensbaquian, as a result of significant thermal subsidence throughout the Lower Jurassic.

All this evolution has taken place at the Lusitanian Basin in around 30 Ma, showing a good example of rapid shifting from tectonic to thermal subsidence in a peri-atlantic basin.

Key words: Triasic, Liassic, Portugal, Subsidence