# [PS]An Analogue Study of Petroleum Systems: West Iberian Basins vs East European Basins*

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## Abstract

The purpose of this article is to describe the stratigraphy, sedimentology and evolution of the petroleum systems in the West Iberian Basins and to highlight the correlation with the petroleum systems in the East European Basins, especially those formations affected by the salt tectonics. The data used in this article comes from original research and field observation as well as published papers and technical reports. Petroleum systems elements include Palaeozoic and Mesozoic source rocks, siliciclastic and carbonate reservoir rocks, and Mesozoic and Tertiary seals.

There are both similarities and differences between the Western Iberian Basins and the East European Basins, the differences being mainly related to the later onset of the main rift phase in the East European basins, which was accompanied by Neogene subsidence and burial. Traps are, in general, controlled by diapiric movement of the evaporites during the Late Jurassic (Western Iberian Basins), Late Cretaceous and Late Miocene (both basin systems). Organic-matter maturation, mainly due to rift-related subsidence and burial, is described together with hydrocarbon migration and trapping.

In the East of the Alpine-Carpathian-Dinaric orogenic system, hydrocarbon traps are formed by domes and dome-like anticlines, as well as by stratigraphic traps. The domes were created by salt diapirism, which was probably induced by the rapid burial of the evaporitic layer at the base of the middle Miocene sedimentary sequence. The stratigraphic traps are a result of facies changes related to Molasse sedimentation that is characterized by a thick sequence of ungraded, crossbedded sandstone, shale and marlstone. On the other hand in the Western Iberian Basins we can identify three main petroleum systems, sourced, respectively, by Palaeozoic shales, Lower Jurassic marly shales and Upper Jurassic marls.

The unconformities recorded in the Iberian sedimentary basins can be correlated with episodes of compression between Iberia, Eurasia and Africa. The sedimentary record of the major basins includes continental units in the interior, which progressively pass to marine sedimentation in areas closer to the present coastlines of the Atlantic and the Black Sea,respectively, reflecting various paleogeographic, tectonic, climatic and eustatic events.

In conclusion, this article has shown the many similarities as well as the differences between the basins located in the Western and Eastern extremities of the Alpine-Carpathian-Dinaric orogenic system using data from both geophysical prospecting (2D and 3D seismic interpretation) and well logging, as well as published papers on stratigraphy, sedimentology and petroleum systems in the studied areas.

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# An analogue study of sedimentary systems: West Iberian Basins vs East European Basins

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## Abstract

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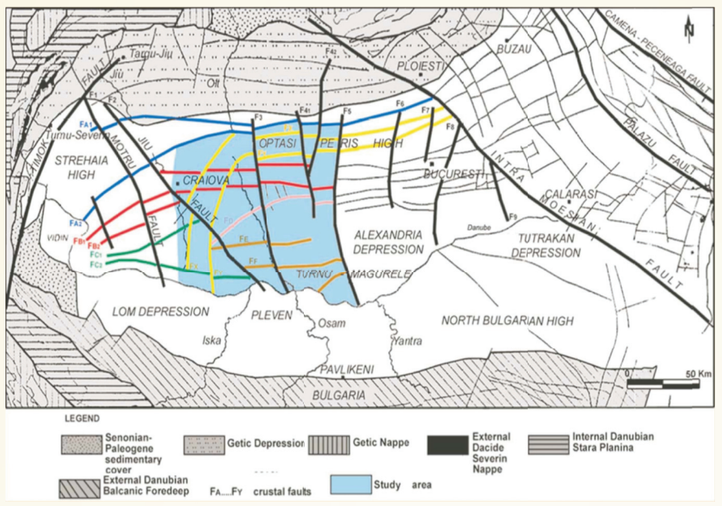


Fig.1. Tectonic sketch map of the Moesian Platform (after Tari et al., 1997)

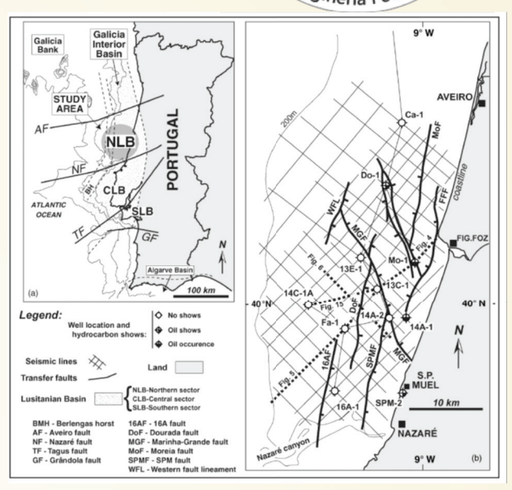


Fig.2 Location of the Lusitanian Basin (after Alves T.M., 2003)

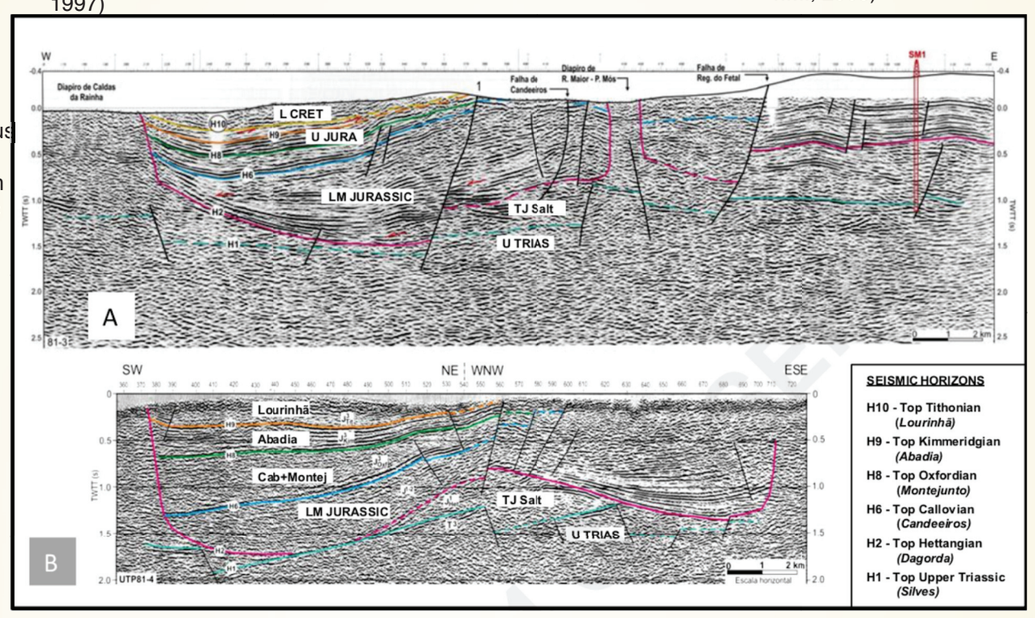


Fig. 3. Interpreted seismic lines across the Lusitanian Basin (from Carvalho, 2013)

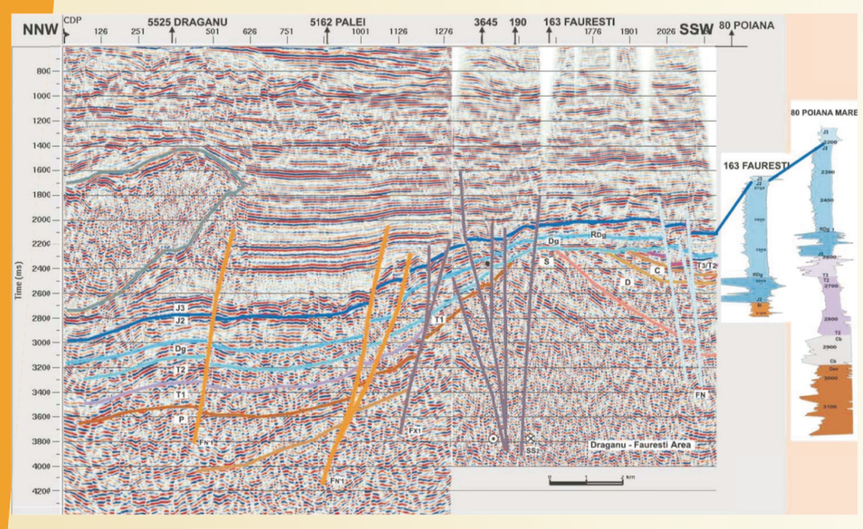


Fig.4. Interpreted seismic profile across Draganu-Fauresti Area, showing formations of Getic Depression thrust over Moesian Platform and the highly eroded Fauresti Horst with scarp splay fault of the strike-slip, tilted and rotated blocks and syndepositional normal faults. (after Stan, 2003)

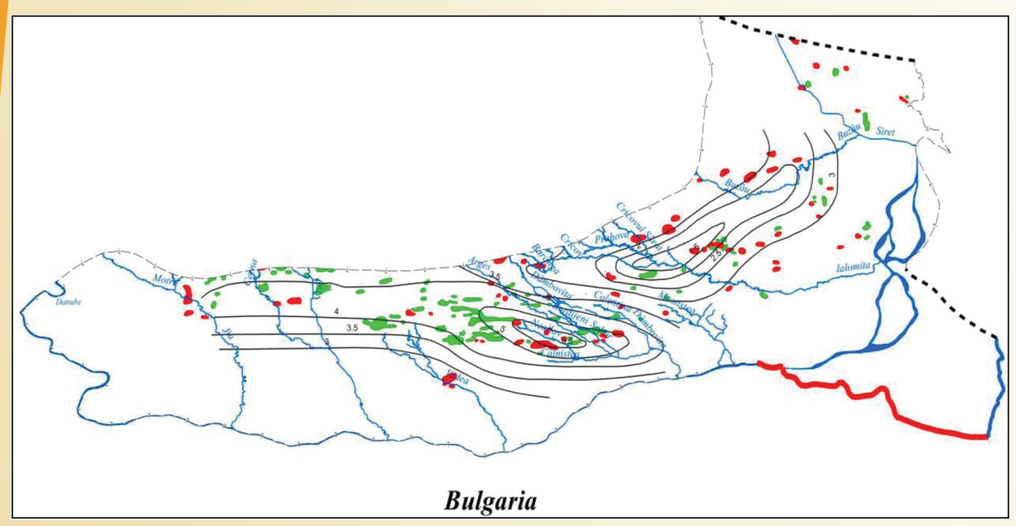


Fig. 5. Oil and gas fields and geothermal gradient curves in the Moesian Platform (modified after Paraschiv, 1979).

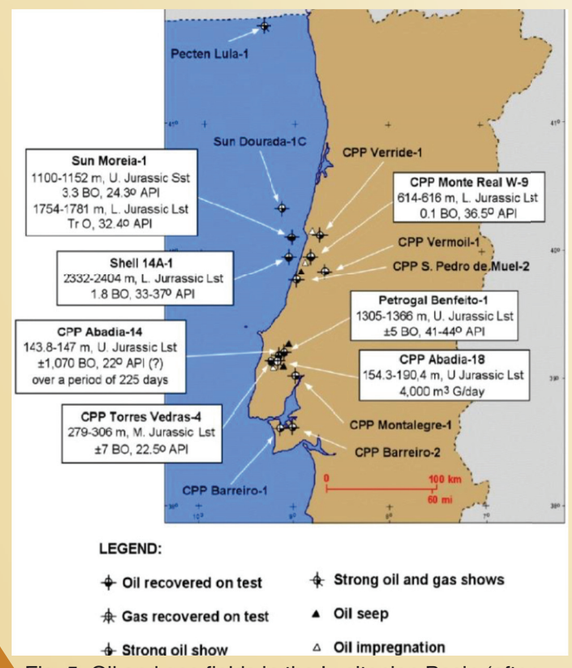


Fig. 5. Oil and gas fields in the Lusitanian Basin (after Pires Pedro, 2014)

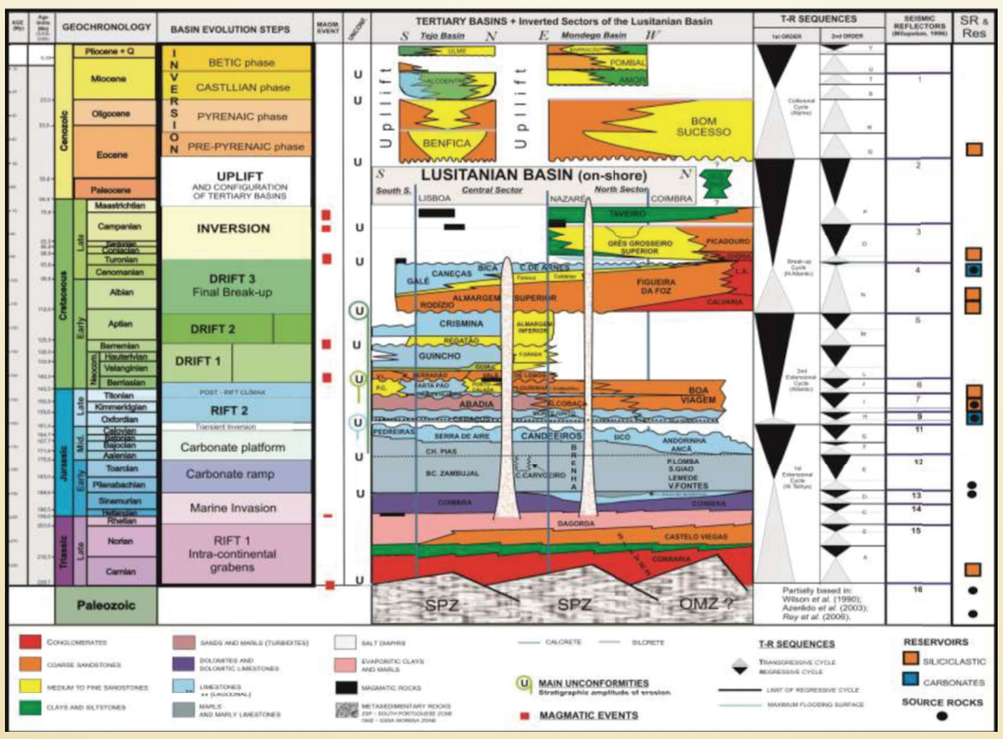


Fig.6. Lusitanian Basin – Sedimentary infill (after Pena dos Reis et al., 2011).

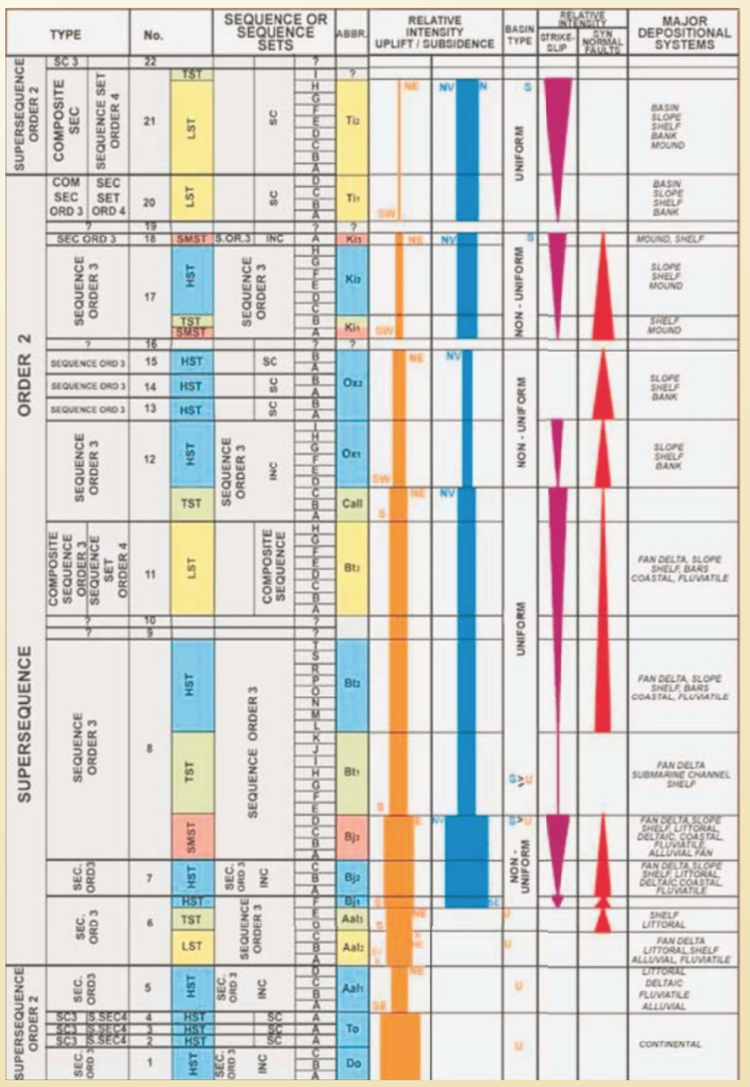


Fig.7. Jurassic tectonic and eustatic events on the Moesian Platform (after Stan, 2003).

## Conclusions

In conclusion, this paper attempts to create an "analogue study" from a tectonic, stratigraphic and evolutionary point of view of two basins situated at opposite sides of the Alpine-Carpathian orogenic system. The most important similarity being that of the tectonic evolution, especially the results of the Mesozoic extensional conditions and Tertiary compression.

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