

Outcrop Analogues in the Western Iberian Margin, Northeast Atlantic

Rui Pena dos Reis¹ and Nuno Pimentel²

¹Centro de Geociências, Universidade de Coimbra, Coimbra, Portugal.

²Instituto Dom Luiz, Faculdade de Ciências, Universidade de Lisboa, Lisboa, Portugal.

ABSTRACT

The Northeast Atlantic is a well-known petroleum province, including some of the most prolific Atlantic areas, intensively explored and productive along the coasts of the UK and Norway. However, more towards the South, the Irish and Celtic Seas, and the Western Iberian Margin, only recently witnessed increasing interest and its potential is yet to be fully confirmed. To address the complexity of these promising areas, it is crucial to have access to good data and to build-up good geological models. These models will be the guidelines for most of the discussions and interpretations which are supposed to occur all along the exploration pathway, from the definition of Plays until the location of Prospects and eventual drilling. The possibility to have real access to the petroleum system elements such as source-rocks, reservoirs, traps, etc. is therefore an invaluable tool to de-risk all the exploration and production phases. The Lusitanian Basin is the only fully outcropping North-Atlantic basin, exposing the whole Mesozoic sequence, due to the alpine up-lift which resulted from the Iberia-African plates' collision. From the first Triassic red-beds and evaporitic clays, to the last sealing Late Cretaceous carbonates and clays, this long-lived and complex evolution spanned over more than 100 my and is represented by over 4 km thick sediments, which may be observed in many outcrops along the basin. Moreover, the basin has at least two active petroleum systems which may be used as a good analogue for other similar basins. The abundant and large-scale outcrops of the Lusitanian Basin, most of them along costal cliffs, allow to understand the controlling factors of the evolution of the basin within its geodynamic framework. Several Rift and Sag phases, Drift and Inversion are well defined and may be observed. Different petroleum-system related features may be analyzed, such as: i) source-rocks (Pliensbachian and Callovian); ii) reservoirs (siliciclastics and carbonates); iii) seals and traps (stratigraphic and structural); iv) piercing diapirs and salt-walls (and its associated thickness/facies controls); v) depocenters and its control on maturation. All these observations may be matched with abundant (mostly vintage) seismic lines and well-data. This contribution is intended to show the potential of the Lusitanian Basin as an analogue for other Northeast Atlantic basins, as well as for the conjugate margins of the North-American continent.