

Exploration insights of the deep offshore West Iberian Margin in the context of the Central and North Atlantic rifting

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The deep offshore West Iberian margin is still an underexplored hydrocarbon province, which evolved in paleogeographic proximity with the North Africa and Newfoundland (Northeast Canada). Such relationship is revealed through the synchronous timing of the main rifting events and has major significance to the analysis of the petroleum systems occurring throughout its margins.

From the Late Triassic to the Early Cretaceous, four distinct rift phases segmented the continental crust into discrete tectonic domains of the West Iberian margin, each with distinct subsidence features revealing northwards and westwards migration of the rift locus, which include: 1) the widespread continental rifting at Central and North Atlantic and western Tethys (Carnian–Hettangian); 2) the Early Jurassic (to mid Jurassic) subsidence, coeval with the transition to seafloor spreading at Morocco-Nova Scotia margins; 3) the Late Jurassic rift phase between Iberia and Newfoundland and 4) the Early Cretaceous transition to seafloor spreading and continental breakup, mainly expressed on the northern Iberia and Newfoundland margins.

The occurrence of the main source rocks is closely related to the discrete rift climax events described throughout the margin, which were identified during the Sinemurian-Pliensbachian, the Oxfordian-Kimmeridgian and the Barremian-mid Aptian. An additional post-rift Late Cretaceous source interval is expected to have been deposited during the base-level high of the Cenomanian-Turonian.

Subsequent inversion of the margin from the latest Cretaceous to the present day (but focused mainly in the Eocene and the Oligo-Miocene), resulted in the formation of multiple structural architectures of inversion. Their location and magnitude depends mainly on the position on the margin and the inherited rift geometry.

As a result, the deep offshore basins of the West Iberian margin, namely, the Alentejo, Peniche and Porto Basins are revealed as primary targets for future exploration.