

The Lusitanian Basin (Portugal) – lithostratigraphic and geodynamic correlation with other Portuguese and Moroccan basins

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The Lusitanian Basin is located in the western atlantic façade of Iberia, corresponding to a passive margin of the North-Atlantic Cretaceous opening, conjugate of other basins in NE America. However its Late Triassic - Early Cretaceous evolution presents important relations with the Central Atlantic and the Alpine Tethys. This fact can be better understood by looking at other nearby basins, such as the *Algarve* Basin (200 km S), and the Moroccan basins of the *Atlas* (700 km SE) and *Essaouira* (800 km S).

The Lusitanian Basin presents a 1st Late Triassic intra-continental rifting, with siliciclastics, evaporites and carbonates. The 2nd rifting starts in the Oxfordian, marked by a regional unconformity and thick marine and continental siliciclastics. The opening of the North-Atlantic, with a 3-stepped diachronous (Berriasian-Aptian) break-up unconformity, is marked by prograding fluvial and coastal mixed deposits.

The same broad evolution may be identified at the Algarve basin, with small differences: Sinemurian volcanics, an Aalenian gap and depositional gaps coeval with the three Cretaceous atlantic break-up steps.

The complex Atlas basins are closely related to the Tethys evolution, with important subsidence during the 1st Rifting phase: Triassic red-beds and Liasic carbonates give place to deltaic and continental red-beds (or even depositional gaps) with a generalized Upper Jurassic unconformity. Opening to the Tethys marine influences and carbonates became definitive since the Cenomanian.

The Essaouira basin, closely related with the Central Atlantic opening, presents a more complete stratigraphical record, with abundant Sinemurian volcanics (CAMP) and post-Break-up Jurassic marine and Cretaceous continental deposits. As in the Lusitanian basin, the subsidence is mainly Upper Jurassic, but without an unconformity.

A comparative approach to these basins, supports important geodynamic correlations, related with the opening of the Central and North Atlantic, as well as the spreading of the Alpine Tethys and detachment of the Iberian plate.

EXTENDED ABSTRACT

- i) at least 3 printed pages = 6 template pages
- ii) at least 1 figure (1 to 10)

1. INTRODUCTION

The Lusitanian Basin is located on the western border of the Iberian plate, and extends (onshore and offshore) some 250 km in a NNE-SSW trend along its structural axis of maximum subsidence, and up to 100 km East-West. The axis of maximum subsidence follows a general NNE-SSW structural orientation. The basin is located between bordered by Hercynian basement rocks, namely in the east the Iberian Meseta to the east, and to the west a marginal horst system to the west (the Berlenga and Farilhões islands are emergent parts of it).

The geometry and distribution of subsidence during the basin's infill was influenced by the reactivation of several pre-existing faults which, together with sea level changes, played a significant role in the creation of accommodation space, as well as in the control of the general distribution of the sedimentary environments and the resulting depositional systems.

The stratigraphic succession preserved in the Lusitanian basin records major basinal events closely related with the evolution of the Tethys and the Atlantic opening in this region.

The earlier rifting episode that began during Late Triassic and led to the definition of a system of sub-meridian grabens and half-grabens filled up with red beds and evaporites resulting from marine Tethysian incursions. Overlying ramp marginally sediments of early Jurassic age with expansion of the basin, are interpreted as the result of a regional thermal subsidence interval until the Callovian. A second rifting episode began during the late Jurassic with the formation of very subsident pull-apart sub-basins infilled with prograding deltaic and turbidite sediments. A complex stacking pattern of the Cretaceous sediments, presenting three main unconformities, (Berriasian, Barremian and Late Aptian) is interpreted as the result of a series of three northward stepping sectors of the onset of sea-floor spreading. A major late Cenomanian unconformity defines the first changes associated to the tertiary inversion of the basin.

Magmatic events underline this evolution, allowing its integration into a regional geodynamic context.

ESTRUTURA

0. Introdução

Evolução geod iberica influenciada pelo Tetis e Atlântico

As bacias da região devem apresentar assinaturas comuns dos grandes eventos

estudadas a relação entre as bacias....

1 – Estruturação Inicial

Preenchimento Siliciclástico de blocos

Evento evaporítico generalizado

Evento magmático gradativo S para N

Sal / Pereiros / Coimbra é o fim da influência atlântica africana

2. Invasão marinha e aprofundamento generalizado em Rampa = SinRift em Marrocos = Estruturação tethyseana

3. PosRift em Marrocos (reflexo do Tethys) = Descontinuidade tardia no Algarve = Descontinuidade tardia e ténue na BL

5. Descontinuidade Caloviano-Oxfordiano

Alinhamento da BL com o Rift Atlântico africano e distensão

Levantamento da Ibéria e erosão

Eixos para SW e Depocentros para SW (onde está o rift africano)

Progradação e enchimento

Em Marrocos deverá prosseguir o enchimento continental.

6. Passagem à margem passiva

Por sectores avançando de S para N (abriu 300 km e parou 20 Ma; abriu + 200 km e parou 10 Ma; abriu + 300 km).

Esta oceanização bloqueou em definitivo a abertura do Tethys, com a passagem da drenagem para o Atlântico em Marrocos

FIGURAS

TABELA BL-Marrocos