

**The Meso-Cenozoic Alentejo basin (SW Portugal)**  
– lithological correlation from outcrop and well data

Grou, T. & Pimentel, N.

*Geology Department, Faculty of Sciences, Lisbon University. tomas.grou@gmail.com*

The Alentejo basin is one of the west Iberian Mesozoic basins, developed in relation with the North-Atlantic opening. First sediments are dated from Upper Triassic and the sedimentary infill includes Jurassic mostly carbonate and Cretaceous mostly siliciclastic sediments. A Cenozoic cover is also present, including Paleogene to Quaternary mostly siliciclastic sediments.

Subsidence has been important during the Mesozoic, with thick Jurassic carbonate sequences, especially during the Upper Jurassic. However, basin's inversion has been also important, with a first mild event in Callovian times, marked by a sub-aerial unconformity and intraformational conglomerates. Stronger inversion events are documented in late Cretaceous and Cenozoic times, related with the alpine orogeny and Africa-Iberia plates collision.

The only outcrops of this basin are located around the town of Santiago do Cacém, 150 km South of Lisbon and halfway between the southern edge of the Lusitanian Basin and the western edge of the Algarve basin (Fig 1). These outcrops show uplifted complete sections of the Upper Triassic to Lower Jurassic sequence, including Silves Fm (red beds), Dagorda Fm (red clays), CAMP related volcanic and Fateota Fm (dolomites) (Fig 2). Above a regional depositional hiatus, Middle Jurassic units are represented by Rodeado and Monte Branco (limestones) and a second hiatus precedes a thick Upper Jurassic sequence including intraformational conglomerates and limestones of the Deixa-o-Resto Fm (Inverno *et al.*, 1999; Pereira & Alves, 2012). This Mesozoic sequences are affected by lythic faults towards W, folded, eroded and unconformably covered by Tertiary sands (Fig. 3).

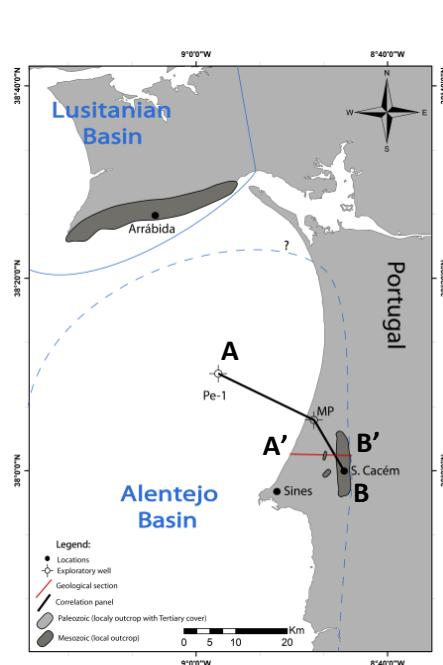
Around 40 km NW of these outcrops, an exploratory well (Pescada – 1) has been drilled by Texaco in 1975, reaching the basement at a total depth of 3115m. The target were Jurassic limestones at a closed anticline trap, but no oil shows were found. The crossed section shows Upper Triassic dolomitic siltstones and volcanics, Lower Jurassic dolomites, Middle Jurassic limestones, Upper Jurassic carbonates, Lower Cretaceous calcareous sandstones and Tertiary (Oligocene and Mio/Plio-Pleistocene) sands. Biostratigraphic dating was restricted to the Middle and Upper Jurassic section, with lithological correlation for the rest of the well.

Between these two places with significant information (Pescada-1 well and Santiago do Cacém outcrops), an on-shore well (Monte Paio) has been drilled in the '70s by the Portuguese Geological Survey (SGP) with engineering purposes, related with the development of the Sines harbor close to that area. This well reached the basement at a depth of 1100m, crossing Upper Triassic siliciclastics and evaporites (Silves and Dagorda Fm.), Jurassic carbonates (Fateota, Rodeado and Deixa-o-Resto Fm.) and Cenozoic sands (Miocene and Plio-Pleistocene). However, its lithostratigraphy is poorly known and there is only one very short and synthetic public report about it, with a basic lithological column and supposed ages. Some specific studies on Upper Jurassic biostratigraphy have been promoted but have not been published.

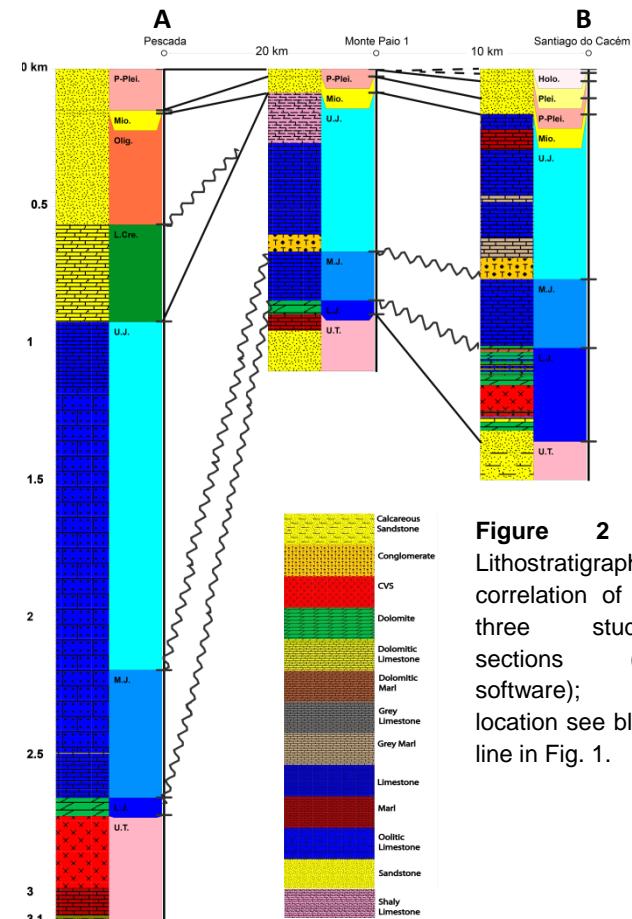
From preliminary comparative observations of these three sections (Fig. 2), we underline the absence of volcanics and the thin Lower Jurassic sequence in Monte Paio, as well as the important facies differences in the Upper Jurassic sequence, with

## Poster

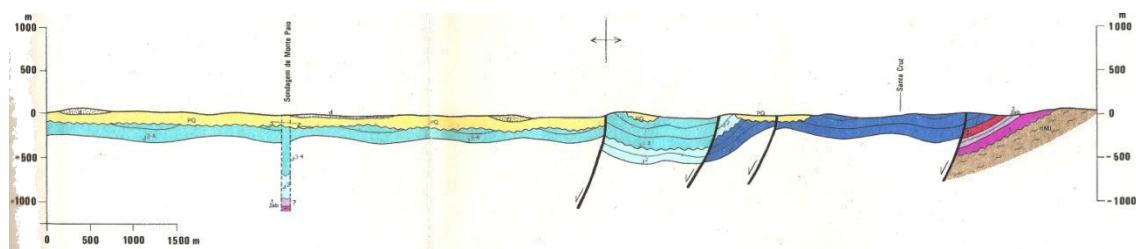
intermediate characteristics between shallow water in SC and deeper water in Pe-1. This work will address a detailed lithological description of the Monte Paio well, to identify facies variations, providing a better approach to the lithostratigraphic correlation between the outcrops of Santiago do Cacém area and the report data of the Pescada – 1 well. This study will provide a better knowledge of the inner proximal margin of the Alentejo Basin and will improve the knowledge of the tectono-stratigraphic evolution of the whole Basin during the Mesozoic and Cenozoic.



**Figure 1** – Location of the three studied sites in SW Portugal: Pe – 1 well, Monte Paio (MP) well and Santiago do Cacém outcrops.



**Figure 2** – Lithostratigraphic correlation of the three studied sections (KS software); for location see black line in Fig. 1.



**Figure 3** – Geological section from Santiago do Cacém towards W, with projection of the MP well (left side) (in Oliveira, 1984); for location, see red line in Fig. 1

## References

- Pereira, R. N. and T. M. Alves (2012), Tectono-stratigraphic signature of multiphased rifting on divergent margins (deep-offshore Southwest Iberia, North Atlantic), *Tectonics*, doi:10.1029/2011TC003001, in press.
- Inverno, C. M. C.; Manupella, G.; Zbyszewski, G.; Pais, J.; Ribeiro, M. L. (1993) – Notícia explicativa da folha 42-C Santiago do Cacém. Serviços Geológicos de Portugal, Lisboa.
- Oliveira, J. T. (1984) – Carta Geológica de Portugal, Escala 1:200.000, Folha 7. *Notícia Explicativa*, 77 pp., Serviços Geológicos de Portugal, Lisboa.