

Integrated thermochronology and organic maturation studies in the South Portuguese Zone and Algarve Basin (South Portugal)

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This PhD research project started in February this year. Its main goal is to combine apatite fission track analysis (AFTA) with other low-temperature thermochronometers (zircon fission track, (U-Th)/He apatite) to construct temperature-time paths for the South Portuguese Zone and the Algarve Basin. The field work will be carried out mainly in South Portugal. The geology of South Portugal comprises the Variscan basement of the South Portuguese Zone (SPZ) and the Meso-Cenozoic Algarve Basin (AB). The SPZ consists of terrigenous sediments and volcanics (shales, quartzites, greywackes, rhyolites, pyroclasts) of Middle Devonian to Late Carboniferous age [1]. The AB overlies unconformably the SPZ. The AB sedimentary records has more than 3 km in thickness and consists of mostly marine sediments which accumulated during Mesozoic-Cenozoic times [2]. The objectives of this research project are: (1) assess maximum palaeotemperatures attained by the SPZ and the AB, using vitrinite reflectance (VR); (2) determine palaeogeothermal gradients and palaeoheat flow for the SPZ and AB; (3) establish the timing and duration of cooling after peak metamorphism/maturation, using multiple low temperature thermochronological techniques; (4) infer the magnitude and timing of crustal exhumation based on the VR and low temperature thermochronometry data; (5) integrate all these data to reconstruct the burial and exhumations histories of the SPZ and AB; and (6) use the results to assess the potential of offshore petroleum systems in terms of the timing of source organic maturation and tectonic history of potential reservoirs.

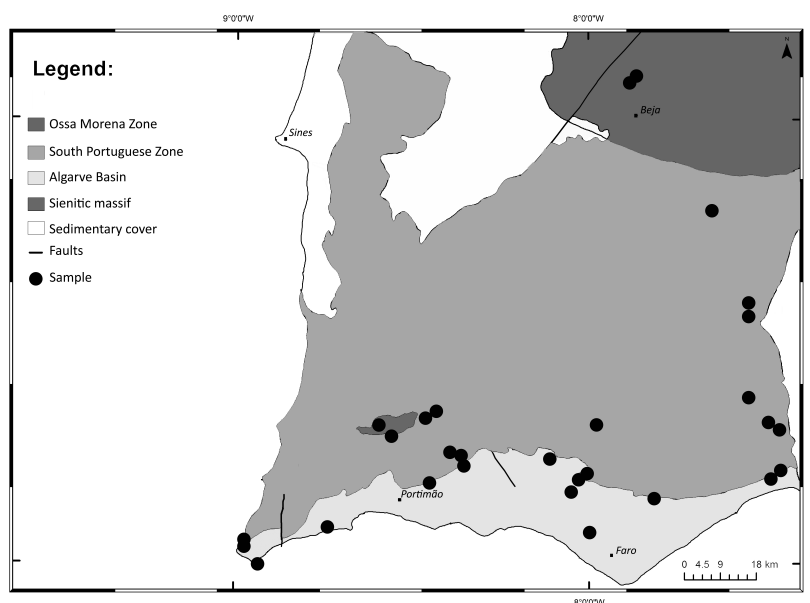


Fig. 1. Geology of South Portugal and samples collected for the project.

References

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