

Andrew Whitham CASP Fieldwork Awards 2024 – Winner

Applicant: Gilda Maria Rodrigues Lopes

Project title: Paleoenvironmental and age control characterization of a potential Lower Cretaceous carbon capture reservoir in the Algarve Basin, Portugal

Award: £2,284

Scientific question and rationale: The Lower Cretaceous Fontes da Matosa Formation, a predominantly sandstone unit with clays and mudstone intercalations, has the potential to be a significant carbon storage unit in the central Algarve Basin. It was deposited in a fluvial setting during a sea-level fall period and is believed to extend offshore into a major deltaic environment. The unit is enclosed by limestone and marl successions, making it a suitable candidate for carbon storage. However, to fully exploit this potential, developing a well-controlled dating method using palynology is necessary. This will lead to a significant enhancement of the intrabasinal stratigraphic correlation within the Algarve Basin. Furthermore, studying the regional paleoenvironmental framework can enhance our comprehension of the history and evolution of the vegetation during the upper Berriasian period in Portugal. With this project, we can start to unlock the true potential of the Fontes da Matosa Formation and contribute to the global efforts to combat climate change.

Specific objectives and deliverables:

- (1) Establishing a biostratigraphic framework based on palynology to constrain the reservoir and allow intrabasinal correlation.
- (2) Characterizing the paleoenvironmental evolution of the region to improve the very scarce floral record of Portugal for the late Berriasian and correlate it with other Portuguese and European records.

Proposed work plan:

A) Field campaign in three localities in the central Algarve Basin (Portugal) (Spring 2024) – 10 days

- Sections: (1) cutting of the A22 motorway (reference section); (2) Mem Moniz claystone disused quarry; (3) Fontes da Matosa road section.
- Detailed outcrop documentation and bed-by-bed logging of strata (lithologies, biofacies, sedimentary structures and discontinuity surfaces).
- Drawing of sedimentological logs (scale 1:2).
- High-resolution sampling (for palynology).

B) In the following 12 months:

- Processing and counting samples for palynology analysis, including statistical analysis.
- Integration of results from all sections to establish a palynostratigraphic framework.
- Reappraisal of the existing paleoenvironmental models for the late Berriasian in Portugal, namely the vegetation record.
- Submit a paper in an indexed journal (e.g., Cretaceous Research).
- Final report for CASP.

Proposed expenditure, including details of any other sources of funding: This proposed fieldwork is a stand-alone project, with no other sources of funding available.

Expenditure:

- £300 Flight; Manchester/ Faro – Faro/Manchester
- £45 Train; Sheffield/Manchester – Manchester/Sheffield
- 10 x £50 = £500 daily allowance
- £639 accommodation
- £800 car rental

TOTAL = £2284