

Evolution of the Medjerda delta's palaeoenvironment : Evidence of an intense sedimentation event post 10th c. A.D. near the ancient city of Utica (Tunisia)

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1. Introduction

Since the late 20th c., the rapid progradation of the Medjerda delta was the subject of numerous investigations (e.g. Oueslati 1995; Paskoff et al., 1992). This phenomenon has also been studied more recently through geoarchaeological approach and GIS technics (Delile et al., 2013). These studies led to the development of a spatio-temporal pattern of the multiple defluviations experienced by the Medjerda during its advance on the sea. A mapping of these alluvial fans, combined to a re-reading of the last archaeological surveys carried out on the delta, evidences that the silting-up of the ancient Utica bay took place much faster and earlier than we thought.

2. Material and Methods

In order to compare the results from the GIS and the deposits from the field, a preliminary core (UTC 2, ~6 m deep) was conducted with a hand auger. The texture of the sediment was first estimated manually on the field, and then analysed by laser granulometry (Malvern Mastersizer 2000). More recently, another core was extracted with a mechanical drill to reach deeper layers. This core is currently under analysis. The study of fluvial palaeoenvironments and sedimentary processes will be carried out using different and complementary approaches: particle size analysis and quartz morphoscopy, sedimentological and biological analysis, mineralogical and geochemical approaches, radiocarbon dating.



Figure 1: Location map of the Medjerda delta and the coring area

3. Results and discussion

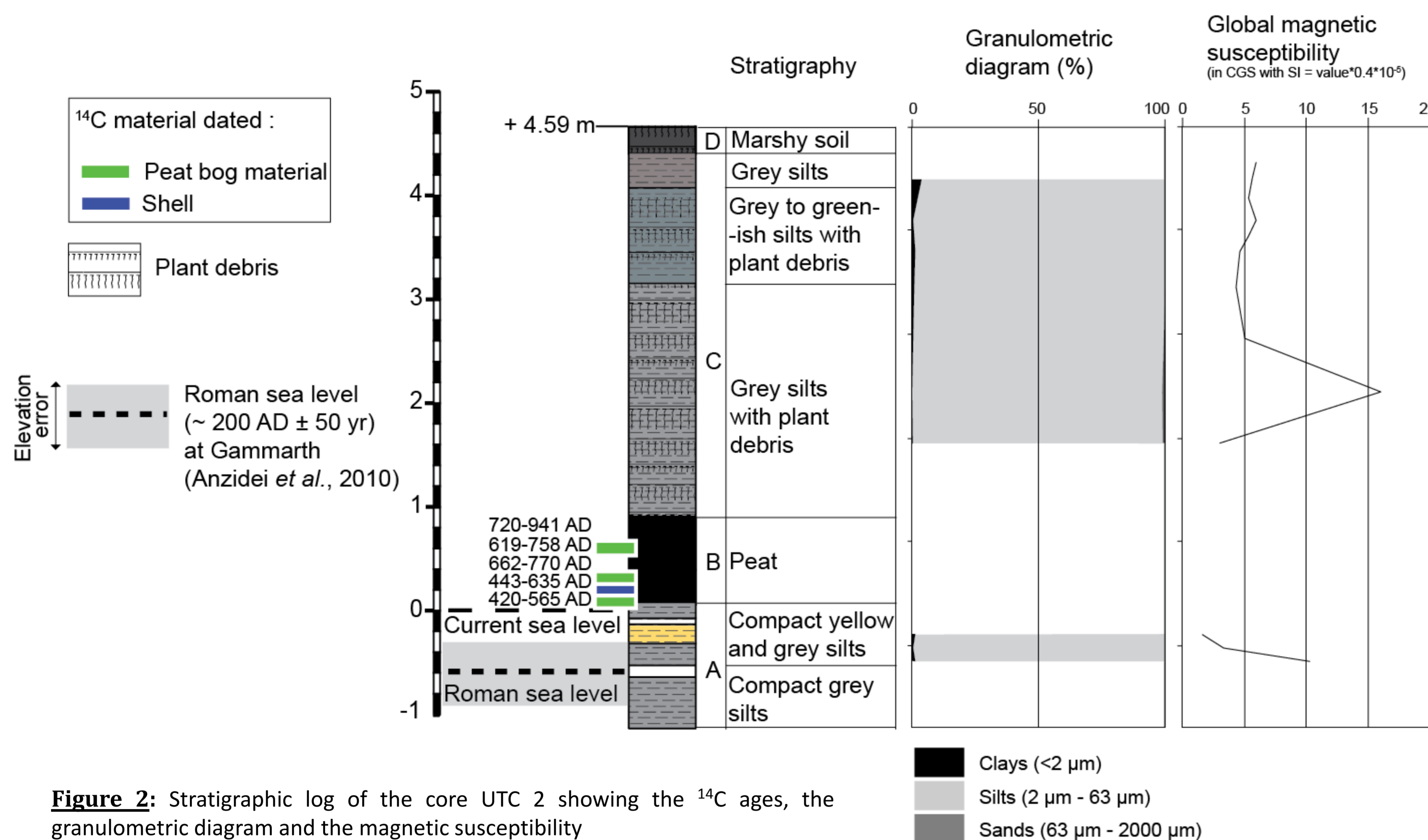


Figure 2: Stratigraphic log of the core UTC 2 showing the ¹⁴C ages, the granulometric diagram and the magnetic susceptibility

Core UTC 2 was taken from a marshy zone, on the north-western side of the promontory of Utica (Fig. 1). The altitude of the coring point, in relation to the LMSL, is +4.59 m. Based on the stratigraphy and dating, the core UTC 2 can be divided into three major units (Fig. 2):

- a **pre-peat environment unit (A)**; according to the radiocarbon dates the unit A should correspond to the Roman period;
- a sequence showing a typical **peat environment (B)**; UTC 2 shows the development of a peat bog between the end of the Roman period (~ 5th c. A.D.) and the end of the High Middle Ages (~ 10th c. A.D.);
- and finally a **post-peat state (C)**; the peat layer is suddenly sealed by ~3,50 m thick grey silts deposits, probably from fluvial origin, highlighting a radical change in the environmental conditions, leading to a large aggradation of this sector. This phenomenon should have had an impact on the occupation and on the economy of the city. The field observation suggested a very homogeneous post-peat sequence. However, the results of particle size analysis don't show any break in sediment accumulation. They put in evidence very well sorted and very fine silty sediments, deposited in a constant process of decantation.

Is this sequence caused by a sudden accumulation or is it the fact of successive events? The question remains open. In any case, it definitely ended the development of the peat and raises the question of this aggradation origin: what has happened in the watershed? What were the climate and/or anthropogenic forcings?

The study of the deeper core UTC 10 and new radiocarbon dating will help us to know if we can consider this post-peat accumulation as an event or not, and to better understand the evolution of the Medjerda delta's palaeoenvironment.

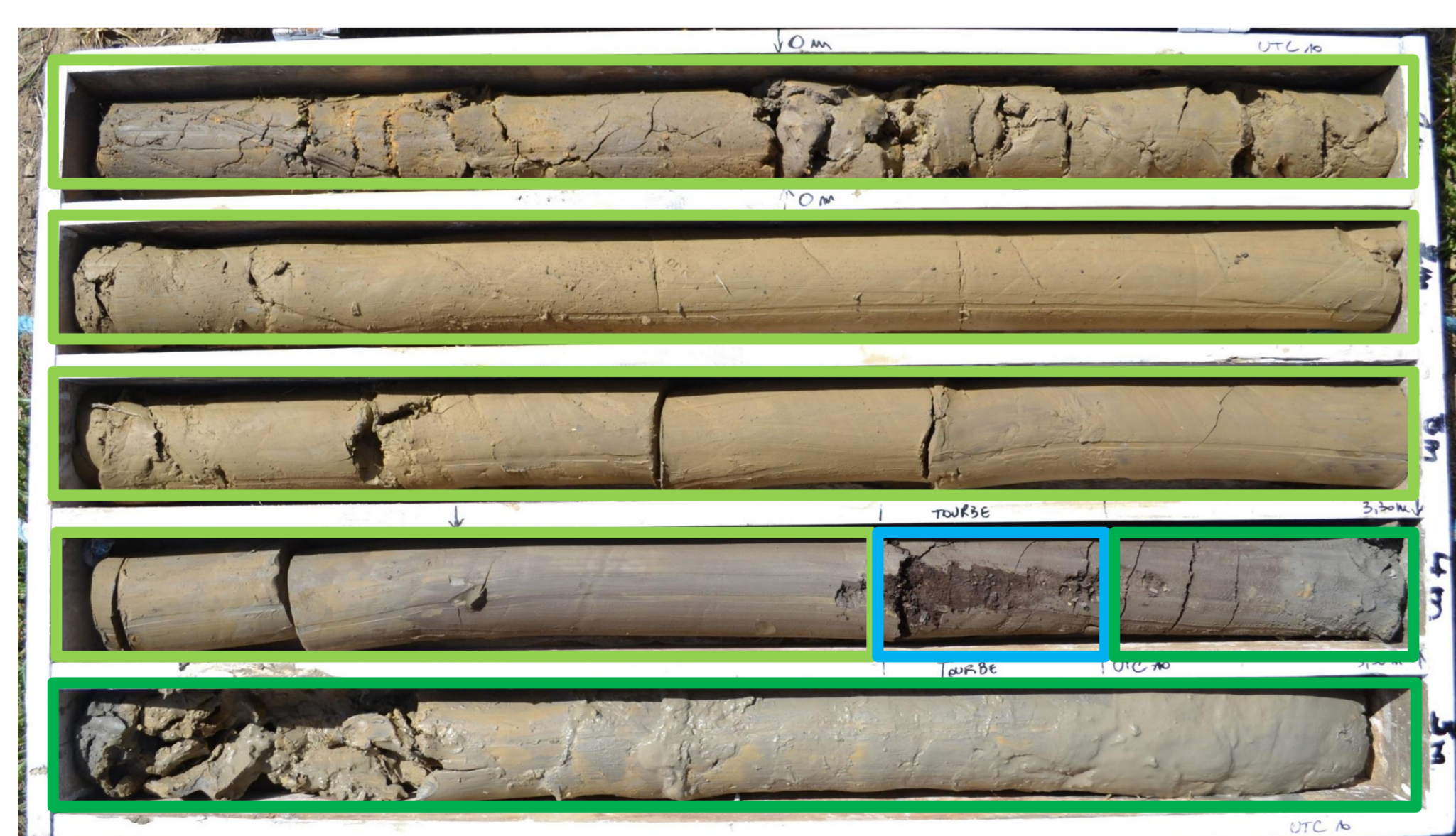


Figure 3: Part of the core UTC 10; we find the same 3 units (post-peat, peat and pre-peat sequences).

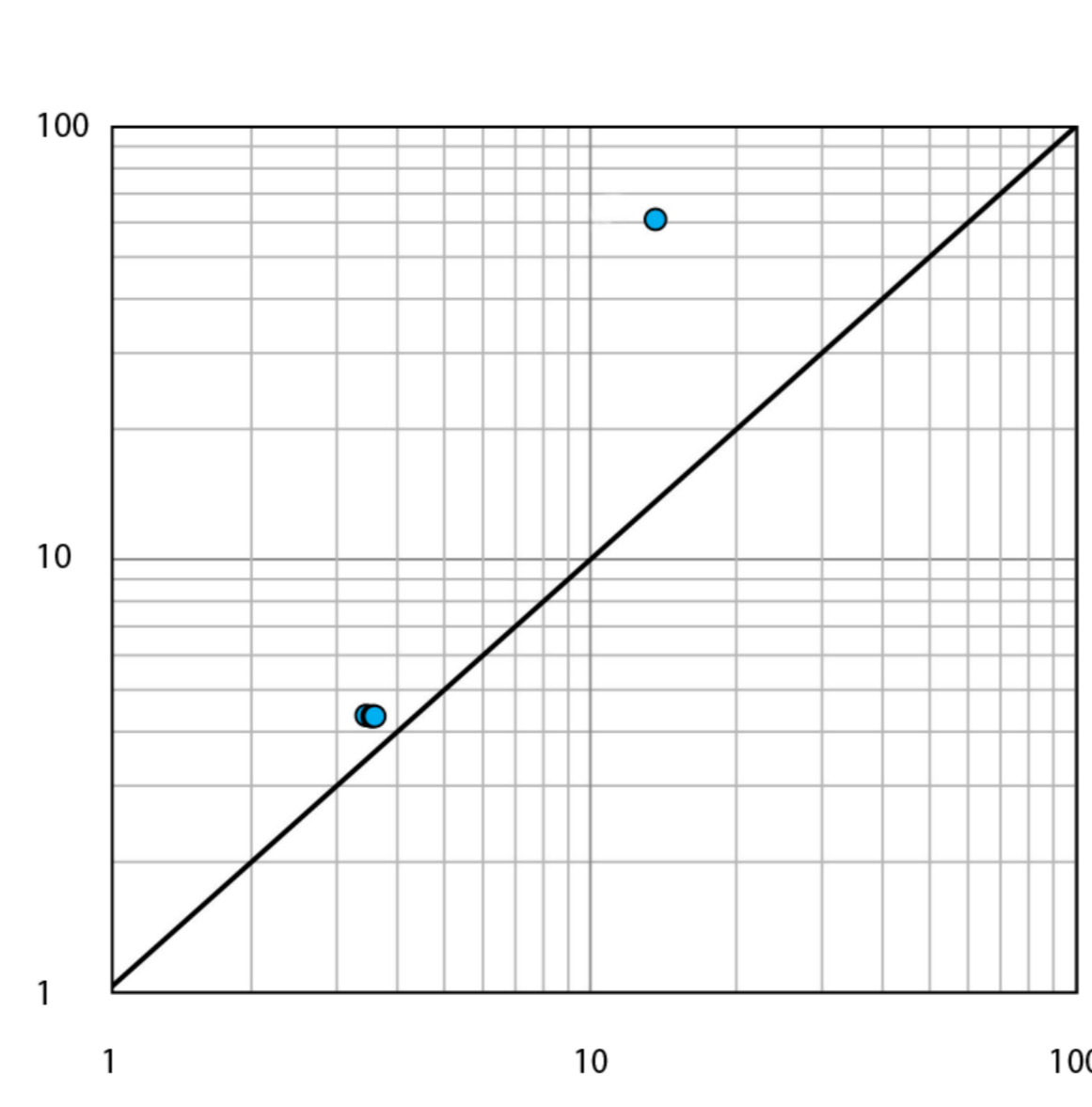


Figure 4: C/M diagram for the core UTC 2

4. Conclusion

This project proposes an interdisciplinary reflection to understand the delta landscapes changes during the Holocene. The originality lies in the multidisciplinary approach, aiming to provide an evolutive image of the landscapes of the Medjerda watershed, and to precise the sedimentary record considering control variables such as climate and anthropogenic pressure.

5. References

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