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# Late Pleistocene to Holocene hydrodynamic and morpho-sedimentary evolution of the Akka plain (Drâa Basin, Morocco): a high-resolution multiproxy study

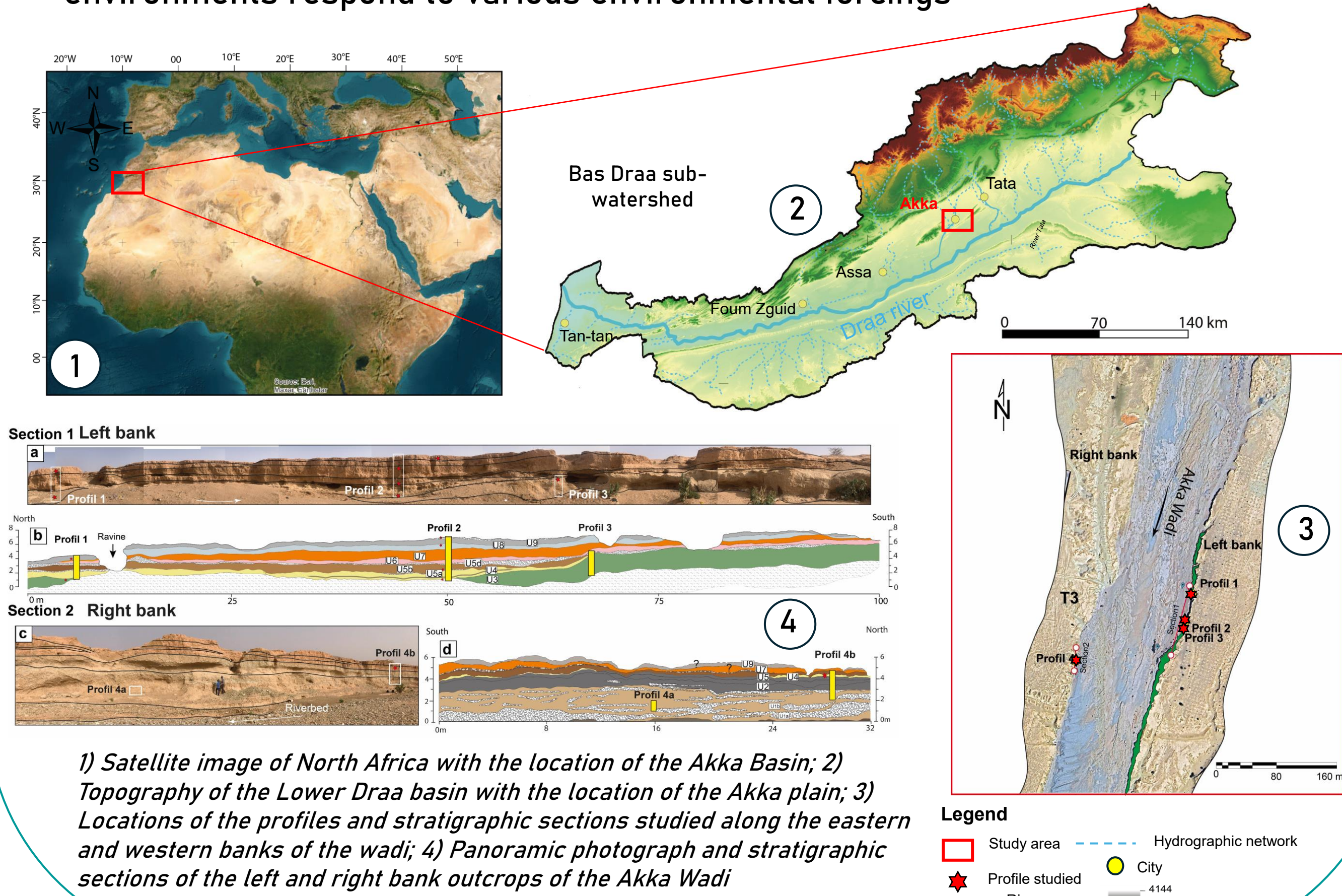
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## INTRODUCTION

The Akka Wadi is a major right-bank tributary of the Drâa River, located in the pre-Saharan region of the western Anti-Atlas in southern Morocco. This area, characterized by an arid to semi-arid climate, contains alluvial formations that have yet to be studied in detail using geochronological and geomorphological methods for the Quaternary period.

Fluvial archives provide valuable information for investigating morpho-sedimentary dynamics and environmental changes at a regional scale. Their analysis allows us to reconstruct landscape evolution and to understand how environments respond to various environmental forcings



## AIMS

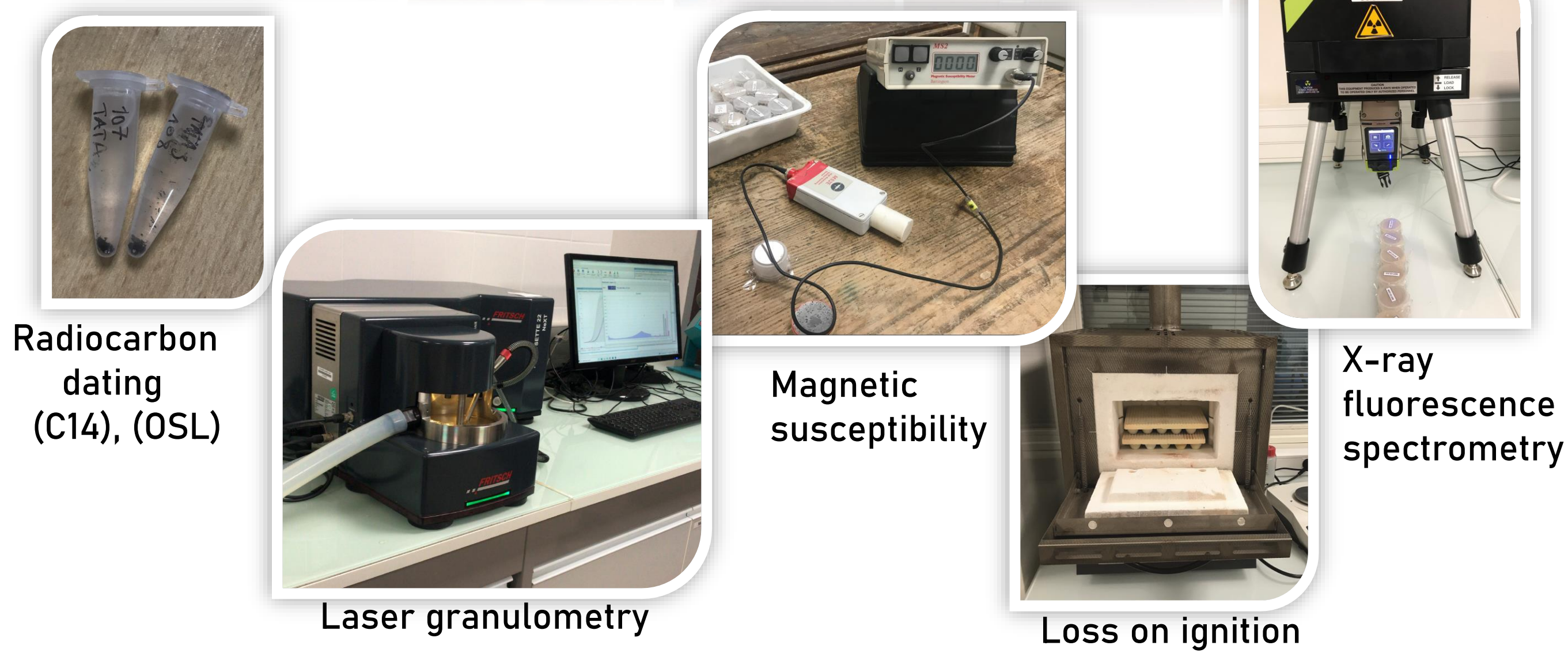
- Reconstruct paleoenvironmental and hydrodynamic variations from the Late Pleistocene to the Holocene by analyzing morpho-sedimentary dynamics, stratigraphy, chronological data (<sup>14</sup>C and OSL dating), as well as sedimentological and physico-chemical analyses.
- Identify the forcings that have influenced the evolution of the Akka Wadi's environments and landscapes.

## METHOD

### Stratigraphic cross section process and sampling

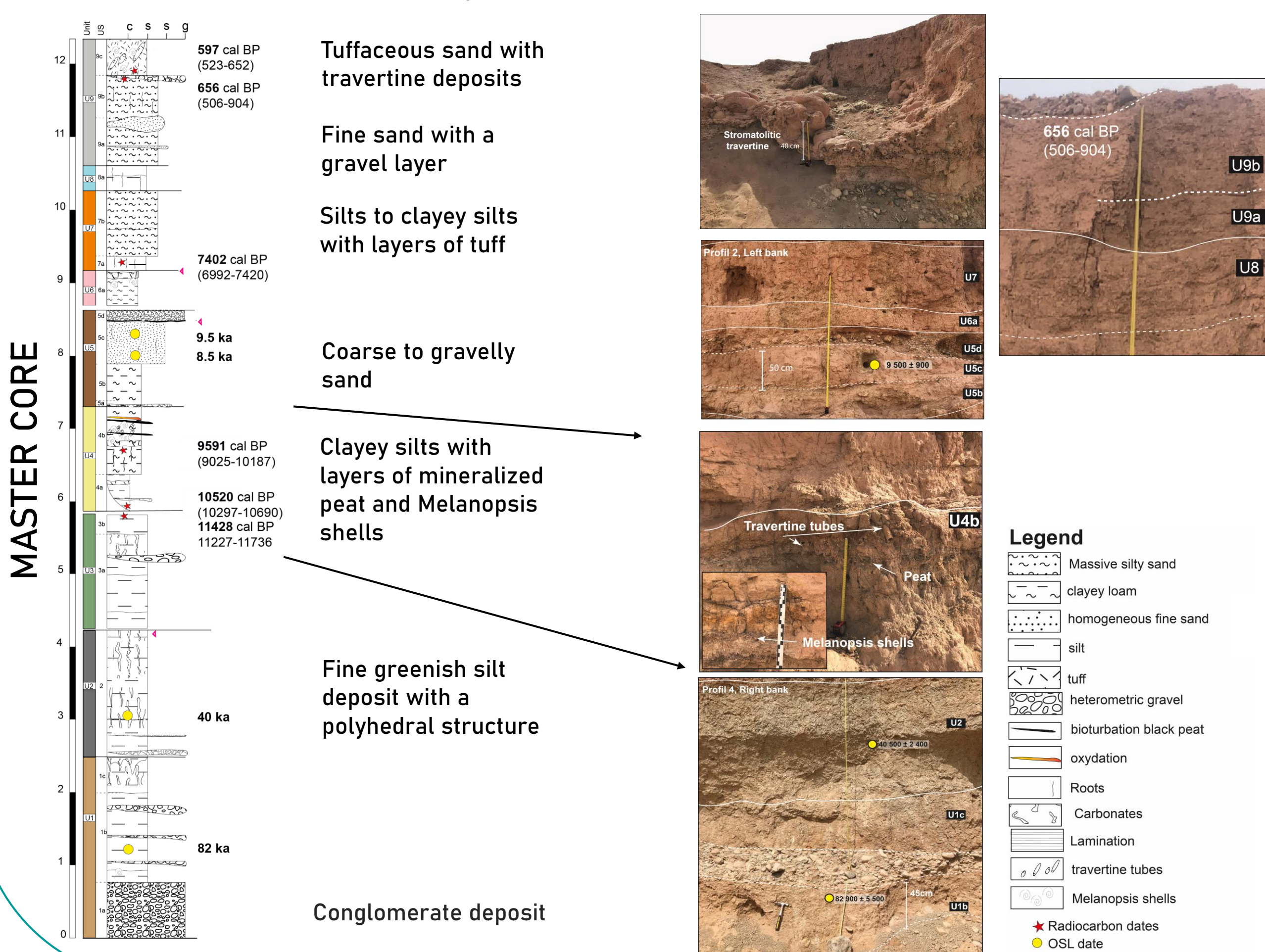


### Laboratory methods

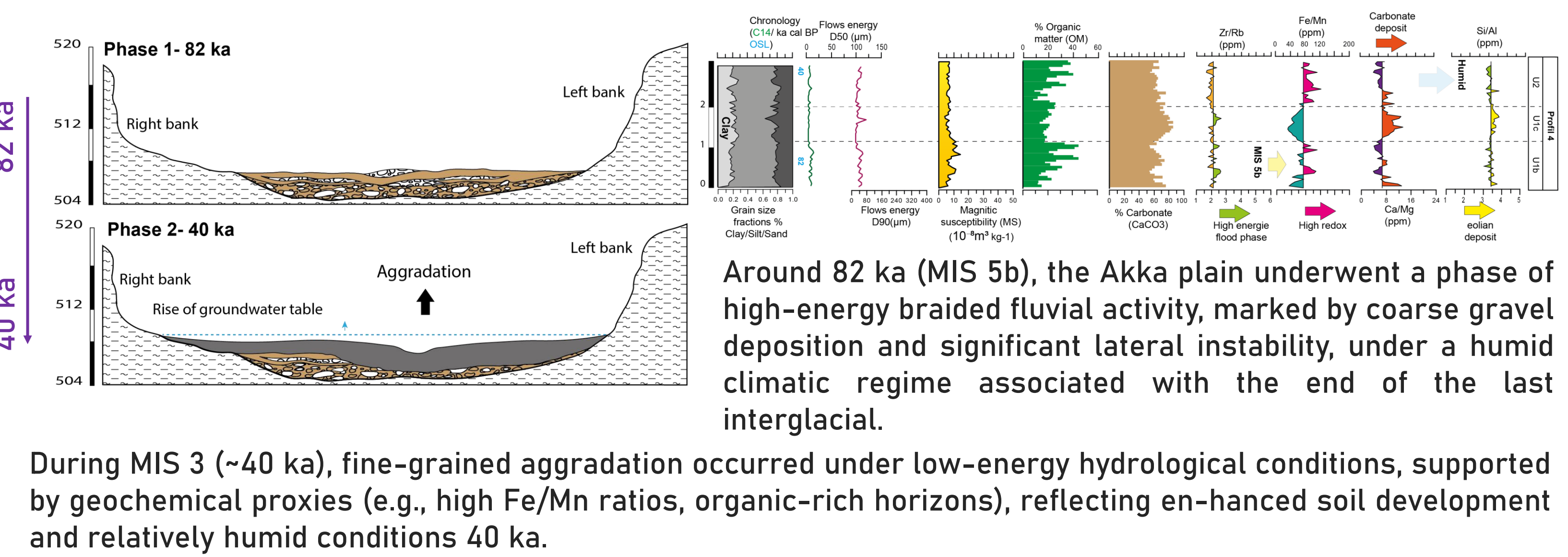


### Morphosedimentary dynamics and paleoenvironmental evolution of the Akka plain

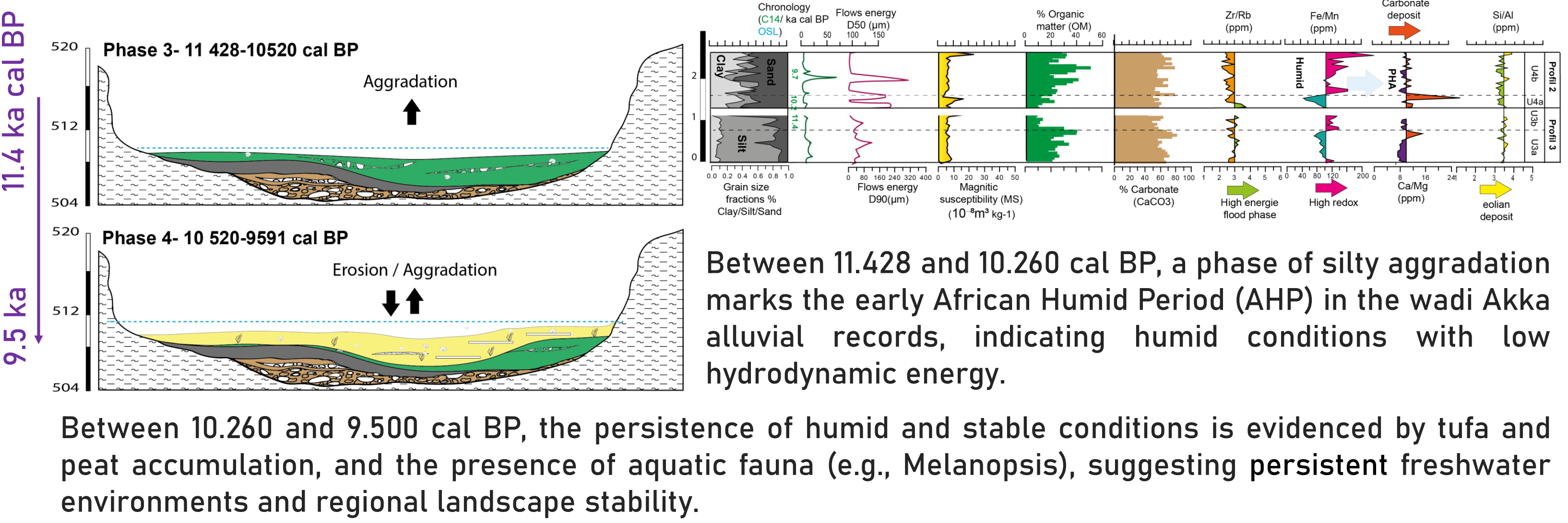
Litho-chronostratigraphic analyses of the Akka archives reveal nine sedimentary units, dated between 82 ka and 597 cal BP



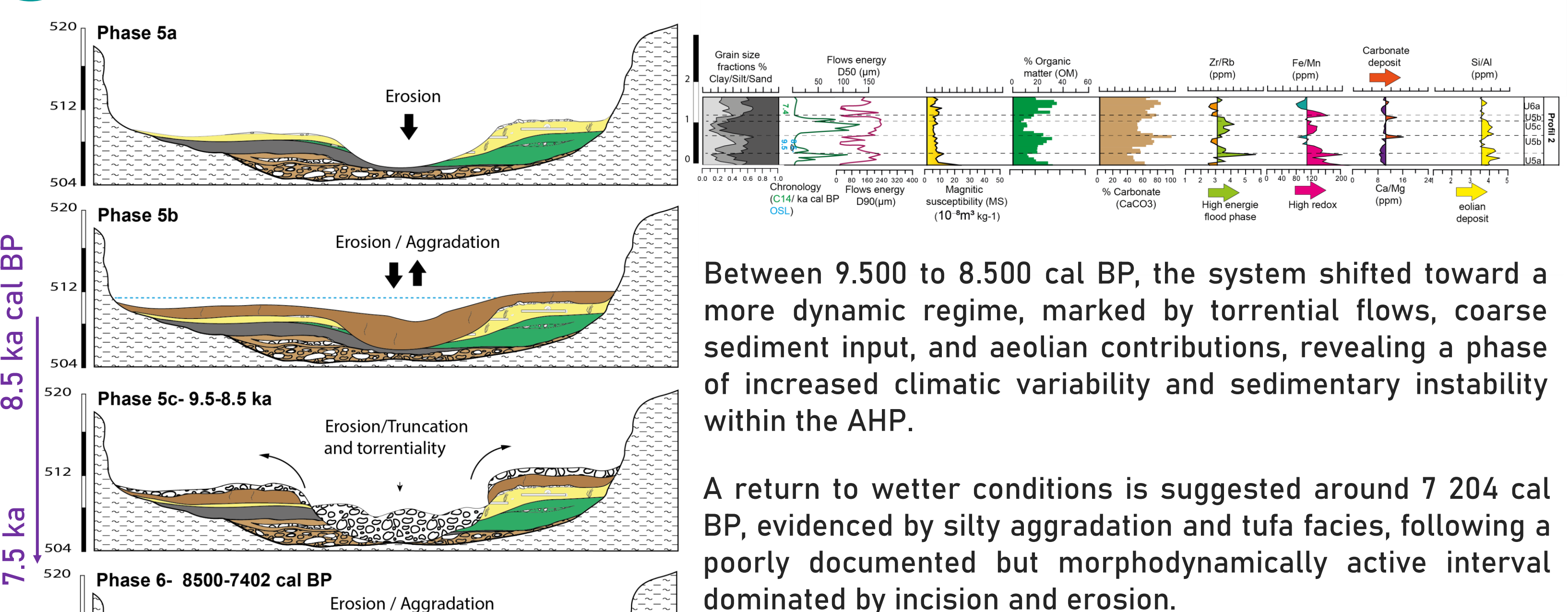
## 1 LATE PLEISTOCENE (MIS 5b & MIS 3) - Fluvial Aggradation and Hydroclimatic Instabilities



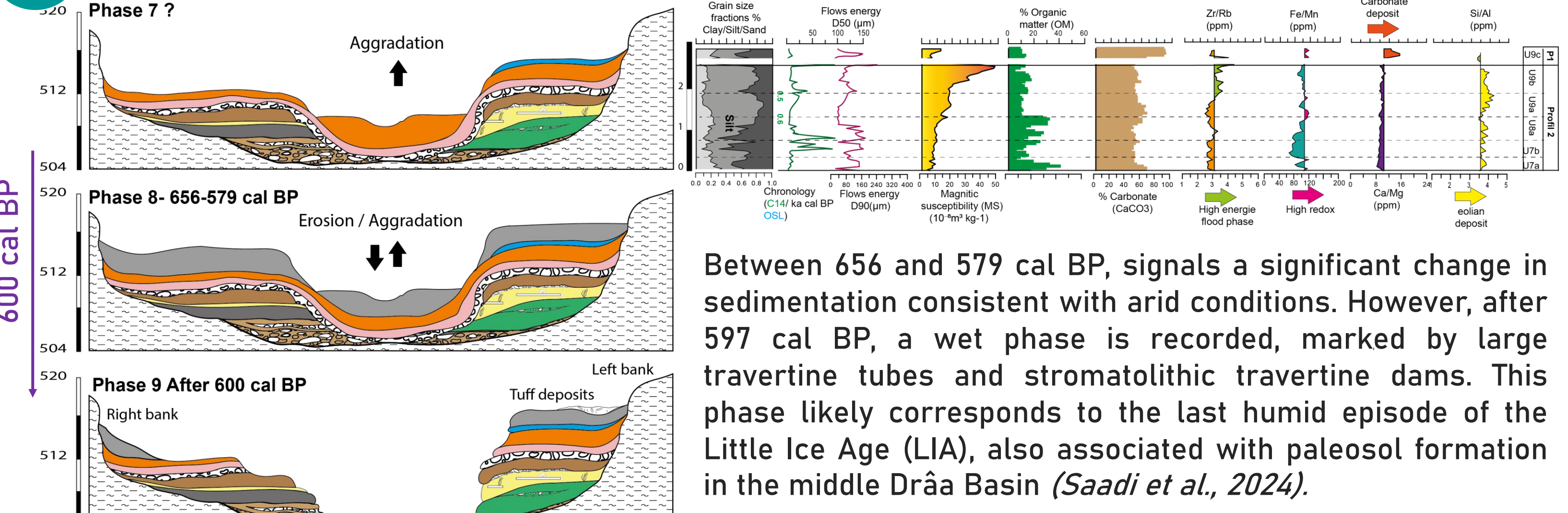
## 2 EARLY HOLOCENE - Fluvial reactivation and signs of the African Humid Period (AHP)



## 3 MID HOLOCENE - Major fluvial incision and sedimentary discontinuity



## 4 LATE / FINAL HOLOCENE - Little Ice Age



## DISCUSSION & CONCLUSIONS

The sedimentary archives of the Akka alluvial plain provide a valuable new reference for understanding the impacts of climate change on the continental Saharan environment of North Africa during the Late Pleistocene to Holocene.

The fluvial record in the Akka Plain predominantly preserves the most humid phases of the Late Pleistocene and Holocene, leading to an over-representation of wetter conditions in the sedimentary archive. In contrast, the Middle Holocene and much of the Late Holocene are characterized by incision and truncation events, often accompanied by gravel deposits resulting from highly erosive fluvial processes. These dynamics account for the frequent sedimentary hiatuses and discontinuities observed in the fluvial systems. Such periods appear to be linked to rapid climatic fluctuations and a general trend of aridification driven by orbital forcing.

## RESULTS