The environmental contexts of late Pleistocene occupations in Mediterranean North Africa are key to the dispersal of Anatomically Modern Humans (AMHs). Shifting environments controlled the movements of the late Middle and Upper Palaeolithic populations via corridors through the now hyper-arid Sahara and potentially along the coastline during Oxygen Isotope Stages 5-3. The archaeological sequence at the Haua Fteah, Libya, lies at a coastal crossroads in these corridors between the Nile, the Maghreb, and Saharan routes. Excavated in the 1950's, and recently re-investigated by the TRANS_NAP Project the 14m deep stratigraphy encompasses a sequence from the 'Libyan Pre-Aurignacian' to modern-day stabling deposits, representing, according to present chronologies, up to 200,000 years of sedimentation. Cave and rockshelter sediments, similar to those at the Haua Fteah, result from complex interplay between anthropogenic and 'natural' influences, and contain high-resolution histories of cultural and environmental change. Yet each cave is unique in the ways in which environmental changes and their impacts on the external landscape is recorded in the sediments, and therefore a full understanding of the processes driving sedimentation is fundamental to the cultural and environmental chronologies built upon such sequences. This paper will present results from research into the environmental and behavioural potential of the Middle to Upper Palaeolithic layers at the Haua Fteah. Through the application of soil micromorphology, and associated physical and chemical analyses, a detailed site formation history will be developed, and its implications for the use of on-site environmental records in wider debates surrounding palaeoenvironmental controls on the dispersal of AMHs in North Africa considered.