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## Deciphering stratigraphy and formation processes at the open-air Portela 2 archaeological site (Central Portugal)

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In Portugal, evidence of human occupation dating to the Last Glacial Maximum (LGM), between 27-19 ka BP, is well-known from caves and rock-shelters, while geoarchaeological data referring to open-air contexts are still scarce. Here we present the preliminary results from the ongoing interdisciplinary investigation at open-air site Portela 2 (Maceira, Leiria, Central Portugal), which is situated in an elongated and semi-closed topographic depression with fluviokarst characteristics, opened in Middle Jurassic carbonate bedrock.

A rescue archaeology intervention in 2009 led to the discovery of the site where, among eight hundred lithic artefacts, fifteen Vale Comprido points were recovered, suggesting a Proto-Solutrean occupation of the area. These finds, poorly known in south-western Europe, prompted new systematic stratigraphic excavations in 2021, in the framework of the PALEORESCUE project (PTDC/HAR-ARQ/30779/2017).

In this study, we follow a broad geoarchaeological approach to address site stratigraphy and formation processes reconstruction, including geomorphological, sedimentological, soil micromorphological and geochronological analyses. Some manual boreholes were performed to verify the thickness of the local sedimentary succession around the site, and thus delimit the extension of the archaeological deposit. The sedimentary succession exposed after the archaeological excavations at the Portela 2 site, together with the remains of the post-Jurassic siliciclastic covers that discontinuously overlay the carbonate bedrock around the depression, were sampled to carry out sedimentological routine analyses. In addition, undisturbed samples from the Portela 2 succession were cut into thin sections and used for microstratigraphic observations under the petrographic microscope. Bulk sediments were dry-sieved and observed under a stereomicroscope to evaluate grain composition and morphology. Grain-size data were obtained through sieving at  $\frac{1}{2} \phi$  intervals. On average, one hundred quartz grains per sample were randomly selected from the 1.0-0.5  $\phi$  fraction, recording surface aspect (frosted or bright) and roundness degree; heavy mineral discrimination in 3-4  $\phi$  fraction was performed as well, using Frantz magnetic separator and optical inspection (also estimated by X-ray diffraction). Luminescence dating and laser diffraction particle-size analysis of the fraction smaller than -1  $\phi$  are in progress.

The preliminary results indicate sedimentological, mineralogical, and petrographic affinities between the siliciclastic infillings at the Portela 2 archaeological site and the Cretaceous and Pliocene covers. Overall, the studied sedimentary succession consists of remobilized Cretaceous or Pliocene deposits,

sometimes mixed between them, and locally affected by soil formation processes during the Holocene. At the moment, direct aeolian inputs cannot be excluded either. Furthering this investigation will provide an absolute chronology for the Portela 2 deposit and a better understanding of the regional paleoenvironmental context, resulting in new insights into the studies of the relationships between human occupations and natural dynamics at the turn of the LGM in the western Iberian Peninsula.