ARCHOSL — Result In Brief

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Better understanding early migration from Africa to Europe

European researchers are further developing and refining the means to accurately reconstruct and interpret the earliest human expansions into Europe from Africa.

Various archaeological sites within the Iberian Peninsula are believed to hold the answers to fundamental questions regarding human evolution and migration from Africa. Existing chronologies, however, are still not sophisticated enough to support the development of well-sustained hypotheses on the age of such early expansions. Being too ambiguous, imprecise or poorly described, or being based on non-numeric dating methods alone, the current chronological framework does not allow for sound conclusions on hominid migratory patterns or the driving mechanism(s) behind such migrations.

In this context, the ARCHOSL project team seeks to apply newly developed techniques and protocols in the field of optically stimulated luminescence (OSL) dating. This approach has the potential to provide robust absolute chronologies on key Lower Palaeolithic archaeological sites in western Europe.

Among key project objectives is the pursuit of new methodological advancements in and refinements of the latest protocols in single-grain and multiple-grain OSL dating. Developments in this area will enable workers in the field to push back the existing age range of the technique.

To date, the project team has made progress in the collection of sediment samples (68 in total) from 11 archaeological sites in northern and southern Spain. Various techniques have been applied for measurements related to the sediment materials collected. This has enabled ARCHOSL members to arrive at a number of preliminary results that are key to advancing the project’s underlying goals. For example, the majority of quartz samples that were measured display sufficiently bright and rapidly bleaching thermally transferred (TT)-OSL signals, enabling the estimation of burial doses from individual grains. One groundbreaking result has been the successful application of TT-OSL dating at the single-grain level, opening up the possibility of applying TT-OSL to a wider range of deposits.

Certain results also demonstrate the reliability of using extended-age optical dating methods on samples from the region, and highlight the potential for obtaining chronologies as far back as the Early/Middle Pleistocene boundary. Chronologies obtained as part of this study are some of the oldest produced to date using newly emerging luminescence techniques.

Ongoing ARCHOSL work will advance the quest to confidently reconstruct the emergence and expansion of human species in western Europe, placing Europe and Spain in particular at the forefront of emergent geochronology research. It will also contribute to improved interpretations of when and how past environmental changes impacted human populations and their