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Project summary

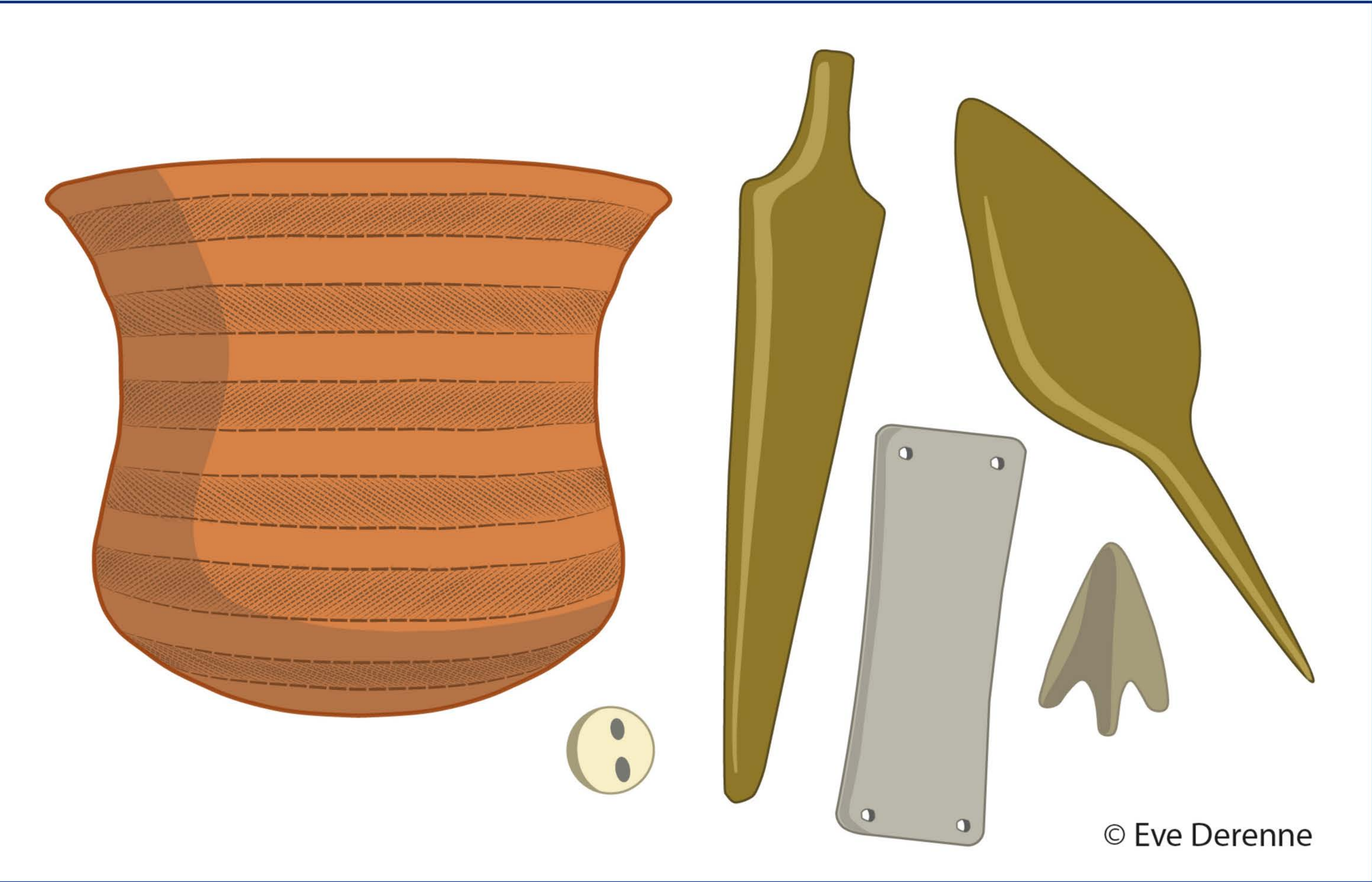
The 3rd millennium BCE saw the emergence of maritime networks across the Mediterranean, integrating its western and central regions through increased movement of people, cultural exchange, and seaborne trade and foreshadowing the rise of later Mediterranean civilizations. Bell Beaker ceramics, found from Iberia's Atlantic coast to Tyrrhenian Italy, are widely recognized as markers of this connectivity. However, limited chronological precision and fragmented regional studies have obscured broader interaction dynamics. SEASCAPES addresses these gaps by employing a multidisciplinary approach that combines expertise in prehistoric maritime networks, material culture studies, biomolecular archaeology, radiocarbon dating, and spatio-temporal modeling to explore the origins and macro-scale trajectories of Bell Beaker-period maritime interaction.



Objectives

SEASCAPES explores the emergence of maritime connectivity in the Central and Western Mediterranean during the 3rd millennium BCE, focusing on interactions between Europe and North Africa through cultural, dietary, and mobility patterns. Its findings engage directly with contemporary themes of migration, globalization, and cultural exchange. The project has four key objectives:

- **Data Synthesis:** Systematically compile and evaluate existing chronological and cultural data on Mediterranean Bell Beaker groups.
- **Radiocarbon Dating:** Launch the first large-scale dating programme for the Mediterranean Bell Beaker period, doubling the total number of radiocarbon dates in existence, and directly dating pottery using compound-specific radiocarbon analysis (CSRA) of lipid residues to refine early chronologies and typological sequences.
- **Dietary & Cultural Practices:** Analyse organic residues from ~800 sherds to reconstruct subsistence strategies (e.g., dairy production, aquatic resource use) and integrate results with spatial data to identify regional subsistence patterns.
- **Maritime Network Modelling:** Investigate the origins and spread of the Mediterranean Bell Beaker phenomenon and reconstruct maritime routes by integrating friction-surface models, Bayesian chronological outputs and the distribution of shared cultural traits.

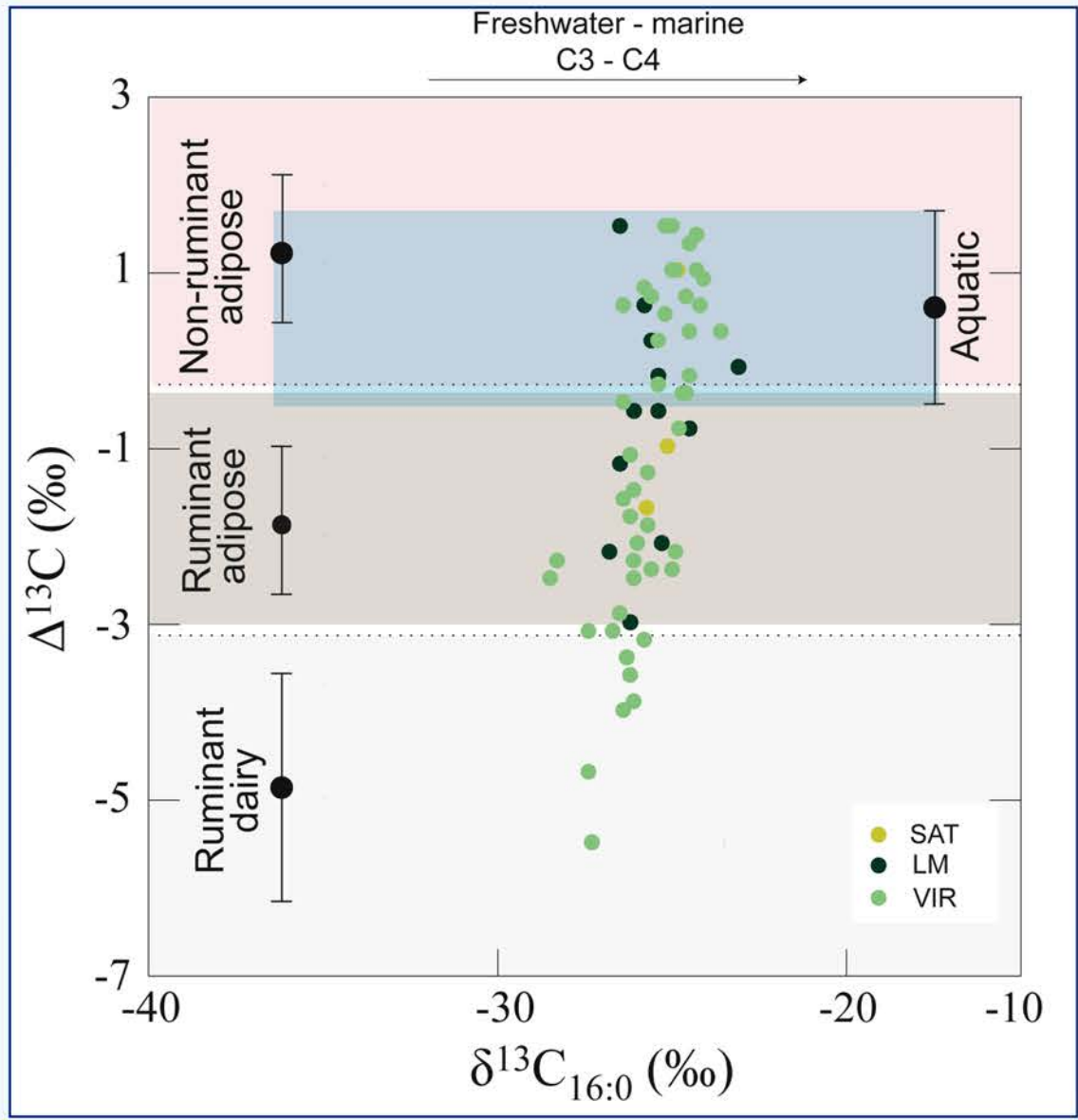


The "Bell Beaker package"

Methodology

The project integrates advanced radiometric dating and computational modelling in a **three-fold approach**:

- **Conducting the first large-scale radiocarbon dating programme** of Mediterranean Bell Beakers, more than doubling the number of high-quality radiocarbon dates from Mediterranean sites and providing the first adequate dating for a number of its regional variants. The project establishes a robust temporal framework combining AMS radiocarbon dating and compound-specific radiocarbon dating (CSRA) of lipid residues ($C_{16:0}$ and $C_{18:0}$ fatty acids) extracted from pottery sherds. Bayesian chronological modelling integrates the radiocarbon dates with stratigraphic and typological data, refining site-level chronologies and testing the synchronicity of cultural components.
- **Identifying spatial patterns in subsistence economies and dietary practices** through analysis of lipid biomarkers in pottery. Parallel mapping of shared material culture and subsistence patterns delineates interaction zones and regional exchange networks, connecting dietary habits with cultural traits and offering insights into how subsistence strategies influenced—or were influenced by—maritime connectivity.
- **Testing hypotheses on the dynamics of the origins and spread of maritime networks** during the 3rd millennium BCE through spatio-temporal least-cost-path modelling, incorporating the outputs of Bayesian chronological modelling with newly generated and compiled chronological, cultural, dietary and environmental evidence to identify directional trade asymmetries and correlating network centrality.



First results

Bayesian chronological models have been produced for 123 sites across the research area of the project. Key parameters from these site-based models provide the input for the network analysis. Preliminary results suggest that the emergence of the Bell Beaker phenomenon in Portugal occurred approximately 200 years later than previously suggested, at ca. 2550 cal BCE.

The analysis of absorbed pottery lipids reveals high proportions of non-ruminant adipose fats for sites in southeastern Iberia, which suggests important consumption of pork.

Partners

SEASCAPES is based on a collaborative international network and would not be possible without the local knowledge and expertise of our collaborators:

- **Portugal:** Dr. Michael Kunst (formerly German Archaeological Institute, Madrid), Prof. Ana Catarina Sousa (University of Lisbon), Prof. Victor Gonçalves (University of Lisbon)
- **Spain (Andalusia):** Prof. Juan Antonio Cámara (University of Granada), Dr. Alberto Dorado Alejos (University of Granada)
- **Spain (Balearic Islands):** Prof. Manuel Calvo Trias (University of the Balearic Islands), Dr. Damià Ramis (Independent Researcher), Dr. Jaume Coll Conesa (Museo Nacional de Cerámica y Artes Suntuarias González Martí)
- **France:** Prof. Olivier Lemerrier (University of Montpellier), Dr. Emilie Blaise (UMR 5140, Archéologie des Sociétés Méditerranéennes), Dr. Fabien Convertini (INRAP)
- **Italy (Sardinia):** Prof. Riccardo Cicilloni (University of Cagliari), Prof. Carlo Lugliè† (University of Cagliari), Dr. Gianfranca Salis (Soprintendenza Archeologia, Belle Arti e Paesaggio — Cagliari)
- **Italy (Sicily):** Dr. Enrico Giannitrapani (Arkeos), Dr. Filippo Ianni (Arkeos), Dr. Salvatore Chilardi (Independent Researcher)

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