PROVENANCE ANALYSES OF CHIPPED STONE TOOLS FROM NEOLIHIC PLATIA MAGOULA ZARKOU, THESSALY (GREECE)

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For prehistoric archaeologists, provenance studies of lithic raw materials for stone tool production are one of the keys for reconstructing prehistoric economic behaviour. However, traditional approaches were not able to cover the full scope of analytical techniques required for a secure "fingerprinting" of geological sources and the assignment of archaeological artefacts to specific source areas. This is especially true for silicites, such as chert, flint and radiolarite. The main problems concern the oftentimes high visual similarities and relatively pure nature of SiO_2 materials (e.g., HUGHES, 2010; BRANDL et al., 2018).

Here we show that the *Multi Layered Chert Sourcing Approach* (MLA) achieves a clear differentiation of radiolarites from Thessaly combining visual grouping, stereomicroscopic analyses of microfossil inclusions, geochemical trace element analyses applying Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS) and statistical analyses employing Compositional Data Analysis (CODA) (e.g. BRANDL et al., 2018). LA-ICP-MS allows for the detection of trace element concentrations down to 0.1 ppm, which is essential for the analysis of silicites.

We demonstrate the potential of the MLA chert sourcing method in a case study from a Neolithic and Bronze Age tell site in western Thessaly, Platia Magoula Zarkou[1] (GALLIS, 1996), where chert and radiolarite were extensively used for chipped stone tool production. Although Platia Magoula Zarkou represents a key site for the study of the Neolithic in Greece covering a time span from 5800 to 5100 BC, systematic provenance studies of the chipped stone industry have never before been undertaken. Our pilot project was able to reveal the origin of selected stone tools from the site, identify primary and secondary sources of the enigmatic "Pindos radiolarite", and establish the Koziakas mountain range with its adjacent rivers as a potential source area for early farming communities in the entire Thessalian plain.

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GALLIS, K. (1996): Die Grabungen von Platia Magula Zarkou, Souphli Magula und Makrychori 2. In: ALRAM-STERN, E. (ed.): Das Neolithikum in Griechenland, mit Ausnahme von Kreta und Zypern. Die ägäische Frühzeit, 2. Serie, Forschungsbericht 1975–1993, Wien, 521–562.

HUGHES, R.E. ET AL. (2010): Journal of Nordic Archaeological Science 17, 15-25.

1 The archaeological site was investigated in the course of the FWF project P 27159 *Platia Magoula Zarkou in Thessaly*.