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# Fires and noises of Late Paleolithic camps: The issues in spatial analysis of hearths

Iwona Sobkowiak-Tabaka\*<sup>†1</sup> and Aleksandr Diachenko\*<sup>‡2</sup>

<sup>1</sup>Institute of Archaeology and Ethnology, Polish Academy of Sciences – 46, Rubież, 61-612 Poznań, Poland

<sup>2</sup>Institute of Archaeology of the National Ukrainian Academy of Sciences – 12, Geroiv Stalingrada, 04210 Kyiv, Ukraine

## Abstract

This paper deals with the methodological issues in identification of hearths at Late Paleolithic sites of the North European Plain through the intra-site spatial analysis. Dominating in this area acidic sandy environment usually does not preserve not only organic debris such as burnt bones or charcoal, but often even not heat-altered sediments or ash which may easily indicate places of potential fireplaces. Moreover, in many cases low amount of iron in sand does not allow to change the color of the soil into red one. Other factors, which might have influence the weak preservation of fireplaces are their short utilization, cultural behavior, (i.e. sleaning) natural leaching of charcoals and other post-depositional processes. The utility of methods recently applied to archaeological data, including the kernel-density analysis, quadrant count method in its different modifications, sector and ring method, cluster analysis and point pattern analysis is discussed both from the perspective of their mathematical structure and specifics of sites in the macro-region. The analysis is accompanied by the case study on identification of hearths at the Federmesser and Swiderian camp-sites in Lubrza 10, Western Poland. Special attention in our research is given to the noisy effects in model outcomes, which are caused by natural fire events, human behavior behind the specific deposition of artefacts, vertical and horizontal re-deposition of materials, as well as the issue of patterns of ‘noisy’ shapes. Methodological insights into identification of hearths enable the discussion of camp structure and its duration in the Late Paleolithic of North European Plain.

**Keywords:** Late Paleolithic, hearths, intra site spatial analysis, campsite, preservation

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\*Speaker

<sup>†</sup>Corresponding author: iwona.sobkowiak@iaepan.poznan.pl

<sup>‡</sup>Corresponding author: oleksandr.diachenko@gmail.com