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Stratzing/Krems-Rehberg in its lithic landscape: Economic behaviour in the late Aurignacian of the Middle Danube region

Introduction

This paper presents preliminary results of a study that examines the predictive ability of distance and terrain difficulty on raw material provisioning for tool making at the Late Aurignacian site Stratzing/Krems-Rehberg (Lower Austria). We assume that present day raw material occurrences can serve as a reasonable proxy for the lithic landscape experienced in the prehistoric past.

Between 1985 and 2003, an interdisciplinary research project explored 1100 m² of the loess ridge on which the site is located (Fig. 1) (Neugebauer-Maresch 1996, 2008). The site stands out by the discovery of Austria's oldest work of art – an anthropomorphic figurine made of amphibolitic slate – besides the preservation of several in situ fireplaces (Fig. 2).

Materials and methods

The lithic assemblage chosen for analysis comes from the excavation area 1988-1991 (Fig. 1) and consists of ca. 7000 lithic artefacts. These have been catalogued into 32 types of raw materials partly relating to various proveniences. For this study we considered only 12 types representing almost 80 % of the lithic assemblage. The raw material analysis followed a two-step model (Fig. 3): 1. Macroscopic investigation to narrow down the source area of the lithic artifact; 2. Microscopic analysis to identify characteristic microfossil inclusions and textural patterns that indicate the geological formation of the rock and thus the provenance of the artifact (see Brandl & Reiter 2008; Brandl et al. 2011 for detailed description of the method).

Difficulty of terrain is a value in kiloCalories per kilometre drawing on the analytical method developed by L. Wilson (Browne & Wilson 2011). Terrain difficulty was measured for each route leading from the site to the source and back in a straight line and was performed by the Geographic Information System (GIS) software.

Preliminary results

Many archaeologists use the distance from site to source as a proxy for raw material cost. The results of this study suggest that difficulty of terrain, rather than distance alone, is a more significant factor with regard to the question why some sources were used more than others. The importance of exogenous erratic flint in the assemblage compared to the respective amounts of even local raw material classes (Tab. 1) clearly contradicts the distance-decay model positing that abundance decreases with distance. While the route separating Stratzing from the source area of erratic flint is by far the longest, it is also the easiest (Fig. 4). The reverse holds true for jasper, chalcedony and rock crystal. Although sources of the latter occur in the surroundings of the site, within a 20 km radius, they only account for extremely low amounts in the analysed assemblage (Tab. 1). At the same time, they also present the highest values with regard to the effort required by travelling from the site to the source and back. These observations indicate that difficulty of terrain, hence overall caloric expenditure, has more predictive ability on raw material provisioning and the organization of economic behaviour, than distance alone.

Perspectives

The strategies people used to keep themselves supplied with stone were influenced by a wide range of other factors that are beyond the scope of this study. Further research aims at examining the relationship between travel costs, distance, and intensity of raw material use. Moreover, it will be important to integrate further variables, including raw material weight, quality and size, to model raw material choice and procurement strategies in the context of the late Aurignacian of the Middle Danube region.

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Fig. 1 Stratzing/Krems-Rehberg, plan of excavation areas according to campaign years (graph Ch. Neugebauer-Maresch, OREA).

Fig. 2 Stratzing/Krems-Rehberg, hearth B (1989) with ring of stones and red burnt sediment (photo Ch. Neugebauer-Maresch).

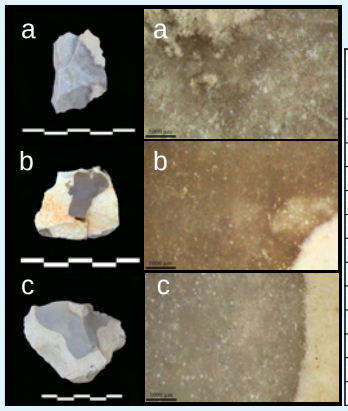

Fig. 3 a, b Artefacts of Stratzing/Krems-Rehberg; c geological sample of Krumlovský Les chert: macro- and microscopic views. The South Moravian origin of the artefacts, based on visual criteria, was confirmed by microscopical analysis (photos Brandl & Schmitsberger).

Raw material	Route length (km)	kilo-Calories	Difficulty (Cal/km)	% of pieces
Silicified limestone	4.2	442,39	105,33	2.04
Radiolarite	4.2	442,39	105,33	23.29
Quartzite	4.2	442,39	105,33	5.37
Quartz	4.2	442,39	105,33	12.95
Spongilite	4.2	442,39	105,33	1.81
Spiculite	4.2	442,39	105,33	9.46
Jasper	20.2	2194,98	108,66	0.39
Chalcedony	19.7	2101,33	106,66	0.09
Rock Crystal	10.8	1203,82	111,46	0.3
Chert (North Alpine)	4.2	442,39	105,33	1.64
Chert (South Moravia)	109.5	11556,4	105,54	0.76
Erratic flint	195.9	20384,5	104,06	41.88

Tab. 1 Stratzing/Krems-Rehberg. Route length and terrain difficulty between selected raw material sources and the site, and percentage of artefacts per raw material class.

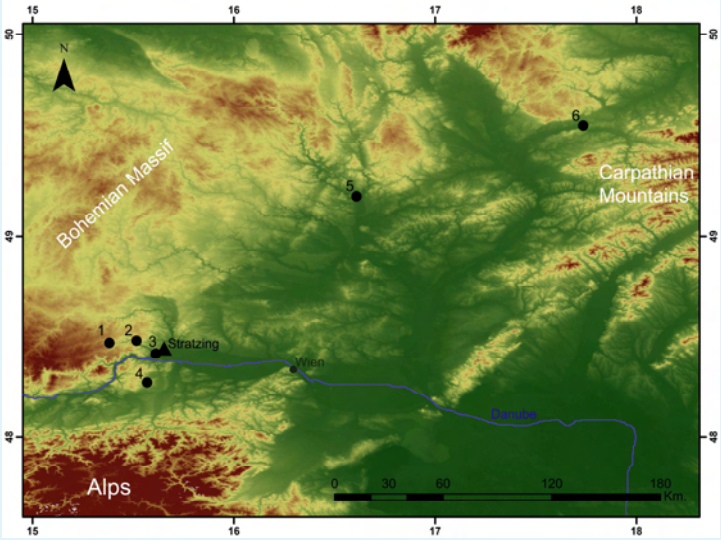

Fig. 4 Stratzing/Krems-Rehberg (triangle) in the lithic landscape of the Middle Danube region. Dots represent the sources considered in this study: 1 jasper; 2 rock crystal; 3 silicified limestone, north alpine chert, radiolarite, spiculite, spongilite, quartzite, quartz; 4 chalcedony; 5 South Moravian chert; 6 erratic flint.