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Neolithic polished axes from NW-Romania (Micula, Satu Mare County) – a mineralogical, geochemical and petrographic study

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The mineralogy, petrography and geochemistry of two polished stone axes found in the surroundings of Micula village, Satu Mare County, NW-Transylvania, Romania are presented here. Based on their shape, the axes are believed to be of Neolithic age. Few archaeological studies on Neolithic chipped or polished stone tools from the area, i.e. the Călineşti-Oaş site (Bitiri and Socolan, 1966) and Pietra Curmeni and Oraşul Nou sites, respectively (Simon et al., 2003) have been published so far.

The Micula Neolithic axes are made of metamorphic rocks, namely hornfels and amphibolites. Optical microscopy, X-ray diffraction, electron microprobe and prompt gamma activation analyses revealed that the hornfels axe (# II.3) consists of a fine matrix of feldspar and clinopyroxene with porphyroblastic feldspar and pyrite. The amphibolite axe (# II.5) shows a fine nematoblastic texture and consists of CaMg-amphibole and Ca-rich plagioclase. Mg-amphibole occurs additionally.

In order to find the possible sources for the raw materials, we collated our results with the (limited) petrochemical and the (more detailed) geological information available in the literature. The comparison with the references data and the geological background including the petrography of the surrounding areas, points to a large range of possible sources: from the northern part of the Eastern Carpathians, to the northern part of the Apuseni Mts. However, the findings of almost identically Neolithic polished tools to the south, at Suplacu de Barcău, may indicate that the northern part of the Apuseni Mountains and the alluvial pebbles of the Someş, Tisa, Crasna or Criş rivers are most likely the ancient raw materials sources used for the tools (Lazăr et al., 2007). Various hornfels occur in the north-western part of the Apuseni Mts., mainly in the thermal aureolas of the Late Cretaceous–Early Paleogene magmatics (so-called banatites) in sediments such as silty clays and clays (Ionescu and Balaban, 1998).

On the other hand, far-situated geological sources, such as the Bohemian Massif, cannot be excluded either, long trade routes for tools in the Paleolithic and Neolithic being known (Thorpe et al., 1984; Constantinescu et al., 2002; Simon et al., 2003). Further provenance investigations will focus on the study of samples from the neighbouring areas in order to provide sound data for comparison.

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