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The applicability of prompt-gamma activation analysis to obsidian provenance studies. The case of a strange find: a blade from Csongrád (South-East Hungary)

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Provenance research, i.e. identification of possible raw material sources of various archaeological objects, preferably using non-destructive methods, is a major task in Heritage Science. Prompt-gamma activation analysis (PGAA) turned out to be successful in provenance research of obsidians. Since the early 2000s, a significant database has been built at the Budapest Neutron Centre, which includes compositional data of about 500 geological and archaeological obsidian items, representing the major European and Mediterranean sources.

Besides the straightforward cases of provenance studies, however, there are still a few difficult questions to answer. During the excavations of a unique grave at Csongrád (SE Hungary), a long transparent obsidian blade, was found together with other objects. The grave was dated to 4370–4239 (1 σ , 68.2%) cal. BC, belonging to the first wave of the 'Pit Grave' culture and having strong eastern contacts.

In a 1983 study by energy dispersive X-ray spectroscopy (EDS), the blade was compared to the Carpathian 1 (Slovakian) type raw material. In 2019, PGAA and portable X-Ray Fluorescence analysis have been done on the piece. Based on the first results, the Csongrád specimen, unlike other archaeological samples studied so far, was not possible to unambiguously associate with any of the known obsidian types.

As a further step, we have extended our database with more geological reference data from both sides of the Caucasus (i.e. from Armenia and Georgia), which are the closest outcrops to the main distribution region of the Pit Grave Culture in the NE part of the Black Sea. Until now, still no reassuring explanation is available concerning the provenance of the Csongrád blade.

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