

NEWS – ZPRÁVY

Arch14CZ: A new open database of radiocarbon dates from the Czech Republic released**Arch14CZ: nová veřejná databáze radiokarbonových dat z České republiky byla spuštěna**

Radiocarbon dating has become a common and widely available method in archaeological research. The number of new dates increases accordingly, making it ever more difficult for a single researcher to grasp all the existing dates, even for a particular period or region. Without appropriate research tools, such as public databases and datasets, radiocarbon dates will remain largely unexploited. So far, dates from the territory of the Czech Republic have been summarized by the Archaeological Chronometry in Slovakia (c14.sk) database. This project at Comenius University in Bratislava gathered 916 Czech radiocarbon dates, but updates of this dataset did not continue beyond November 2014 (Barta *et al.* 2013). Most recently, an expanded dataset was published by Tkáč and Kolář (2021), which contains 1 579 radiocarbon dates partially adopted from the previous C14.sk dataset. The LASOLES dataset was built during a project focused on population dynamics during the Holocene and quantitative modelling of woodland dynamics. Therefore, regular updates are not guaranteed and also the chronological scope is limited to the period from 10 000 BC to AD 1250, excluding a large number of Palaeolithic dates particularly from Moravian sites.

The overview above makes it clear that constant updating is a critical attribute for any radiocarbon database to become an expedient source for archaeological research. Bearing this in mind, we have developed a new database – the Arch14CZ – within the project RAMSES (Ultra-trace isotope research in social and environmental studies using accelerator mass spectrometry). The database was released online at <https://arch14.aiscr.cz/> in May 2023. It has been integrated into the structure of the Archaeological Information System of the Czech Republic (AIS CR; <https://www.aiscr.cz/>) administered by the Institutes of Archaeology of the CAS in Prague and Brno. Being part of this national research infrastructure ensures that Arch14CZ will remain a stable and periodically updated data source into the future.

The mission of Arch14CZ is to gather all published radiocarbon dates from archaeological contexts in the Czech Republic. Remaining outside the scope is radiocarbon dating of palaeoecological contexts without direct human impact, for instance, palynological cores or anthracological sampling. On the other hand, the chronological scope of Arch14CZ is unlimited and covers all periods since c. 50000 BC until the present. The earliest dates are defined only by the limits of the radiocarbon method itself. In the Czech Republic, the oldest dates come from Kůlna Cave and Brno-Bohunice reaching the end of the Middle Palaeolithic around 45000 BC (Valoch 1980; 2008). The opposite side of the chronological range is occupied by the radiocarbon dating of a mass grave from the Napoleonic Wars from Brno-Staňkova ulice (Vymazalová *et al.* 2020). Arch14CZ also records cases in which radiocarbon dating returned recent or sub-recent results for archaeological samples. Although these are perceived as failures usually caused by sample contamination and most of these results do not get published, it is important to keep the evidence to know more about error rate and all dating attempts for particular contexts. Based on all these criteria, the database currently contains 2 420 radiocarbon dates from 479 sites, which were excerpted from 367 published sources.

The structure of Arch14CZ follows the course set by the Slovakian C14.sk database. Both put emphasis not only on information about the dating but also on the sample (type of material, anthropological determination of bones, etc.) and sampled context (exact site location, type of site and

archaeological feature, relative chronology). Where available, individual radiocarbon dates are accompanied by an AMCR ID accessible through an API. This AMCR–Arch14CZ interoperability enables users to link the radiocarbon date with the corresponding fieldwork event. With upcoming versions of the AMCR Digital Archive, it is planned that this interoperability will work in reverse. Arch14CZ also reuses AMCR-controlled vocabularies while keeping the reference to the original term's IDs. Although many radiocarbon databases omit or refer to the archaeological context only in a very limited way, we consider the contextualisation crucial for further analyses of the dataset. For that reason, the information about result reliability is also recorded. It refers to the disagreement between the archaeological and radiocarbon chronology i.e., between the target event and the dated event (*Bayliss 2015*, 689). This is not a negligible problem, since nearly 12 % of recorded dates have some kind of disorder.

The backend interface of Arch14CZ is based on the Deposit open-source graph database engine (*Demján 2013*). It allows for a high degree of flexibility to modify and extend the database scheme if such a requirement arises during the lifetime of the database. It also makes it possible to maintain the high granularity of the data where vocabulary-type entries (e.g. material type or relative dating) are kept separately and linked to the radiocarbon measurement data via relations. The backend as well as the frontend interface are available as free and open source. Both can be re-used to implement radiocarbon databases for different regions or other databases that require complex, interlinked schemes (*Demján 2021a*; *2021b*).

The user can access Arch14CZ via an intuitive web interface that allows elementary filtering of database records according to location, relative chronology, context type, and sampled material. Thanks to the built-in calibration employing the current internationally acknowledged calibration curve IntCal20 (*Reimer et al. 2020*), records can be classified according to the calendar age. Database exports are available in CSV and XLS formats. The whole dataset as well as individual records can also be accessed via an API.

We believe that the Arch14CZ will become a useful tool for researchers in the Czech Republic and abroad interested in radiocarbon chronologies. They can even contribute with their own data, both published and unpublished, to help the project develop. We also encourage anyone who finds any omissions or mistakes in the dataset to contact us.

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