The Beginning of the Middle Bronze Age in Central Europe Based on Radiocarbon Data Models

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Abstract

Current views on the dating of the end of the Early and the beginning of the Middle Bronze Age strongly reflect local chronologies based on the typological scheme. The beginning of the Middle Bronze Age in the region of Moravia (as in Austria, Bohemia and south Germany) was determined on the basis of pottery associated with the Tumulus culture and metals defined as the Mistelbach-Regelsbrunn period, the Lochham horizon, or the Koszider period. An important role in this asynchrony is played by the various ideas defining Koszider hoards and metals as a short episode, which was recently replaced by the longer Koszider period. We describe a way to move beyond this asynchronicity of opinions using radiocarbon dates. Dating independent of archaeological typology makes it possible to work with the entire space as a single development unit.

The end of the Early Bronze Age in Moravia after the disappearance of the Únětice culture is referred to as the Věteřov group (late BA2), which is replaced by the emerging Tumulus culture (BB-BC) in the Middle Bronze Age. At the time of this change we can see a very low number of burial features (Stuchlík 2006). From a geographical perspective, the territory of Moravia is open to the Danube Region and, via passes through the Carpathian Mountains, to Slovakia and the Carpathian Basin, where an entirely different image of development is described. At large burial grounds with several hundred graves (Dunaújváros-Duna-dülö, Gemeinlebarn, Franzhausen II, Jelšovce), burials were made over a long period of time from the Early Bronze Age to the beginning of the Middle Bronze Age – BB1 (Neugebauer et al. 1997; Neugebauer 1991; Bátora 2000; Vicze 2011).

It is generally assumed that the hilltop sites associated with the Koszider period in Hungary or the final horizon of the Early Bronze Age with signs of the Maďarovce-Věteřov-Böheimkirchen culture in the westernmost part of the Carpathian Basin survive to BB1, which is also documented by radiocarbon dates (Kiss 2007; Fischl et al. 2013; Benkovsky-Pivovarová and Stadler 2019). In Moravia, hilltop sites were founded since the beginning of the 2nd millennium BC. The best known of these is the central site of Blučina "Cezavy". The end of the existence of hilltop sites in Moravia is associated with the end of the Early Bronze Age, and the most complete sequence of radiocarbon dates, which comes from Blučina, confirms this (Salaš 1986; Peška 2006; 2012a; Stadler et al. 2000). That the abandonment of hilltop settlements of the Early Bronze Age occurred along with the end of the deposition of Věterov group graves is rather unlikely in view of the current state of knowledge in the surrounding regions of Central Europe.

Radiocarbon data and the suitably used methods of their statistical evaluation give us an objective tool for cross-chronological comparison. The radiocarbon data for this study is based primarily on a sequence of 25 inhumation graves from Moravia with well typologically identifiable material, which we refer to as the basic data set. For the models, additional data is added from graves and settlements from Central Europe. The radiocarbon data evaluation is based on modelling in the OxCal application (Bronk Ramsey 2009).

Radiocarbon data help to significantly understand the dynamics of material culture. It turns out that different types of bronze industries have horizons of occurrence of varying duration. We have verified that while we are unable to use daggers or axes for a more precise chronology, we can work with graves with the presence of pins, similar to more recent works from Germany and Switzerland (Stockhammer et al. 2015; Massy 2018; Brunner et al. 2020).

The starting model of pin horizons from graves with radiocarbon data from Central Europe defined an independent timeline, which in this work was an alternative to traditional synchronisation based on Reinecke's periods. The four pin horizons are characterised by: the group of globe-headed pins with oblique perforation (schrägdurchlochte Kugelkopfnadeln), which in this work have been divided into two horizons, the early one represented primarily by the Matzhausen type and the later horizon by globe-headed pins with oblique perforations (Kollstein type and conical head pins). The third horizon was represented by disc-headed pins with a neck hole, for which we use the generic term Wetzleinsdorf type and the horizon of seal-headed pins (Petschaftskopfnadeln).

The beginning of the independent timeline could be synchronised with Únětice pins, which, based on radiocarbon data, begin to occurred at almost the same time as the globe-headed pins with an oblique perforation. The end of the axis, exactly the beginning of the seal-headed pins, is then linked to the still existing sickle-shaped pins with disc heads (Sichelnadel), using the example of a specimen from the Jánoshida-Berek burial site. The occurrence of this type may have started earlier, but this is not yet documented by radiocarbon data. We have established the boundary between the Early and Middle Bronze Age as the transition period between the globe-headed pins with oblique perforations, which are a characteristic artefact of the Early Bronze Age, and those of the Wetzleinsdorf, which are considered to be an artefact of the Middle Bronze Age.

On the basis of cross-referencing between independent models, the timeline was connected, to a settlement sequence. The sequence of a simple 2-phase model for late globe-headed pins with oblique perforations and Wetzleinsdorf-type pins was used as the first model. We add sequence "hilforts", a third independent phase, consisting of radiocarbon dates obtained from long-occupied sites (tell or hilltop settlement). Based on three case studies, the known radiocarbon sequences of sites from the end of the Early Bronze Age have been divided into those that end their development before the transition boundary – the Blučina case study, those that clearly continue beyond that boundary and still exist after the horizon of the globe-headed pins with oblique perforations – the Böheimkirchen case study and the third Jászdózsa-Kapolnahalom case study, which has one of the positive indexes in the model and stays among the previous models. The hilltop sites coinciding with the Blučina case study are Kakucs-Balla-domb, Kakucs-Turján, Kroměříž-Hradisko, Waidendorf-Buhuberg and, with some reservation , Vrcovice-Dolní Lipnice. Among the hilltop sites coinciding with the Böheimkirchen case study are Százhalombatta-Földvár, Rybník-Nad Hronom and, presumably, Jászdózsa-Kápolnahalom. Two basic facts emerged from this modelling. Firstly, that the disappearance of hilltop sites in the Carpathian basin area is not contemporary and secondly, that the early disappearance of hilltop sites in Moravia is not exceptional. The decline of hilltop sites is contemporary with a significant group of sites in Central Europe. On the contrary, sites that survive to the horizon of Wetzleinsdorf type pins are exceptional. Based on current data, we have no reason to suppose that the change in dynamics of hilltop sites in central Moravia (Hradisko u Kroměříže) is different from that in southern Moravia.

The basic set of radiocarbon data from Moravia could also be synchronised with a crucial key study for southern Germany and Switzerland (Brunner et al. 2020), which, based on radiocarbon data, attempted to define the Reinecke periods time interval in absolute data. Based on the same model, we concluded that there is striking similarity in these two regions in the chronological intervals calculated by the model and based on the pooled data we attempted to define Reinecke's periods more generally.

The beginning of the Middle Bronze Age is proven with high probability at c. 1610 cal BC by models with radiocarbon data of graves with metals. The occurrence of Tumulus style pottery at the same time is based on only one date and must now be referred to as a hypothesis. The elements of the previous horizon of the Early Bronze Age still survive. Based

on the model of the typological-chronological scheme, we define this period of the declining style of the Earlier Bronze Age in the interval beginning around 1600 BC and ending in the second half of the 15th century BC. Metals of an Early Bronze Age character and pottery of the late Early Bronze Age ceramic style appear in graves, hoards of the Koszider horizon, as well as in some settlements. This period has been treated by many periodisation systems as being separate. However, based on our processing, we have come to the conclusion that no horizon or degree between the horizons of Langquaid (BA2) and Lochham (BB1) can be defined. We argue that none of the grades thus defined (BA2 spät, MD I, BA3, BA2c) is appropriate for the situation in Moravia. S. Stuchlík (last 2006) has long been in favour of a two-stage classification of BA2 (early-late). Z. Pivovarová-Benkovsky in her last work (Benkovsky-Pivovarová – Chropovský 2015) and the work by M. Ernée are also based on the two-stage division of period BA2 (Ernée 2015; Ernée – Langová et al. 2019). Thus, current chronological concepts reject a more detailed division.

The submitted work, along with the presentation of new radiocarbon data from the graves, also provides a synthesis of typological elements and radiocarbon data. The data models have been designed so that chronological relationships can be described with a high rate of objectivity. Possible data arrangements were presented in the discussion, helping to answer the hitherto ambiguously perceived relationships between radiocarbon dates, traditional typological and cultural patterns, between Moravia and surrounding regions. The submitted data models and proposed interpretation schemes may be supplemented, refined or revised in the future on the basis of new data.

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