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Dating the Beginning of the Late Bronze Age

As part of the FHŠ and IFIN-HH collaboration project, we performed a series of AMS datings of samples from the late 15th and early 14th centuries BC at the 1 MV Tandetron of the Department of Applied Nuclear Physics. The aim of the project was to date the oldest cremation graves in eastern Slovenia from the Zavrč cemetery and to synchronize the chronology of the beginning of the Late Bronze Age with the wider cultural area ranging from the Carpathian Basin to northern Italy. Based on the previous results of datings of various sites in the region, new datings and comparisons of the results, we demonstrated that the Urnfield Culture in Central-Eastern Europe begins around $1,420 \pm 20$ BC.

As part of the project, we dated charcoal samples and samples of cremated bones from the same contexts. In the past experiments in controlled environments clearly demonstrated that exchange of carbon between bone apatite carbonate and CO_2 in the combustion gases depend on both temperature and CO_2 concentrations. Hence CO_2 derived from woods from the cremation fires is likely substituted into the bone bio-apatite fraction explaining the remarkable similarity of $\delta^{13}\text{C}$ values of cremated bones. Our assumption was that in open pyres the concentration of CO_2 was lower and that the age discrepancy between the results could be explained with the old wood effect.

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