Earliest musical instruments in Europe 40,000 years ago

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A flute from the site of Geißenklösterle made from mammoth ivory.

The first modern humans in Europe were playing musical instruments and showing artistic creativity as early as 40,000 years ago, according to

new research from Oxford and Tübingen universities.

The researchers have obtained important new radiocarbon dates for bones found in the same archaeological layers as a variety of musical instruments. The instruments take the form of flutes made from the bird bones and mammoth ivory. They were excavated at a key site in Germany, which is widely believed to have been occupied by some of first modern humans to arrive in Europe.

In a paper published in the *Journal of Human Evolution*, the researchers describe the new dating results for animal bones, excavated in the same archaeological layers as the instruments and early art, at Geißenklösterle Cave in the Swabian Jura of southern Germany. The animal bones bear cuts and marks from human hunting and eating.

The new dates were obtained by Professor Tom Higham and his team at Oxford University, using an improved ultrafiltration method designed to remove contamination from the collagen preserved in the bones. The researchers show that the Aurignacian, a culture linked with early modern humans and dating to the Upper Paleolithic period, began at the site between 42,000 and 43,000 years ago.

The new dating evidence, obtained from bones in the site, provided results that are 2,000 to 3,000 years older than previously thought. So far these dates are the earliest for the Aurignacian and predate equivalent sites from Italy, France, England and other regions.

Lead author Professor Higham from Oxford University said: "High-resolution dating of this kind is essential for establishing a reliable chronology for testing ideas to help explain the expansion of modern humans into Europe, and the processes that led to the wide range of cultural innovations, including the advent of figurative art and music."

Professor Nick Conard of Tübingen University, who was excavator at the site, said: "These results are consistent with a hypothesis we made several years ago that the Danube River was a key corridor for the movement of humans and technological innovations into central Europe between 40,000 and 45,000 years ago. Geißenklösterle is one of several caves in the region that has produced important examples of personal ornaments, figurative art, mythical imagery and musical instruments. The new dates prove the great antiquity of the Aurignacian in Swabia."

The study results indicate that modern humans entered the Upper Danube region before an extremely cold climatic phase at around 39,000 to 40,000 years ago. Previously, researchers had argued that modern humans initially migrated up the Danube immediately after this event.

"Modern humans during the Aurignacian period were in central Europe at least 2,000 to 3,000 years before this climatic deterioration, when huge icebergs calved from ice sheets in the northern Atlantic and temperatures plummeted," said Professor Higham. "The question is what effect this downturn might have had on the people in Europe at the time."

The results are also important for considering the relationship between early moderns and Neanderthals in Europe. Despite a major effort to identify archaeological signatures of interaction between Neanderthals and modern humans in this region, researchers have yet to identify indications of any cultural contact or interbreeding in this part of Europe.

The results suggest that the Danube Valley is a plausible homeland for the Aurignacian, with the Swabian caves producing the earliest record of technological and artistic innovations that are characteristic of this period. Whether the many innovations found in Swabia were stimulated by climatic conditions, competition between modern humans and

Neanderthals, or by social and cultural influences that formed quite independently remain a central focus of their research.

More information: www.sciencedirect.com/science/ … ii/S0047248412000425

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