

'Peking Man' older than thought; somehow adapted to cold

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Darryl Granger, a Purdue professor of earth and atmospheric sciences, stands with the accelerator mass spectrometer used in a study that determined the age of "Peking Man" was around 200,000 years older than previously thought. Purdue is the only university in the nation with an accelerator mass spectrometer powerful enough to perform the type of testing used in this study. (Purdue News Service photo/Andrew Hancock)

(PhysOrg.com) -- A new dating method has found that "Peking Man" is around 200,000 years older than previously thought, suggesting he somehow adapted to the cold of a mild glacial period.

A dating method developed by a Purdue University researcher allowed a more accurate determination of the age of the Zhoukoudian, China, site of remains of *Homo erectus*, commonly known as "Peking Man." The site was found to be 680,000-780,000 years old. Earlier estimates put the

age at 230,000-500,000 years old.

Darryl Granger, the Purdue professor of earth and atmospheric sciences who developed the dating method, co-led the study with Guanjun Shen of China's Nanjing Normal University. They analyzed four stone tools and six sediment samples from the site.

"This was the first dating of this kind to be used in an early hominid site in China," Granger said. "Many of the existing data methods rely on the availability of volcanic rock, which the Zhoukoudian site does not have. This method provides a new tool to provide insight into places where dating was previously limited."

A paper detailing the work is featured on the cover of the current issue of *Nature*.

Susan C. Antón, associate professor in the Center for the Study of Human Origins at New York University said this discovery indicates "Peking Man" was somehow behaviorally able to cope with the cold environment.

"There is evidence that Homo erectus had physically adapted to the cold, but they probably also had to be doing something in terms of behavior to handle the cold of a glacial period in northern China," she said. "There isn't good evidence of fire or any kind of skins or clothing, but evidence of such things doesn't last long and wouldn't be recorded particularly well in the archeological record. It doesn't mean they didn't have them, but we don't have a definitive answer."

Homo erectus is considered to be the ancestor species to humans and the first species that left Africa and moved into Asia. The "Peking Man" site, discovered in the late 1920s, was among the first found for Homo erectus and shaped the thoughts on the age and behavior of the species,

Antón said.

Granger used aluminum-26 and beryllium-10 radioisotopic dating, which is based on radioactive decay in the mineral quartz. As cosmic rays penetrate into rocks at the Earth's surface, chemical reactions produce these isotopes of aluminum and beryllium. If the rocks are then buried, the isotopes are no longer produced and those existing begin to decay. The rate of decay can tell researchers when the rocks were deposited in a site, he said.

Granger developed the method in 1997 and first used it for geomorphology work in caves in Virginia, but he recognized it could be used at hominid sites important to understanding human evolution. A colleague in China contacted Granger and asked him to examine the Zhoukoudian site.

The Purdue Rare Isotope Measurement Laboratory, which is funded by the National Science Foundation, is one of only two laboratories in the nation with equipment capable of performing this kind of dating. The facility contains an accelerator mass spectrometer that can perform ultra-sensitive analyses to measure low levels of trace elements in a sample.

Uranium-based methods of dating had been used at the site, but it appears the results had underestimated the ages, probably due to uranium dissolved in groundwater, Granger said.

Co-authors of the paper include Guanjun Shen and Bin Gao of the College of Geographical Sciences at Nanjing Normal University and Xing Gao of the Institute of Vertebrate Paleontology and Paleoanthropology at the Academia Sinica in Beijing.

The research team had difficulties in separating quartz from the sediment samples, and Shen and Gao got their entire department in on

the work, Granger said. The sediment contained about 1 percent quartz, and the dating method requires pure white quartz.

"They ended up hand separating these bits of quartz the size of grains of sand," he said. "It took about eight hours to separate 2 grams of the pure white quartz needed, and each sample required 40 to 60 grams. Luckily the stone tools we analyzed were made only of white quartz."

Granger and Shen next plan to work on other poorly dated hominid sites in China.

Source: Purdue University

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