



## **Cal Poly Professor Part of Team Conducting Research On Oldest Human Settlement in Northeast Asia**

SAN LUIS OBISPO -- In collaboration with Chinese earth scientists, Cal Poly Physics Professor Kenneth Hoffman has established the age of ancient stone tools found in northern China: 1.36 million years. The tools now represent the earliest known presence of humans in northeast Asia, according to an article published in the September issue of the journal *Nature*.

The work is important because it places in time the earliest known human settlement in Northeast Asia, providing an important piece of the puzzle tracing the path and timing of human migration throughout the Paleolithic Age, according to editors at *Nature*.

Hoffman was invited to Beijing in March 2001 by Dr. Rixiang Zhu of the Chinese Academy of Sciences. Zhu's group at the Institute of Geology and Geophysics had already conducted extensive research on the ancient dry-lakebed sediments in which the stone tools were found.

However, the true age of the tools had remained a mystery since their discovery in the remote Nihewan Basin at the Xiaochanglian archaeological site in northern China more than two decades ago.

Establishing their age proved difficult because they were found in sediments lacking the usual natural materials that typically give scientists reliable materials for carbon- or other radioactive- isotope dating methods.

While in Beijing, Hoffman was able to review the Chinese data and help establish the age of the stone tools using the "magnetostratigraphy" of the sediment section.

This scientific technique involves the investigation of magnetic direction of sediment layers.

"We know that Earth's magnetic field 'flips' polarity from time to time in the geologic past, causing compass needles to switch direction from pointing northward to pointing southward, or back again," Hoffman explains. "And for the last several polarity reversals the ages are rather precisely known."

Magnetic particles in each sediment layer record the direction of the field at the time they are deposited and hold that direction through the ages.

In Beijing, Hoffman was able to determine the sequence of magnetic polarity recorded in the ancient sediment section from well above to well below the layer in which the stone tools were found. Hoffman was then able to establish the tools' age: 1.36 million years.

The date makes Xiaochangliang the site of the oldest known human settlement, as well as the oldest assembly of recognizably Paleolithic stone tools found to date in Northeast Asia.

Hoffman holds a Ph.D. in geophysics from the University of California at Berkeley and is an internationally recognized expert in paleomagnetism — the study of Earth's past magnetic field — and, in particular, polarity reversal. The stone-tool paper is Hoffman's eighth publication in the prestigious journal *Nature* since his arrival at Cal Poly in 1974.

Rick Potts, director of the Human Origins Program at the Smithsonian's National Museum of Natural History and co-author of the paper, helped provide the context and paleoarcheological significance of the result.

For more information on the *Nature* article or to purchase a copy, visit the journal's Web site at [www.nature.com](http://www.nature.com).

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**Cal Poly Public Affairs**

California Polytechnic State University

San Luis Obispo, CA 93407

805.756.7266

[polynews@calpoly.edu](mailto:polynews@calpoly.edu)