

Abstract:

Genetic evidence suggests an African origin for modern human ANATOMY, and archaeological evidence suggests a sub-Saharan African origin for modern human BEHAVIOR. Testing the latter hypothesis requires a reliable, precise and accurate chronology for the first appearance of innovations considered hallmarks of the origin of modern human behavior, including ground bone tools, art, ornamentation, sophisticated stone tool technologies and resource exploitation patterns, and systematic trade over long distances. These innovations are conventionally associated with the transition from the Middle to the Later Stone Age. This transition may be earlier than the Middle to Upper Paleolithic transition in N. Africa and W. Eurasia, but this is difficult to prove because most chronometric techniques that can be used in this time range (40-100,000 years ago) are highly unreliable, particularly radiocarbon dating. Advances in techniques of radiogenic argon dating ($^{40}\text{Ar}/^{39}\text{Ar}$) by single crystal laser fusion dating of volcanic tephra make it possible to obtain accurate and precise dates on eruptions as young as 2000 years old. The central and southern Rift Valley regions of Kenya have many Middle and early Later Stone Age sites with stratified volcanics. The primary sources of traded obsidian are in the central Rift and the southern Rift sites often have excellent bone preservation. Several archaeological sites with multiple stratified volcanic horizons have now been sampled in both areas of the Rift. In the southern Rift, test excavations have been conducted at four sites that have MSA and/or early horizons. Each site has two to four volcanic layers stratified within the archaeological deposits. Argon dating will be performed by Dr. Alan Deino at the Berkeley Geochronology Center, USA. Amino acid racemization of ostrich eggshell provides an additional means of dating archaeological sites. Dr. Gifford Miller of the University of Colorado, Boulder, has dated the top of an 8-meter thick Early LSA to MSA sequence to 32,000 BP. The shell also produced a radiocarbon date of 29,975 BP. The MSA/LSA transition occurs approximately 7 meters below this date, and one meter below a volcanic ash. The late MSA and transitional horizons have high frequencies of traded obsidian. The results of chronometric dating on the tephra from the transitional industries at two of these sites should make it possible to test the hypothesis for an east African origin for modern human behavior.