



# 2009-10 AAPG Distinguished Lecture

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## Abstract

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## The Paleoclimatic Framework of Human Evolution

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There is a growing consensus that climate variability (i.e. magnitude and frequency of climate change) was an important factor in natural selection. Reconstruction of the environment requires multidisciplinary interaction of geologists, soil scientists, paleoanthropologists and paleoecologists. The study of a Plio-Pleistocene “time slice” in Olduvai Gorge, Tanzania provides a successful example of a reconstructed paleolandscape that is rich in detail and adds a small piece to the puzzle of hominin evolution in

Africa. Lake Olduvai in the Olduvai basin expanded and contracted on Milankovitch time scales (23 Ka). Groundwater-fed wetlands provided a source of food and safety in an otherwise harsh setting. The importance of springs and wetlands to the ecology of hominins at Olduvai had not been appreciated before and the linkage was noted only because of the interdisciplinary approach of the research.

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## The Sedimentary Record of Human Evolution

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When and where humans evolved are fundamental questions that capture our attention and spark curiosity. Until recently most geologists involved in human origins research were geochronologists interested in dating fossils and adding branches to the hominin family tree. Questions now being asked need an interdisciplinary approach. Why did humans leave the safety of trees? What were the drivers that may have nudged hominids toward bipedalism and developed species that failed, while only one ultimately succeeded? Were the development of tools, the exodus from Africa, and brain development leading to

language, art and imagination a passive or direct response to some paleo-environmental stresses?

Sedimentary Geology is crucial to finding the answers to these questions. Studies involving (1) stratigraphy and correlation, (2) paleoclimate and climate change, (3) paleoenvironmental reconstruction, (4) water and food resources, (5) sourcing of raw materials for stone tools, and (6) associated flora and fauna at sites in East Africa show that Sedimentary Geology provides fundamental insights into questions of human origins.

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## Gail Ashley

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Dr. Ashley is a geoscientist of international stature. She is Professor II of Geological Sciences at Rutgers University (New Brunswick, NJ) and Director of the Quaternary Studies Graduate Program there. She has been at Rutgers for 30 years and supervised 37 graduate students (~50% were women). Her current research focuses on the paleoclimate record of East Africa during the time of early human evolution. She received her PhD from University of British Columbia and has served as president of the Geological Society of America (GSA), the Society for Sedimentary Geologists (SEPM), the American Geological Institute (AGI) and Vice-President of the International Association of Sedimentologists (IAS). Her publication list includes over 75 peer-reviewed articles and editorship of six books. She has also served as Editor-in-Chief of the international publication, *Journal of Sedimentary Research* (1996-2000) and on numerous National Research Council and National Science Foundation boards, committees and panels. She has received the New Jersey Women of Achievement Award, the Association of Women

Geoscientists “Outstanding Teacher Award” and both the Distinguished Service Award and Honorary Membership from SEPM.

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