

Title**Complex Geophysical Processes and Coupled Paleobiological Records in the Eastern Africa Rift: Accidental Mixes or Unique Ecological Niches?**

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Abstract

Plate Tectonics moved and pinned the African continental plate within equatorial latitudes for the past 150 million years, creating unique ecological conditions for animals and plants to continuously proliferate. The African Plate became ridge-bounded with negligible plate motion, causing hot, low-density mantle material to rise and trigger the Afar Plume. The rising plume led to regional uplift/doming, widespread volcanism, rifting, and breakup along the northeastern part of the plate, leading to the formation of the Red Sea and the Gulf of Aden oceanic rifts, the proto-oceanic Afar Rift, and the continental eastern Africa Rift System (EARS), starting at about 30 million years ago. Today, the EARS is one of the most active continental rift systems in the world.

Extensive data from three decades of tectonic, geological, paleobiological, and paleoenvironmental investigations in the Middle Awash region and adjacent areas of the Afar Rift in northeastern Ethiopia reveal the complex interactive processes recorded within the rift basins. For example, paleobiological records indicate that anatomically modern human beings and their ancestors originated and inhabited the EARS for millions of years before they dispersed out of Africa. Despite hostile settings and conditions related to intense geophysical processes and voluminous volcanic eruptions within the rift basins, favorable ecological niches allowed the sustenance, proliferation, and preservation of records of rich fauna and flora. The presentation will highlight the geological processes, the paleobiological records and paleoenvironmental conditions, and the emergence of anatomically modern humans potentially within the Afar Rift.

Bio-sketch

Dr. Giday WoldeGabriel, a native of Ethiopia, earned his PhD in Geology from Case Western Reserve University in Cleveland, Ohio in 1987. He joined the Earth and Environmental sciences Division of the Los Alamos National Laboratory as a Directors postdoctoral fellow in 1987. He has worked on many projects related to geothermal energy, environmental restoration, site characterizations for nuclear waste disposal, oil shale resources evaluation, natural phenomena hazards assessments, etc. He also actively collaborates with colleagues from the University of California, Berkeley and the University of Tokyo on the geology, tectonics, and human origins studies in the Ethiopian Rift System. Giday has authored and coauthored more than 80 peer-reviewed papers, including about 15 papers in Science and Nature journals. He organized two international workshops on 'Transboundary Water Issues in the Nile River Basin and on 'Tephra Applications to Geological and Environmental Studies'. He is a recipient of the 2001 LANL Fellows Prize and was selected Laboratory Fellow in 2010. He is Editorial Board Member of Quaternary International, the Journal of the International Union for Quaternary Research.