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375-3: GEOCHEMICAL CHARACTERIZATION AND CORRELATIONS OF UPPER HADAR FORMATION CORE AND OUTCROP TEPHRA: NORTHERN AWASH SITE, HOMININ SITES AND PALEOLAKES DRILLING PROJECT (HSPDP)

Wednesday, 25 October 2017
09:00 AM - 06:30 PM
Washington State Convention Center - Halls 4EF

Continuous, high resolution paleolake records are crucial to improve our understanding of the interplay of basin-scale, regional, and global influences on the climate history of East Africa. High-precision paleorecords, when combined with examination of the faunal record in adjacent hominin-bearing outcrops may also lead to an understanding of the influence of climate change on hominin evolution. These endeavors are dependent on establishing a solid chronostratigraphic framework for the paleolake records. Tephra layers recovered from the lake cores provide well-defined isochronous markers, and through the use of geochemical fingerprinting allow precise correlations.

The HSPDP Northern Awash (NA) core site is located 30 km NE of the Hadar Formation type area and hominin fossil sites. Three cores of Hadar Formation sediments were collected from the NA site with a composite thickness of ~285 meters of material and ~98% recovery. In this study we use geochemical analyses of outcrop and core tephra (individual volcanic glass shards and feldspar crystals) to establish chronostratigraphic links between the NA cores and Pliocene fossiliferous Hadar Formation outcrops at Hadar and Ledi-Geraru. Individual glass shards of 10 outcrop tephras and 13 NA core tephras were analyzed for their major, trace, and rare Earth element (REE) abundances. Feldspar crystals from three outcrop tephras and 15 NA core tephras were also analyzed to provide additional correlations. Of the nine NA core vitric tephra, four are compositionally bimodal and five are unimodal basaltic. The feldspar is predominantly plagioclase with a loose population of An_{18-78}. One confident and four potential tephra correlations are established between the two NA core sites. These geochemical characterizations resulted in six firm correlations between the NA core's high-resolution record and the near-by Ledi-Geraru outcrops, consequently providing three ties to the distal fossiliferous outcrops at Hadar. These correlations also aid in the construction of the NA core age-model where preliminary single-crystal $^{40}Ar/^{39}Ar$ dates of the NA core tephra range from ~2.9 to >3.2 Ma. These critical correlations enable the integration and comparison of the NA core's high precision paleoenvironmental records with outcrop and fossil records in the Hadar Basin.

Authors

Dominique Garello
Arizona State University

Diana C. Roman
Carnegie Institute of Washington

Alan L. Deino
Berkeley Geochronology Center

Christopher J. Campisano
Arizona State University

J Ramón Arrowsmith
Arizona State University

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