Geophysical Research Abstracts
Vol. 19, EGU2017-1810-2, 2017
EGU General Assembly 2017
© Author(s) 2017. CC Attribution 3.0 License.

Changes in vegetation and climate as reflected in tooth enamel isotopes of Quaternary mammalian faunas from Indonesia

Renee Janssen (1), Josephine Joordens (1,2), Dafne Koutamanis (2), Mika Puspaningrum (3), John de Vos (4), Natasja den Ouden (4), Jeroen van der Lubbe (1), John Reijmer (1), Oliver Hampe (5), Gareth Davies (1), and Hubert Vonhof (6)

(1) VU University Amsterdam (r2.janssen@vu.nl), (2) Leiden University, the Netherlands, (3) University of Wollongong, Australia, (4) Naturalis Biodiversity Center, Leiden, The Netherlands, (5) Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitatsforschung, Berlin, Germany, (6) Max Planck Institut für Chemie, Mainz, Germany

Climate and sea level fluctuations play a dominant role in the Quaternary biodiversity dynamics of Indonesia, with glacial-interglacial cycles affecting hydroclimate, vegetation, and animal migrations. We analyzed the carbon (δ^{13}C), oxygen (δ^{18}O), and strontium (^{87}Sr/^{86}Sr) isotopes of bovid, cervid, and suid teeth from several Pleistocene and Holocene sites on Java and Sumatra, in order to refine reconstructions of the paleohabitats of these faunas, gain more insight into their climatic background, and constrain their chronology. Our carbon isotope data indicate that individual sites are strongly dominated by the presence of either C_3-browsers or C_4-grazers. Herbivores from the Padang Highlands (Sumatra) and Hoekgrot (Java) cave faunas were mainly C_3-browsers, while the studied herbivores from *Homo erectus*-bearing sites Trinil and Sangiran (Java) utilized an almost exclusive C_4 diet. The C_4 signal of Trinil herbivores confirms that the *Hauptknochenschicht* (Trinil HK) was deposited during glacial conditions, allowing us to hypothesize that it can be dated to MIS 16, 14 or 12. We propose that the dominant vegetation signals in Indonesian fossil sites, as revealed by δ^{13}C data, reflect a glacial-interglacial contrast. The scarcity of δ^{13}C values typically indicating mixed C_3/C_4 feeding may indicate that the transition between glacial and interglacial precipitation regimes was relatively abrupt. The observed positive correlation between δ^{13}C and δ^{18}O values can be attributed to the glacial-interglacial contrast between precipitation δ^{18}O values, caused by differences in monsoon intensity. The ^{87}Sr/^{86}Sr data show that the dominant C_4 signal observed in the Sangiran and Trinil herbivore faunas corresponds with roaming in a variety of landscape settings, corroborating our hypothesis that the δ^{13}C values are representative of the overall C_3/C_4 vegetation balance in these areas. These results provide a framework that will allow interpretation of future isotope data from these and other fossil sites in this region, including the isotopic composition of *Homo erectus* fossils.