Geophysical Research Abstracts
Vol. 20, EGU2018-4082, 2018
EGU General Assembly 2018

Terrestrial mollusk records from Chinese loess sequences and changes in the East Asian monsoonal environment

Naiqin Wu (1,2,3), Fengjiang Li (1,2), Denis-Didier Rousseau (4,5)

(1) Key Laboratory of Cenozoic Geology and Environment, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China (nqwu@mail.iggcas.ac.cn), (2) Institutions of Earth Science, Chinese Academy of Sciences, Beijing 100029, China, (3) College of Earth Sciences, University of Chinese Academy of Sciences, Beijing 100049, China, (4) Laboratoire de Meteorologie Dynamique, UMR INSU-CNRS 8539 & CERES-ERTI, Ecole Normale Superieure, Paris Cedex 05, France, (5) Lamont-Doherty Earth Observatory of Columbia University, Palisades, NY 10964, USA

The terrestrial mollusk fossils found in Chinese loess strata have been studied for over one hundred years. However, the greatest progress in these studies has been made only in the last two decades. In this paper, we review the advancements, advantages and limitations of terrestrial mollusk studies in Chinese loess deposits. Improvements in research methods and approaches have allowed the extraction of more detailed paleoenvironmental and paleoclimatic information from mollusk assemblages. The broadened research scope and content have yielded many new findings and results. The mollusk record has thus become one of the most important proxies in the paleoenvironmental and paleoclimatic reconstruction of loess-paleosol sequences in China. The greatest progress in the studies of terrestrial mollusks in Chinese loess sequences can be summarized as follows: (1) modern mollusk assemblages can be classified into four ecotypes, based on their temperature and humidity requirements, including eurytopic, semi-aridiphilous and sub-humidiphilous, cold-aridiphilous, and thermohumidiphilous types; (2) Quaternary mollusk assemblages can be modified into the following three ecological types: glacial loess, interglacial paleosol, and interstadial weakly-developed paleosol assemblages; (3) mollusk records successfully reveal long-term climatic and environmental changes reflective of the history of East Asian monsoonal variations since the Late Cenozoic, and the succession of mollusk species also indicate short-term environmental changes such as millennial climate variability during Last Glacial Maximum and unstable climatic fluctuations during glacial and interglacial periods; and (4) more recently, new analytical approaches have offered increased research potential in areas such as paleotemperature reconstruction using the isotopic compositions of modern and fossil mollusk shells, combined with higher accuracy 14C dating of Quaternary loess deposits, which will greatly improve future loess paleoenvironmental research.