Hominin responses to environmental change during the Mid-Pleistocene transition – a simulation-based approach

Christine Hertler*†[1,2], Ericson Hölzchen[1,2,3], Jesus Rodriguez[4], Ana Mateos[4], Alexia Wurster[1,3], Cristina Esteban[5], Iza Romanowska[6], and Maria Rita Palombo[7]

[1]ROCEEH Senckenberg – Senckenberg Research Institute, Senckenberganlage 25, 60325 Frankfurt am Main, Allemagne

[2]ROCEEH, Heidelberg Academy of Sciences and Humanities – Karlstraße 4, 69117 Heidelberg, Allemagne

[3]Goethe University, Dept. of Biosciences – Max-von-Laue-Straße 13, 60438 Frankfurt am Main, Allemagne

[4]National Research Center on Human Evolution (CENIEH) – Paseo Sierra de Atapuerca, 3, 09002 Burgos, Espagne

[5]Universidad de Burgos, Escuela Interuniversitaria de Postgrado en Evolución Humana – 09001 Burgos, Espagne

[6]Barcelona Supercomputing Center (BSC) – Carrer de Jordi Girona 29-31, 08034 Barcelona, Espagne

[7]Sapienza Università di Roma, Dipartimento di Scienze della Terra – Piazzale A. Moro, 5, I-00185 Roma, Italie

Résumé

The Mid-Pleistocene Revolution (MPR) represents a shift in global climate leading from an obliquity-dominated periodicity prior to 1.2 Ma to a precession-dominated regime after 780 ka. During the transition period, glacial-interglacial cycles vary rather irregularly with respect to both, duration (frequency) and amplitude of the episodes. As a response to those climate shifts, environments as well as hominin settlement patterns changed accordingly. The effects can be observed in all regions inhabited by hominins, i.e. Sub- Saharan Africa, the Mediterranean and Southwest Asia, Central, North and West Europe, East Asia and Southeast Asia.

Hominin responses, however, differ depending on predominant settlement patterns, archaeological equipment and available technology, subsistence behavior and resource supply. In view of rapid shifts in the environments hominins found regionally specific responses to the same climate shifts on a global scale.

The International Focus Group 'METHOD: Modelling Environmental Dynamics and Hominin Dispersals Around the Mid-Pleistocene Revolution' funded by INQUA studies collaboratively the effects of climate change on hominin environments and corresponding hominin responses. The METHOD-IFG represents a network of scientists from a variety of disciplines including archaeology, palaeontology, palaeobotany, and palaeoanthropology, involved

*Intervenant

†Auteur correspondant: christine.hertler@senckenberg.de

in data collection. With respect to modelling and simulation the network also includes mathematics and informatics. We study and compare the different responses by a simulation-based approach, applying in particular agent-based modelling. Our network and our approach will be introduced.

Mots-Clés: climate change, hominins, Mid, Pleistocene Revolution, land use strategies