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# Topographic reconstruction of Africa before 1Ma: implications for hominin dispersal.

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## Résumé

The aim of this work is to study the impact of environmental - geological and climatic - processes on the dispersal and evolution of hominins in the East African Rift before 1 Ma. To this end, the physical environment is reconstructed by integrating the various processes that shape it - geodynamics, tectonics, volcanism, climate, vegetation and physiography - into a continuous model of landscape evolution in time and space. These reconstructions will then

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be used to constrain hominin dispersal and evolutionary trajectories using macro-ecological models.

We present how we can reconstruct the topography over time through its dynamic and tectonic-volcanic components: i.e. by distinguishing, then combining, the respective influence of dynamic topography (i.e. the deflections of the topography due to the vertical stresses imposed by the underlying mantle convection) and of isostatic topography (i.e. due to horizontal crustal tectonics) and volcanism that partially and episodically reshape the surface of the Earth. The former, dynamic component, is obtained by comparing and electing the most appropriate model of global dynamic topography - albeit at a regional scale for this study. The second, isostatic component, is reconstructed by a reasoned interpretation of the amplitude of tectono-volcanic events based on comprehensive compilations. By integrating these two fields, we obtain an original regional elevation model that is continuous over time, and which will serve as the basis for the climatic, physiographic and, more generally, environmental reconstructions of our subsequent studies.

Finally, we discuss the initial constraints that these two fields generate in the spatio-temporal framework of the study, particularly in terms of the timing and amplitude of changes, as well as regional basaltic resurfacing. The aim is to deduce what direct constraints these fields may impose on the dispersal of hominins and the connectivity of spaces in the first instance, but also to what extent they have an influence on other environmental parameters such as climate and physiography. Particular attention will be paid to the area of the Great Rift System, because of its historical importance in hominin evolution, but the study will cover all of Africa's continental surfaces.

**Mots-Clés:** Paleogeographie, TopographieDynamique, Hominines, Rift