
Suitable climatic conditions for hominins from central Sahel to eastern Africa during the mid-to-late Pliocene

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Résumé

During the mid-to-late Pliocene (ca. 4–3 Ma), several hominin species were present in central Sahel, eastern and southern Africa, with the central Sahel generally considered a less relevant area for them. However, the climatic conditions that these hominin species could endure are poorly constrained, preventing the assessments of their spatial dispersion and hence of their potential geographic mobility. Here we simulate the climatic envelope suitable for mid-to-late Pliocene hominin presence, using the earth system model IPSL-CM5A and the Maxent algorithm. The latter indicates high habitat suitability indices for these hominin species in semi-arid regions where annual thermal amplitude is moderate, mostly corresponding to tropical xerophytic shrublands. This demonstrates geographically continuous, suitable climatic conditions between central Sahel and northeastern Africa, but not between eastern and southern Africa. This discontinuity suggests that southern African and eastern African hominins were separated by an environmental barrier that they could only cross during particularly favourable periods or by broadening/shifting their climatic envelope. During periods of climate changes driven by orbital precession, the Turkana basin and the Laetoli region both remain suitable, suggesting they may have functioned as refugia and potentially explaining species diversity in eastern Africa.

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