
ENM or SDM in Paleo, state of the art, intercontinental dispersal and limitations

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Résumé

Regardless of whether they are called ENM (ecological niche models) or SDM (species distribution models), the use of models coming from spatial ecology is growing fast in paleontological studies. After a brief state-of-the-art of ENM/SDM use in deep-time, I will illustrate through a series of my works carried out in recent years how we can use ENM/SDM to test eco-evolutionary hypothesis, to reconstruct large-scale dispersal or to detect futur potential fossil sites. First, we are projecting modern african great apes climatic niches to Pleistocene and Pliocene. We show how past climate change may have impacted their distribution, which part of Africa remained suitable for 5 myr and which part is now considered the most likely to discover great apes fossils. Second, we will reconstruct the potential dispersal pathway that older hominids could have used to leave Africa after its connexion with Eurasia in the Early Miocene. We show how the Mediterranean Basin could have been inhabited by the first hominid who left Africa and how their future European relatives adapted to a colder climate in just a few millions of years. Third, we show how modern ENM/SDM core hypothesis and future prediction can be tested thanks to Paleontological data by comparing predicted and empirical patterns through times. We illustrate how Proboscidea's climatic niche computed in Africa during the middle Miocene is sufficient to predict its futur distribution in Eurasia. Finally, the main limitations associated with ENM/SDM in deep-time will be discussed and ways to circumvent potential bias will be presented.

Mots-Clés: Ecological niche models (ENM), Species distribution models (SDM), intercontinental dispersal, paleoSDM, paleoENM, great apes, hominids

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