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Middle Miocene Hominoids dispersion and radiation: impact of climate and vegetation changes in Europe

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The middle Miocene is a time of important climatic changes, and a crucial period for ape's evolution. The Middle Miocene Climatic Optimum (MMCO), that occurred approximately 17 to 15 Ma, was one of the last global warming event of the Cenozoic. This period also corresponds to the first dispersion of apes from Africa to Europe, which was made possible by tectonic and environmental changes, in particular the expansion of hominoids habitat: (sub-)tropical forest. Following the MMCO, an abrupt global cooling occurred that coincides with an important radiation of European hominoids. The most common view is that the widening of hominoids habitat during the MMCO was the main factor of their dispersion from Africa to Europe. Moreover, the major climatic change that followed induced an opening of the environment because of cooler and dryer conditions, which should have lead to a fragmentation of hominoids' habitat. This imply that hominoids evolved separately in refuges during the end of the Miocene, so the radiation observed in the fossil record of European Miocene apes is interpreted as a divergent evolution in a fragmented habitat. However, no study has yet demonstrated this evolutionary scenario.
Our aim is to study the environmental changes during the middle Miocene, in particular climate and vegetation changes, and to link them with these two major events of hominoids' evolution.
Using climate and vegetation models, we investigate the role of environmental variation in hominoids' evolution during the middle Miocene, in particular between 17 and 14 Ma. We perform two climatic experiments (16Ma and 14Ma) with the atmospheric general circulation model LMDZ. The results of these experiments will then be used to force the dynamic vegetation model CARAIB. This should help us to simulate hominoids' habitat for the two time period chosen, and to discuss the role of important climate change for Miocene apes evolution.