Comparative models for biological response to climate: how can we represent modern data as paleodata?

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Understanding the response of hominins to climate change requires information from hominin fossils and the paleoenvironments in which they are preserved. However, a less obvious but potentially important source of information is the relationship between climate variation and morphological and behavioral variation in living species. Comparative studies of these relationships in living primates and other mammals can provide a baseline for evaluating changes in human evolution: *i.e.*, which hominin changes are "typical" responses to a set of climate changes, and which changes are novel to human evolution? While such broad comparative studies have been conducted in the past, their applicability to our purpose is limited due to the difficulty of establishing equivalence between paleoenvironment indicator variables (*e.g.*, isotope ratios, ecomorphological indicators) and modern ecological variables (*e.g.*, average monthly rainfall, fruit seasonality). However, there may be ecological variables that are available for both modern and ancient environments (*e.g.*, presence of species or genera that indicate the existence of particular niches).

This talk aims to promote discussion regarding two goals: first, to identify sets of ecological variables that can be measured in both modern and ancient environments, and second, to evaluate approximate relative probabilities that each of these types of variables will be preserved in fossil settings. Ultimately it is hoped that such data can be used in comparative studies of covariation between ecology and biology in living species to provide baseline expectations of hominin response to climate change. In particular, resampling analyses which investigate the effects of partial preservation of climate variables (*i.e.*, do statistical trends change if none of the arboreal habitat signals are preserved at some "mosaic habitat" sites?) have the potential to identify particularly robust patterns of environment/primate biology covariation against which the observed pattern of human evolution can be compared.