Do we need to be including biotic interactions when estimating the ecological niches of past hunter-gatherer cultures?

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Abstract

A coarse explanation of the Eltonian Noise Hypothesis is that at large geographic scales and with high resolution abiotic variables (*/A/*), we indirectly capture the influence of biotic interactions (*/B/*) on a species' existing fundamental niche. It is not uncommon, however, for an archaeological distribution to occupy only a portion of that culture's estimated niche. There are also instances in which we observe that our niche estimations do not fully predict our occurrence data – an extreme minority of occurrences do not fall within the estimated niche. This is difficult to explain when we are certain that these occurrence data are not erroneous. Could our assumption that we are effectively capturing biotic interactions indirectly be incorrect? Might it be possible to improve our ability to estimate past ecological niches of past hunter-gatherers – archaeological cultures – and their geographic distributions via the direct inclusion of biotic interactions?

We know that Paleolithic hunter-gatherer populations were heavily dependent on the hunting of large mammals, and this relationship to large mammal communities represents biotic interactions as the presence or absence of prey species would have influenced the ecological niche of the hunter-gatherer groups. Since archaeologists possess extensive faunal data (animal remains) from archaeological contexts, we are in a unique position to evaluate whether or not these data can improve our ability to estimate past hunter-gatherer niches. However, the vast majority of these faunal data come from the same archaeological sites that serve as occurrences to estimate past cultural niches. A number of colleagues and I are currently exploring the idea of estimating present-day large mammal niches, hindcasting these estimations onto past environmental scenarios, confronting these hindcast models with archaeological data, and ultimately incorporating the results of said models as variables when estimating a past hunter-gatherer niche. Similarly, vegetation data from past contexts are limited, yet we possess present-day data that can be hindcast in an effort to take such variables into account, as well. This is pertinent as past vegetation influenced human prey species distributions. I think that this workshop will be an excellent setting to discuss and improve this idea.

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