The diffusion of pottery technology among Eastern European hunter-gatherer-fishers: using spatial-temporal modelling to understand the knowledge transfer process

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Abstract

Northeast of a line between the Baltic and Black Seas, pottery technology first appeared in mid-Holocene hunter-gatherer-fisher contexts, long before the local start of food production. A general east-west gradient in legacy 14C dates associated with the earliest pottery types supports the traditional view that pottery-making knowledge spread westwards from Siberia, but large dating uncertainties hinder observation of more detailed spatial-temporal patterns, and do not exclude multiple independent sources of pottery making, or allow us to compare potential mechanisms for the diffusion of this technology. We report preliminary results of a new initiative to date the spread of hunter-gatherer pottery between the Urals and the Baltic, combining 14C dating, technological and typological analysis, and spatial-temporal modelling.

Modelling the process of cultural transmission involves assumptions about how knowledge of the craft of pottery was passed from person to person, consuming resources of energy and time as part of this process. Knowledge of the tradition was spread as each cohort of pottery-using people influenced those around them. The rate of spread was moderated by the strength and range of the pre-existing social network or the 'sphere of influence' that each community had over others nearby. Other parameters that may be modelled include demographic variables of population density and diffusion rate, and the physical terrain itself.

Therefore, by reconstructing how the hunter-gatherer landscape was interconnected along natural routeways, and using Bayesian chronological models of 14C results from selected sites to apply a spatiotemporal gradient to this network, we can predict the arrival time of pottery at any given location in the study region. Using typological data to validate this model, we can also identify cases where the data expose limitations of this framework with regard to rapid transmission that occurred alongside certain patterns of resource adaptations. The rapid spread of hunter-gatherer pottery across north-east Europe, in the early 6th millennium BC, strongly suggests that demographic factors are unlikely to have contributed significantly to the process, at least during its initial spread.

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