




Using a Georelational Spatial Information System to Examine Questions about the Large-Scale Development of Cultural Behavior in Human Evolution: The Example of Ochre in the African Middle Stone Age

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Archaeological databases should not be an end in themselves. Rather, they provide tools for addressing research questions based on large volumes of data that cannot be examined using conventional methods. In particular, large-scale archaeological meta-analyses about the long term development of cultural behavior during the Pleistocene are best approached with georelational spatial information systems such as the [ROCEEH Out of Africa Database \(ROAD\)](#). In our poster presentation we report the results of a project about ochre use during the African [Middle Stone Age](#). We assessed data from 100 different archaeological sites and entered them into ROAD. The published data from each locality was evaluated based on the character and quality of the ochre artifacts reported, the nature of the excavation, the stratigraphy of the site, and the reliability of its dating. To overcome problems associated with variable data inherent in our age model, we employed the statistical concept of *time averaging* by developing an analytical tool called “time slice”. This tool tallies the numbers of localities and assemblages which meet certain criteria as specified in a predefined query. It also allows the user to slide the analytical window across the scope of analysis at a given time interval. We wrote two queries for this analysis, one that generated a list of African localities containing assemblages of ochre, and another for stone artifacts. This method enabled us to identify three distinct chronological phases of ochre use between 500,000 and 40,000 years ago.

However, with regard to statements about the evolution of cultural behavior, data mining can only be the first step. In the next step, the results must be subjected to an interpretation process that is not based on the data themselves. For this purpose we integrated our results with findings about ritualized behavior from primatology, the cognitive sciences, and anthropology.

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This allowed us to offer some well-founded conclusions about the evolution of ritual behavior during a critical phase as *Homo sapiens* developed into a socially complex bio-cultural species, not fundamentally different from contemporary humans.

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