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## Eco-Cultural Niche Modeling (ECNM) for Archaeology

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Eco-Cultural Niche Modeling (ECNM) is an application of ecological niche modeling to human behavior. It predicts unknown human *habitat*, or eco-cultural niche, from the known sites, based on the genetic algorithm that employs various environmental variables including elevation, temperature and precipitation. It is therefore useful for archaeology to predict the spatial distribution of the prehistoric people, whose life was highly dependent on their environmental settings. Applying this method, Banks *et al.* (2008) has suggested that the niche competition between the Neanderthals and the Anatomically Modern Humans (AMHs) resulted in the distinction of the former.

The paleoenvironment research group of the *Koutaigeki* Project plans to apply ECNM as a part of multidisciplinary research to reevaluate tempo-spatial distribution of the Neanderthals and AMHs in terms of the abrupt climatic change. This paper presents the preliminary results of predictive modeling of archaeological sites using ECNM, with the case study of the human activities in Southwest Kanto region (East Japan) during the Jomon Period (Holocene). The geospatial analysis using Desktop GARP, a free ECNM software, has revealed that the hunting activities, evidenced by pit traps, was carried out in the hilly areas, while the location of shell middens indicate that shellfish was collected and processed in the area approximately less than 5 km inland from the paleocoastline.

Keywords: archaeology, paleoenvironment, Eco-Cultural Niche Modeling (ECNM), predictive modeling, Genetic Algorithm for Rule-set Production