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Reconstructing the Distribution of Archaic and Modern Humans in Time and Space in Relation to the Last Glacial Climate Change

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The impact of climate change is an intriguing focus to invest the replacement of archaic humans, including Neanderthals in Europe, by the modern humans. On the other hand, our ancestor survived in the same/similar environmental settings sharing with archaic human species. The reason why only homo sapience can survive is the important but still challenging task for anthropologists and archaeologists. In the project “Replacement of Neanderthal by Modern Humans: Testing Evolutionary Models of Learning” supported by MEXT, Japan, we have tried to establish more reliable maps of human distribution and climatic zones by developing some new techniques.

New data-set for calibrating conventional radiocarbon dates, IntCAl09, makes it possible to compare the archaeological events dated by radiocarbon and the history of climate changes recorded in annual rings in ice cores from the Antarctic and Greenland. Because the replacement was a process ongoing in time and space, however, it is not easy to evaluate the impact of climate change on the extinction of archaic humans. Hence, we are applying several different methods to extract quantitative relationship between the changes in human activities and past climate. Our methods include (1) the development of geoscientific and informatics methodology such as the meta-analysis of large data-set of radiocarbon dating, (2) the reconstruction of climate and vegetation maps in higher resolution based on a global circulation model, (3) reconstructing history of regional environments based on geochemical proxies from land, and (4) the combination and comparison between environmental factors and human distribution using the eco-cultural niche modeling. Each branch of our project has established methods to evaluate the more concrete distribution of past climate and human species in time and space. We would like to discuss the current status of our project and the problems we have to overcome.