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Reconstruction of paleo-vegetation distribution by using an atmosphere ocean coupled GCM and a DGVM

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" The replacement of Neanderthals by Modern Humans has been considered to have occurred during 60,000-30,000 BP, which is also characterized by millennial scale climate change known as the Dansgaard?Oeschger events. The distribution of Neanderthals and Modern Humans during this period suggests correlation with that of paleo-vegetation and animals. This relation reflects the difference between the adaptabilities of Neanderthals and Modern Humans to environmental changes by way of their ability to hunt animals as food resources. Hence, it is important for the RNMH project to predict distribution of fauna, flora and climate change during this period. When estimating fauna distribution of the past, it is necessary to evaluate the changes in flora and thus changes in climate of the past. This can be directly achieved by examining data from sediment proxies, e.g. pollen records and isotopes. However, the availability of such proxies to reproduce the distribution of flora and climate changes is limited.

In the present study, we tried to reconstruct the vegetation distribution across North Africa, the Mediterranean and Europe during 60,000-30,000 BP from the results of a paleo-climate reconstruction by using a general circulation model as input for a dynamical global vegetation model. GCMs consume huge amounts of computational resources and so experiments are usually run using lower resolution models whose grid sizes are not sufficiently small for anthropological studies. In this study, we developed an " anomaly procedure " in order to incorporate features from both a high-resolution model and paleoclimate information. As a result of this new method, we successfully obtained a high-resolution vegetation distribution for a specific period of the past. However, it is not yet clear how these results can be validated against paleovegetation records. We need further discussions on how the appropriate paleoclimate can be reproduced by the GCM and how the vegetation model results can make a robust contribution toward the RNMH project.

Keywords: D-O cycle, Paleoclomate, Paleovegetation, Modeling