Geophysical Research Abstracts
Vol. 17, EGU2015-11509, 2015
EGU General Assembly 2015

What drives LGM precipitation changes over the Western Mediterranean?

Pauline Beghin, Sylvie Charbit, Masa Kageyama, Nathalie Combourieu Nebout, Christine Hatté, Christophe Dumas, and Jean-Yves Peterschmitt

Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette Cedex, France (masa.kageyama@lsce.ipsl.fr)

The evolution of precipitation is one of the key question concerning future climatic changes, especially in regions like the Mediterranean area which are currently prone to droughts. The influence of atmospheric circulation changes (in the mid-latitudes westerlies or in the strength of the subtropical subsidence) along with changes in local mechanisms for generating precipitation (such as convection) makes it difficult to predict precipitation changes confidently over this area. In order to predict the future climate of this region, understanding its governing mechanisms is crucial. A possible approach is to test our understanding on different documented past climatic contexts. This paper focuses on the Last Glacial Maximum period (LGM) over the Western Mediterranean and puts in perspective the available paleoclimatic reconstructions and the outputs of nine global climate models. We first review paleoclimate information about the LGM precipitation in this region. These reconstructions range from humid to semi-arid conditions. Model outputs from the PMIP3/CMIP5 database also yield a wide range of mean annual responses, from wetter to drier conditions in this area. This variety of responses allows to investigate the mechanisms governing LGM precipitation in the western Mediterranean area. Over the Iberian Peninsula and northern Morocco, most models simulate a larger amount of LGM precipitation in winter w.r.t. the preindustrial period. This feature is mainly due to the large-scale effect of the southward shift of the North Atlantic jet stream. In summer, precipitation changes mainly result from convection and therefore from local processes. Our results show a correlation between the anomalies of summer precipitation and of surface surface air temperature, highlighting the key role of convective processes. These contrasted changes in winter and summer, linked to different mechanisms, could explain the range of climatic reconstructions, especially if the climatic indicators are more sensitive to seasonal precipitation.