Projekt: **438**

Refugia for trees during the last glacial maximum

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It is of special interest to find out areas of highest biodiversity and to preserve them. These are areas where plants and animals were able to survive the last glacial maxima. In a pilot project the investigation has concentrated on Europe and summer-green trees, the results of that is in press in:

Glacial refugia for summer-green trees in Europe and S-W Asia as proposed by ECHAM3 time-slice atmospheric model simulations, by Suzanne Leroy and Klaus Arpe, accepted for publication by the Journal of Biogeography

A weakness in this investigation is the use of a quite old atmospheric climate model (ECHAM3) and a relative low resolution (T42) for carrying out the simulations. The refugia areas which were expected were found in this investigation. They are in mountainous regions which need a high horizontal resolution which was achieved in the recent investigation by a simple down-scaling method. In a T42 resolution important geographical features are hardly represented, e.g. the Danube and Po river valleys. A higher resolution model simulation (we are aiming for a T106 resolution in our further investigation) will rely less on the down-scaling method and therefore provide more reliable results. Also it is known that the ECHAM3 model had quite a few deficiencies which are removed in the presently operational climate model ECHAM5 that we like to use for the further investigation. We intend to broaden the investigation to other taxa and other areas, e.g. China and the temperate belt of Eastern Asia.

Method
Time-slice simulations for the Last Glacial Maximum (LGM) with the ECHAM5 T106 atmospheric model will be carried out, using prescribed sea-surface temperature (SST) as suggested by CLIMAP or gained by a recent coupled atmosphere-ocean model simulation. The simulated data will be further down-scaled by adding the difference between the LGM and present-day simulations on a present day high-resolution climatology. The high speed computer is needed for carrying out the simulations with the atmospheric model, the further processing will be done with PCs or similar computers. Validation will be done with LGM pollen data from Europe and from eastern Asia.

The project is carried out in cooperation with Prof. Suzanne Leroy, Institute for Environment, Brunel University, West London, UK, email: suzanne.leroy@brunel.ac.uk
The simulated data needed for this investigation will most likely be useful for other projects in the frame of PMIP2. E.g. Ute Merkel, FB5 Geosciences -Department of Geosystem Modelling, University of Bremen (umerkel@palmod.uni-bremen.de), wants to use the data to investigate the impact of model resolution under LGM conditions.