Geophysical Research Abstracts, Vol. 7, 00308, 2005
SRef-ID: 1607-7962/gra/EGU05-A-00308

Climate extremes in the Mediterranean region and their sensitivity to future global warming

H. Paeth and A. Hense

Meteorological Institute, Universtiy of Bonn, Germany (hpaeth@uni-bonn.de, +49-228-735188)

The Mediterranean region (MTR) has been supposed to be very sensitive to changes in land surface and atmospheric greenhouse-gas (GHG) concentrations. Particularly, an intensification of climate extremes may be associated with severe socio-economic implications. Here, we present an analysis of climate mean and extreme conditions in this subtropical area based on regional climate model experiments, simulating the present-day and possible future climate. The analysis of extreme values (EVs) is based on the assumption that the extremes of daily precipitation and near-surface temperature are well fitted by the Generalized Pareto distribution (GPD). Return values of extreme daily events are determined using the method of L-moments. Particular emphasis is laid on the evaluation of the return values with respect to the uncertainty range of the estimate as derived from a Monte Carlo sampling approach.

During the most recent 25 years the MTR has become dryer in spring but more humid especially in the western part in autumn and winter. At the same time, the whole region has been subject to a substantial warming. The strongest rainfall extremes are simulated in autumn over the Mediterranean Sea around Italy. Temperature extremes are most pronounced over the land masses, especially over northern Africa. Given the large uncertainty of the EV estimate, only 1-year return values are further analysed. During recent decades, statistically significant changes in extremes are only found for temperature. Future climate conditions may come along with a decrease in mean and extreme precipitation during the cold season, whereas an intensification of the hydrological cycle is predicted in summer and autumn. Temperature is predominantly affected over the Iberian Peninsula and the eastern part of the MTR. In many grid boxes, the signals are blurred out due to the large amount of uncertainty in the EV estimate. Thus, a careful analysis is required when making inferrences about the future

behaviour of climate extremes.