Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08041, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08041
EGU General Assembly 2008

High precipitating events in Mediterranean regions : a climate downscaling approach

A. L. Beaulant, O. Nuissier, B. Joly, V. Ducrocq, A. Joly, S. Somot, F. Sevault
Météo-France/CNRM/GMME, 42 Av. G. Coriolis, 31057 TOULOUSE CEDEX, France
(anne-lise.beaulant@cnrm.meteo.fr)

Mediterranean regions are regularly affected by high precipitating events (HPEs) that often lead to devastating flash floods. The evolution of the occurrence and severity of such extreme events in the frame of the global climate change remains an open question. To address this question, we have designed an hybrid downscaling (also called statistico-dynamical downscaling) method to climate model outputs for an enhanced greenhouse climate at the end of the 21th century i.e. following IPCC-A2 scenario.

This statistico-dynamical downscaling is based on a two-step method: i) first, representative situations are selected among an ensemble of propitious synoptic environments to HPEs for the present climate (1960-2000) and for the future one (2070-2099) and ii) second, for these situations, simulations are carried out with a fine-scale non-hydrostatic model which can adequately model processes leading to the formation of heavy precipitation events. Large-scale conditions patterns propitious to high-impact weather have been identified by a statistical method. It is based on a clustering of the 500 hPa geopotential field combined with criteria on the low-level moisture flow. It has been first designed for ERA-40 re-analyses and then applied to the French ARPEGE Climate / OPAMED coupled regional model outputs to identify twenty cases equally partitioned between the present and future climate. Then, the dynamical downscaling is performed by simulating these cases with the French MESO-NH numerical model at 10 km and 2.5 km horizontal resolution. Initial and boundary conditions are provided by the ARPEGE Climate / OPAMED scenarios.

Preliminary results show that the statistico-downscaling method is able to reproduce

precipitating systems typical of Mediterranean events. Results for 20 cases will be presented at the conference as well as composite analyses of key-ingredients triggering heavy precipitations such as moisture flux, precipitable water, low-level jet and the available convective instability.