Geophysical Research Abstracts
Vol. 14, EGU2012-8848, 2012
EGU General Assembly 2012

Regional and sub-regional climate simulations over Sub-Saharian African regions and the influence on the heat waves hazard

E. Bucchignani (1), P: Mercogliano (1), M. Montesarchio (1), P. Capuano (2), M. Sellerino (2), A. Di Ruocco (2), and W. Kombe (3)

(1) C.M.C.C, Impacts on Soil and Coast, Italy (e.bucchignani@cira.it), (2) AMRA Scarl, Napoli, Italy, (3) ARDHI University, Dar Es Salaam, Tanzania

In the framework of the EU-FP7 CLUVA (Climate Change and Urban Vulnerability in Africa) project, regional projections of climate change at high resolution (about 8 km), based on the new IPCC scenarios (RCP4.5 and RCP8.5) have been performed for selected areas surrounding five African cities of interest. The regional climate model COSMO-CLM has been employed: it is a non-hydrostatic model for the simulation of atmospheric processes. It has been developed by the DWD–Germany for weather forecast services; successively, the model has been updated by the CLM-Community, in order to develop also climatic applications. All the COSMO-CLM simulations have been performed forced by the global model CMCC-MED, whose atmospheric component is ECHAM5 (horizontal resolution of about 80 km). The time period considered is 1951-2050, the step used for the time resolution is 50 sec, the numerical scheme is Runge-Kutta with a HE-VI integration at 2 time levels. A comparison with observed data provided by local municipalities has been performed in terms of two-metre temperature and precipitations; climate projections in the XXI century will be analyzed, comparing the average values over the periods 1971-2000 and 2021-2050, taking into account both the IPCC scenarios considered.
The variations of the fundamental climate parameters, as inferred by the projection of climate change, will condition different hazards at different time-scales. This information can be applied to a single hazard scenarios built from existing historical data for some test cities. We analyzed a data set of daily maximum temperature from Dar Es Salaam (Tanzania) in the period 1960-2011 to evaluate the change in the extreme warm condition that can generate heat waves with the aim to improve the adaptation to these events, especially for those most vulnerable to them. Heat waves were defined following a peak over threshold approach respect to the daily maximum temperature. The trends in the annual highest temperature and in number and duration of heat waves, modelled by using the GEV (Generalized Extreme Value) distribution, show an increase over time. Successively, using the results of the climate simulations, the evolution of the heat wave characteristics has been proposed up to 2050.