Plinius Conference Abstracts,
Vol. 11, Plinius11-179, 2009
11th Plinius Conference on Mediterranean Storms

Maximum daily rainfall changes in Spain for the 21st century.

A. Potenciano (1), L. Barranco (2), and J. Álvarez-Rodríguez (3)

(1) R&D Personnel PhD, Center for Hydrographic Studies of CEDEX. angela.potenciano@cedex.es, (2) Hydrogeologist, Center for Hydrographic Studies of CEDEX. luis.m.barranco@cedex.es, (3) Coordinator of Scientific-Technical Program, Center for Hydrographic Studies of CEDEX. javier.alvarez@cedex.es

The VI Technical Paper of Intergovernmental Panel on Climate Change states that it is very likely that the intensity and frequency of extreme precipitation events is projected to increase, particularly in tropical and mid and high latitudes. In Spain, this frequency increment of extreme events has been tested by different authors. In Mediterranean region, the increase of rainfall intensity in summer is not clear, due to the strong convective rainfall component and its great spatial variability.

In this context, among the objectives of CEDEX working group in water resources in Spain, a preliminary assessment of the potential hydrological impact of climate change on extreme events is included. These studies are promoted by the Spanish Directorate of Waters and the Spanish Office of Climate Change (OECC).

The maximum daily rainfall is a basic element of design for estimating peak flows. Knowledge of the variation of the maximum daily rainfall therefore provides an evaluation of the potential impact of climate change on the occurrence of these extreme events. The impact analysis is performed by comparing the results projected for the periods 2011-2040, 2041-2070 and 2071-2100 versus the reference period 1961-1990. The presentation will address aspects related to the evolution of rainfall and the impact that could be expected in different Spanish territories.

The data selection were provided by the OECC and the State Agency of Meteorology and comprises projections made from three Coupled Atmosphere-Ocean General Circulation Models, CGCM2, ECHAM4 and HadCM3, in two climate change scenarios, A2 and B2. Data from HadAM3 is also used. Statistical downscaling was also provided to manage up to 5000 time series of annual maximum daily rainfall.

The descriptive statistics are based on analysis of the mean, median, variations, trends and seasonality. Some descriptive tools and non-parametric homogeneity test were used considering the non-normal distributions.

Maps of maximum daily rainfall for a return period of 100 years were estimated by interpolation of SQRT et max distribution estimates of the any time series. A deviation map was also obtained by comparison of the 100 year maximum rainfall 1960-1991 map and the ones for the 2011-2040, 2041-2070 and 2071-2100 periods. SQRT et max distribution has been used to produce the Spanish maximum daily rainfall map for road drainage assessment. This distribution was tested in several studies as one of the most suitable for regional analysis.

Key words: climate change, maximum daily rainfall, Spain