Geophysical Research Abstracts
Vol. 15, EGU2013-7433-1, 2013
EGU General Assembly 2013

Mapping Climate Change Impacts in Sardinia with Use of Interpolated Stochastic Weather Generator

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The regional studies of climate-sensitive processes (e.g. agriculture) often require high-resolution climate information. The set of input climate variables and their temporal resolution depend on a process being studied and a model being used. In many cases, the required input climate data consist of time series of multiple daily weather characteristics. Various approaches exist to create the input climate data having a realistic statistical structure. In case of climate change impact experiments, these techniques include bias-corrected or statistically downscaled outputs from Global or Regional Climate Models (GCMs, RCMs) and stochastic weather generators (WGs) conditioned on GCMs or RCMs. The present contribution uses a latter approach, which is improved on here by more effective use of information coming from three sources: observations, GCMs and RCMs. In the first step of the proposed approach, the parameters of stochastic WG calibrated from the station specific weather data are interpolated into a regular grid; the resultant set of WG parameters represents the baseline climate. In the second step, the grid specific WG parameters are modified according to the GCM (or RCM) based climate change scenarios. The improvement to this methodology tested in this study consists in using the high-resolution present-climate RCM simulation to improve the spatial representation of the baseline climate created in the first step.
The present contribution has two aims: (1) It introduces and validates a methodology for creating the gridded weather series data (with a stress on an effect of RCM's involvement on a quality of the spatial representation the present climate). (2) The methodology is used to map selected climatic characteristics (and other derived characteristics) of high importance for Sardinia, including characteristics related to high temperatures, drought and wildfire risk.

Acknowledgements: The present experiment is made within the frame of projects WG4VALUE (project LD12029 sponsored by the Ministry of Education, Youth and Sports), InterDrought (project no. CZ.1.07/2.3.00/20.0248 funded by Ministry of Education, Youth and Sports of CR), and ASCR- CNR bilateral project.