EMS Annual Meeting Abstracts
Vol. 13, EMS2016-429-3, 2016
16th EMS / 11th ECAC

On the coherence of quantile mapping effect on a regional and local scale climate scenario

Lorenzo Sangelantoni (1,2), Alessandro Coluccelli (1), Aniello Russo (1,3), Maurizio Di Marino (2), Fabio Gennaretti (4), and Patrick Grenier (5)

(1) Università Politecnica delle Marche, Department of Life and Environmental Sciences, Via Brecce Bianche, 60131 Ancona, Italy, (2) Osservatorio Geofisico Sperimentale, Viale dell'Indipendenza 180, 62100 Macerata, Italy, (3) NATO STO Centre for Maritime Research and Experimentation, La Spezia, Italy, (4) CEREGE, Aix-Marseille Université, Technopôle de l'Arbois-Méditerranée, BP80, 13545 Aix en Provence, France, (5) Ouranos, Climate scenarios and services Group, Montreal, Canada

Quantile mapping (QM) represents a common post-processing technique employed to connect climate change projections to regional and local impact studies. However, knowledge about the potential alterations of climate change signal CCS (statistics difference between 2071-2100 and 1971-2000 periods) provided by this technique, is still limited. Present study investigates if CCS is coherently altered by QM, applied on both regional and local scale configuration, over a study area covering Central Italy. The annual cycle, spatial pattern and statistical distribution of the temperature and precipitation CCS were assessed before and after the application of a daily-based empirical QM.
In the regional experiment bias correction is applied on a five-RCMs ensemble of runs from the ENSEMBLES project (25 km horizontal resolution). Grid-cell-wise correction function is derived from E-OBS observed dataset, spatially averaged on the same RCMs grid. In the local experiment, QM was applied to adjust and to refine RCMs results towards local point-wise observations, thus combining error correction with downscaling. In the local experiment, the higher-resolution (12.5 km) three-RCMs ensemble from EURO-CORDEX project was also employed. A station-wise correction function is built employing 9 precipitation and 21 temperature observed datasets provided by the Marche Region Civil Protection network.
Regional experiment results show moderate dampen of mean summer temperature CCS from +4°C to +3.5°C, only over coastal-valley territories. Local experiment results highlight different effects on temperature CCS employing gridded or point-scale derived correction function, clearly controlled by the ratio of simulated to observed variance. Consequently, an elevation dependency of the effect on temperature CCS can be observed, especially in higher resolution EURO-CORDEX simulations (up to 1°C in mean summer season temperature CCS over coastal stations). Concerning precipitation, in both regional and local experiments, the spatial pattern, magnitude, annual cycle and statistical distribution of the CCS were not significantly altered by QM application.