

SEMINARIO DEL GIOVEDÌ  
CETEMPS

**“Connecting climate simulations to impact studies:  
effects of statistical bias correction and downscaling  
methods on climate scenarios”**

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**Aula riunioni DSFC, Coppito I, Università degli Studi dell’Aquila,  
Via Vetoio Coppito, L’Aquila**

Global and regional climate models often generate simulations with different statistical properties from observation-based time series, due to errors in model physics formulation, spatial scale mismatch, and unpredictability of natural variability. Hence post-processing must be applied to properly connect climate simulations to impact studies.

Quantile mapping (QM) represents a widely used post-processing technique in climate services. The basic idea is to build a transfer function that maps a simulated climate distribution on a corresponding observation-based reference distribution during a calibration period, and then to apply the transfer function on the whole simulation. Generally, this technique has a bias correction property, if the reference climate observation is at finer scale than the post-processed simulation a statistical downscaling is obtained as well.

In this talk, the theoretical and practical aspects of applying different QM configurations (bias correction only and bias correction plus downscaling) in the context of climate scenarios will be discussed.

In the first section, one of the major concern over post-processing techniques, namely the impact over the original simulated climate change signal and how dealing with such a potential alteration on a case study over Central Italy will be addressed. In a second case study, a bi-dimensional QM configuration expressly aimed at reproducing observed inter-variable physical relationships in the context of Canadian Arctic climate will be considered. Finally, a practical example of employing QM post-processed climate simulations into a statistical model for landslide initiation probability prediction in the Esino river basin (Marche region) will be presented.

**Biografia.** Lorenzo Sangelantoni, after the accomplishment of a PhD in Science (oceanography and atmospheric physics) is post-doctoral fellow, at the Polytechnic University of Marche (Ancona, Italy). PhD research project was aimed at defining 21<sup>st</sup> century regional- to local-scale climate scenarios, based on Regional Climate Model (RCM) simulations (from ENSEMBLES, EURO-CORDEX and Med-CORDEX projects) over Central Italy. Post-doctoral research aims at deepening doctoral outcomes, focusing on the implementation of advanced statistical post-processing methodologies for the study of climate impacts at both regional- and local-scale. Currently his research path is two-fold: to investigate the impact of bias correction and downscaling aspects in the context of regional and local scale climate scenarios. Secondly, identifying the most suitable post-processing technique to provide coherent climate forcing fields to a hydrogeological hazard model.