



Scale dependent impact of Climate Change in the Alpine Region: Hydrological Budget Comparison Between Low, Medium, High and very High Resolution Regional Climate Model simulations.

Erika Coppola, Francesca Raffaele, and Filippo Giorgi

The Abdus Salam International Centre for Theoretical Physics, Earth System Physics Section, Trieste, Italy (coppolae@ictp.it)

We analyze the output of the regional climate model RegCM at 4 different resolutions over the Alpine region to investigate the impact of climate change on the hydrological budget. In particular we focus our attention on the snowmelt-driven runoff (SDR) that is a key quantity since it could affect water storage in reservoirs and hydroelectric generation, and it could have consequences for land use, agriculture, and water management. What we find is a scale dependency change impact on SDR timing. Both results from the A1B and RCP 8.5 scenario simulations indicate a temperature increase up to 4 degrees in the Alps and this leads to a change of SDR timing that can span from 1 to 3 months depending on the model space resolution. The space resolution has an impact on the representation of the complex topography of this region and this in turns affects the snow-albedo feedback that is responsible for SDR timing change. A similar impact is evident on the seasonal change signal for all the others variable that are involved in the surface hydrological budget.

These findings highlight the importance of the spatial scale specification for developing adaptation and mitigation strategies for climate change.