



## **Impact of climate change on runoff timing over the Alpine region**

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In this work we focus our attention on the snowmelt-driven runoff (SDR) on the Alpine region. We use the Regional Climate model output from Med-CORDEX simulation and in particular the ICTP regional climate model RegCM4 at 2 different resolutions (12km, 50km) and the output from other 3 EURO-CORDEX Models (RACMO<sub>2</sub>2E and HIRHAM5, both driven by EC-EARTH and CCLM4-8-17, driven by MPI-ESM-LR; all of them at 44 and 11 km resolutions).

Comparison with the European Water Archive (EWA) observed runoff dataset (242 stations) over Alps show a good performance of all the models in the present day representation of the SDR at the highest resolution. The low-resolution simulations are less accurate in representing the runoff timing.

For the future projection we analyzed the RCP 8.5 scenario for the whole ensemble. All the models show 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. These large changes are probably due to the snow-albedo feedback that is amplified over the complex Alpine topography.

Such a change in runoff timing can be really important for water storage regulation rules for energy production, irrigation and therefore agriculture, and domestic use.