



Representation of the Alpine snowpack in CMIP5 models

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Global Climate Models (GCMs) still have too coarse spatial resolution to adequately reproduce the small-scale variability of precipitation and snowpack in orographically complex areas but increasingly higher resolutions are currently being introduced for the next generation of models. As a preliminary step a comparative assessment of the performances of the current, state-of-art GCMs in the representation of the snowpack characteristics is needed.

Our study investigates how the GCMs participating in the Coupled Models Intercomparison Project phase 5 (CMIP5) represent the snow water equivalent and snow depth climatology over the Greater Alpine Region (4-19°E, 43-49°N) during the historical period 1980-2005. We compare the CMIP5 model outputs to the available satellite and reanalysis products, including Global Monthly EASE-Grid Snow Water Equivalent Climatology, Climate Forecast System Reanalysis, Modern Era-Retrospective analysis for Research and Applications, ERA-Interim/Land and 20th Century reanalyses, highlighting common features and discrepancies.

We also explore the models spread in the representation of the snow seasonal cycle and its projected changes for the XXI century in RCP4.5 and RCP8.5 scenarios, discussing the results in the frame of the latest literature studies. The present analysis aims at providing a comprehensive picture of the current uncertainties in the representation of snowpack by the major gridded snow datasets derived from remote sensing, reanalyses and model simulations, in condition of complex orography.