Geophysical Research Abstracts
Vol. 21, EGU2019-10940, 2019
EGU General Assembly 2019

Past and future European snow conditions as represented by the EURO-CORDEX ensemble

Claas Teichmann (1), Sven Kotlarski (2), Katharina Bülow (1), and Christian Steger (3)

(1) Climate Service Center Germany (GERICS), Hamburg, Helmholtz-Zentrum Geesthacht, Germany (claas.teichmann@hzg.de), (2) Federal Office of Meteorology and Climatology MeteoSwiss, Zurich, Switzerland, (3) Institute for Atmospheric and Climate Science, ETH Zurich, Zurich, Switzerland

Surface snow cover plays an important role in regional climate systems, especially in mountainous and high latitude regions, where snow-atmosphere feedbacks can strongly influence meteorological conditions near the surface. In addition, human activities often rely on a certain amount of snowfall and snow cover in many of these regions. E.g., in some Alpine regions, part of the freshwater supply depends on the availability of meltwater originating from the surface snowpack. Also winter tourism in many cases heavily depends on the availability of natural snow. Recent studies of past snow cover trends using observational datasets show a decrease in snowfall days and snow depth in many regions of Europe.

In order to anticipate future changes in snowfall, snow depth and its implications for human activities and water availability, regional climate models (RCMs) can be used to simulate past and to project possible future evolutions. These models aim at representing the most relevant processes for climatic conditions in a region on time scales of decades to centuries. RCMs incorporate snow parameterization schemes of differing complexity to simulate the snow cover response to climate change and climate variability and thus allow for an approximate representation of snow-atmosphere feedbacks.

In this study, we first investigate the capability of state-of-the-art regional climate models of the EURO-CORDEX ensemble to represent past snow cover and snowfall in different regions of Europe at different grid resolutions (50km and 12,5km) in re-analysis driven simulations. Model results are evaluated against satellite-derived and surface-based observational datasets. This analysis gives us an insight about the reliability of different models in adequately representing snow conditions in different areas. Finally, projected future changes in snow conditions in Europe will be presented.