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Projections for Changes in Natural and Technical Snow Reliability of a Major Turkish Ski Resort by Using RegCM4.3.5

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Climate change has been and increasingly will be a major threat to the ski tourism industry whose survival is highly dependent on existence of snow cover of sufficient depth and duration. The common knowledge requires that in order for a ski resort to be viable, it has to perform operations for at least 100 days in seven out of ten winters. For this matter, it is now even more usual for the ski resorts to adapt to this issue by technical snowmaking. In this study, projected future changes for the period of 2010-2040, 2040-2070, and 2070-2100 in air temperature, relative humidity, and snow depth climatology and variability with respect to the control period of 1970-2000 were assessed for the domain of a major ski resort in Turkey. Regional Climate Model (RegCM4.3.5) of ICTP (International Centre for Theoretical Physics) was used for projections of future and present climate conditions. HadGEM2 global climate model of the Met Office Hadley Centre, MPI-ESM-MR of the Max Planck Institute for Meteorology, GFDL-ESM2M of the National Oceanic and Atmospheric Administration Geophysical Fluid Dynamics Laboratory were downscaled to 10 km for the resort and its surrounding region. Both the projections and the downscaling were realized according to the RCP4.5 and the RCP8.5 emission scenarios of the IPCC. The outputs on snow depth were used for a count of the changes on snow cover duration sufficient for skiing actitivies, signaling natural snow-reliability, whereas the outputs on air temperature and relative humidity were utilized for determination of wet-bulb temperatures. The latter measure was used to interpret the changes in the snowmaking capacity, in other words; technical snow-reliability, of the resort.
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