A Refined Methodology for Modelling Climate Change Impacts on Snow Sports Tourism

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Nature-based tourism is one of the most vulnerable sectors of the economy against climate change. Among its types, winter tourism stands out as the most critical due to the relatively high exposure and sensitivity of snow cover to the anthropogenic warming trends. In this study, we aim at improving previous works by Ozturk et al. where snow reliability of ski resorts have been examined through projections based on regional climate model outputs downscaled from various GCMs. Major improvements to these studies will be related to increasing the resolution, obtaining snow depth values from snow-water equivalent outputs, and hourly, instead of the daily, calculations of wet bulb temperatures. Daily snow depth values will be utilized for 100-days rule that looks for at least 100 days of snow cover at a minimum of 30 cm in order for a ski resort to be viable, whereas the wet bulb temperatures below -7 oC will indicate the snowmaking capacity. The domain of analysis will be the Balkans, the Middle East and the Caucasus. Therefore the spatial gap in the mostly Euro- and Amero-centric literature will also be improved. The domain will be modelled through RegCM 4.4.2 of the International Centre for Theoretical Physics basing its resolution on MPI-ESM-MR of Max Planck Institut für Meteorologie and the concentration scenario RCP 4.5 for a realistic tourism development future of 2020-2050.