

Assessment of tourism and recreation destinations under climate change conditions in Austria

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Abstract

Tourism and recreation are important economic factors which are directly connected to weather and climate of a specific destination. Based on the observation network of the Central Institute of Meteorology and Geodynamics of Austria (ZAMG), data of 37 stations has been collected and analysed for tourism and recreation purposes. The analysis was based on long term data sets which were processed in relevant ways for tourism and recreation, resulting in frequency diagrams of Physiologically Equivalent Temperature (PET) and precipitation. Additionally, we prepared the results according to the demands of tourism and recreation authorities and industry using the Climate-Tourism/Transfer-Information-Scheme (CTIS). Applying data from the regional climate models REMO and CLM we can provide information on future climate conditions in Austria's recreation areas. We chose two different time slices (2021–2050, 2071–2100) and IPCC emission scenarios (A1B, B1). The data was processed based on the threshold factors which are included in the CTIS (e.g. thermal comfort, heat stress, cold stress, sunshine, etc.). For the time slice 2021–2050 only moderate changes can be expected. But for 2071–2100 one can observe a distinct decrease of cold stress and the skiing potential. On the other hand, moderate increases of thermal comfort, heat stress, sultriness and sunshine are expected. No tendencies can be seen in precipitation and wind conditions.

1 Introduction

The global debate about climate change and its effects on ecology, society and economy also reached the tourism sector (IPCC, 2007; OECD, 2007; UNWTO, 2007; SCOTT, 2011). A number of projects dealt with this issue and were conducted in international research groups (MATZARAKIS, 2006; MATZARAKIS and DE FREITAS, 2001; SCOTT et al., 2006, MATZARAKIS et al., 2004; MATZARAKIS et al. 2007a; AMELUNG et al., 2007). So far, less research concerning the link to health resorts and recreational tourism has been performed (MATZARAKIS et al., 2007b; www.austroclim.at).

In the framework of the TOURKLIM-project (Assessment of tourism and recreation destinations under climate change conditions in Austria), a set of Austrian tourism and recreation destinations (Figure 1) was analysed in terms of their climatic potential for tourism, recreation and health issues. Using high-standard Austrian guidelines (e.g. STEIERMARK, 2002), it was verified whether the destination reaches the required climatic conditions in order to get or keep the label “climatic health resort”. Examples for favourable conditions

for a climatic health resort are the elevation above sea-level, the number of days with sunshine, occurrence of wind, frequency of foggy days, distribution of precipitation, etc. (STEIERMARK, 2002).

Each of the analysed locations runs a meteorological station which provides the necessary data for the project. The measured data was used to assess the touristic and climatic potentials of the site. It further provided the basis for calculating the human bio-meteorological index Physiologically Equivalent Temperature (PET) (MAYER and HÖPPE, 1987; HÖPPE, 1984; HÖPPE, 1993) with the RayMan-model (MATZARAKIS et al., 2007d; MATZARAKIS et al., 2010b). We rated PET according to thermal stress classes (MATZARAKIS and MAYER, 2006). Finally, we transferred the results into comprehensive bioclimatic frequency diagrams and Climate-Tourism/Transfer-Information-Schemes (CTIS) (MATZARAKIS, 2007).

Future developments were assessed on the basis of projections calculated by the regional climate model REMO (MAJEWSKI, 1991; JACOB et al., 2001; JACOB et al., 2007) and COSMO-CLM (COSMO model in CLimate Mode) (STEPPELER et al., 2003; BÖHM et al., 2006; ROCKEL et al., 2008) for the two emission-scenarios A1B and B1 (NAKICENOVIC and SWART, 2000). The modelled data was extracted for three periods of thirty years each. Parameters relevant in terms

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