Preparing climate indicators to assess the impact of extreme weather events on critical infrastructures and on tourism in Hungary

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Abstract

The SREX: Special Report of IPCC on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (2011) concluded that there is evidence from observations gathered since 1950 of change in some extremes. A set of climate indices are used in several projects on climate change as prevailing indicators of changes in extremes. The main focus of the presentation is preparing of climate indicators to impact and vulnerability assessment of critical infrastructure, specifically road accidents within extreme weather events in summertime and wintertime periods and of tourism. Our examinations are based on existing dataset of the National Adaptation Geographical Information System (NAGIS) in Hungary. The daily grids for period 1961-2010 in 0.1° spatial resolution for several basic meteorological variables and climate indicators created in CARPATCLIM (Climate of Carpathian Region) project were integrated to the NAGIS system for the territory of Hungary. The common used methods and software in the CARPATCLIM project was the method MASH (Multiple Analysis of Series for Homogenization; Szentimrey) for homogenization, quality control, completion of the observed daily data series; and the method MISH (Meteorological Interpolation based on Surface Homogenized Data Basis; Szentimrey and Bihari) for gridding of homogenized daily data series. It is a relevant climate database for studying climate extremes and climate change in Hungary.

Different climate indicators are defined and quantified to mapping of exposure and sensitivity of road accidents, such as extremely hot days, number of days from heatwaves in summer and zero crossing days, precipitation amount in a specific period, ice days, snow cover, wind speed, cold/wet days, daily mean temperature < 25th percentile, and daily precipitation > 75th percentile in winter. The TCI (Tourism Climate Index) is prepared to vulnerability assessment of tourism.

These climate indicators are the input values to impact studies that will be developed through the integration of the exposure and sensitivity mapping layers to the NAGIS system. Mapping of exposure of the road accidents and of tourism will be based on measurements and climate modelling results of Hungarian Meteorological Service (OMSZ). Among others these climate indicators will be used to assess the vulnerability due to climate change, which will foster the development of adaptation strategies and objective decision making.

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