DETERMINING CLIMATE INDICATORS TO IMPACT AND VULNERABILITY ASSESSMENT OF ROAD ACCIDENTS DUE TO EXTREME WEATHER EVENTS IN HUNGARY

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The 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 climate indicators to impact and vulnerability assessment of road accidents within extreme weather events in wintertime periods based on existing dataset of the National Adaptation Geographical Information System (NAGIS) in Hungary. The daily grid for period 1961-2010 in 0.1° spatial resolution for several basic meteorological variables and climate indicators were created in CARPATCLIM (Climate of Carpathian Region) project is integrated to the NAGiS system for the territory of Hungary. Different climate indicators are defined and calculated to mapping of exposure and sensitivity such as 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 for example. These climate indicators are input values to impact studies will be developed through the integration of the exposure and sensitivity mapping layers to the NAGiS system. Mapping of exposure will be based on measurement data and climate modelling results of Hungarian Meteorological Service (OMSZ), while the transport accident data recorded at the central body of disaster management will serve as a basis for sensitivity mapping. These indicators will be used to assess the vulnerability (due to climate change) which will foster the development of adaptation strategies and objective decision making. Ice days, zero crossing days with precipitation and maximum one day precipitation for the winter in two standard periods are presented for Hungary out of them in this work.

ABSTRACT

NAGiS, CRIGiS AND CARPATCLIM

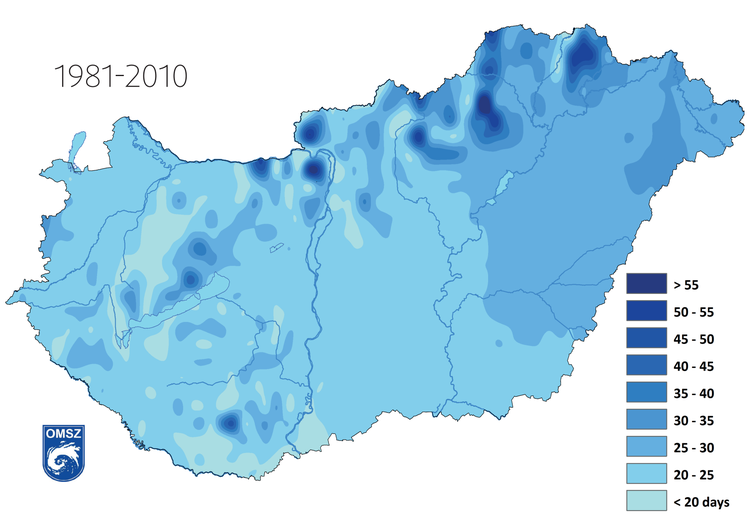
The National Adaptation Geo-information System (NAGiS)
The overall objective of the NAGiS project is to develop a multipurpose geo-information system that can facilitate the policy-making, strategy-building and decision-making process related to the impact assessment of climate change and founding necessary adaptation measures in Hungary. It focuses on the evaluation of negative effects of climate change regarding water management, biodiversity and land use. For this very reason the system establishes a countrywide database with reliable indicators, serving as the basis for a methodology analysing the effects of climate change, as well as the modelling of such effects. The Project is supported by a grant from Iceland, Liechtenstein and Norway.

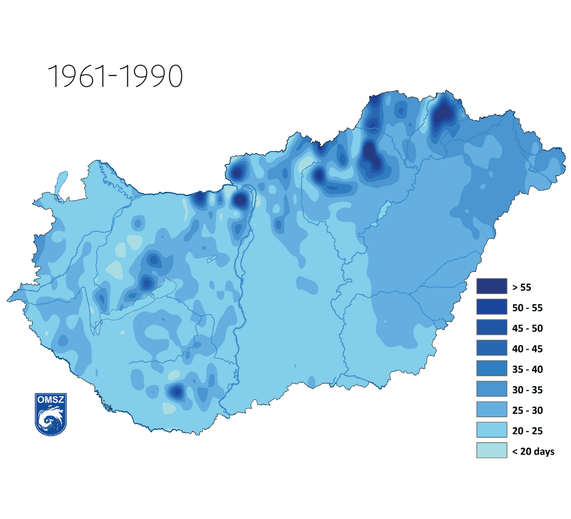
Vulnerability/Impact Studies with a focus on Tourism and Critical Infrastructures (CRIGiS)
CRIGiS is a project of NAGiS. The CRIGiS project is focusing on three important sectors within the tourism and critical infrastructure: study of the excess mortality related to heatwaves; impacts of extreme weather events on road accidents, and the effects of climate conditions on tourism.

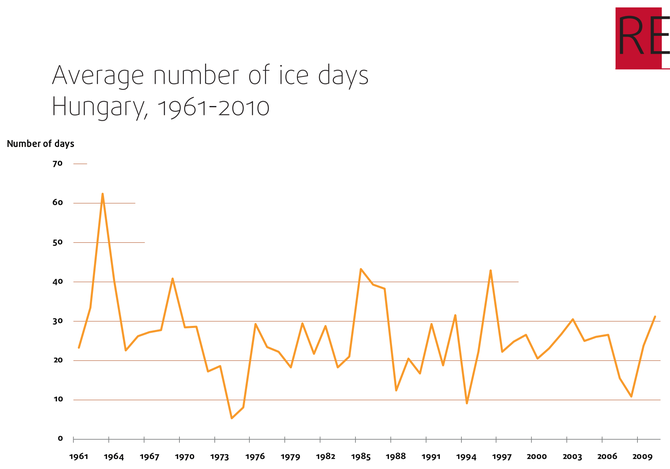
Climate of the Carpathian Region (CARPATCLIM)
The main aim of CARPATCLIM is to improve the climate data source and data access in the Carpathian Region for applied regional climatological studies such as a Climate Atlas and/or drought monitoring, to investigate the fine temporal and spatial structure of the climate in the Carpathian Mountains and the Carpathian basin with unified methods. The final outcome of the CARPATCLIM is a ~10 × 10 km resolution homogenized and gridded dataset on daily scale for basic meteorological variables and several climate indicators, 37 in total, on different time scales from 1961 to 2010. The common used methods were 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.

RESULTS

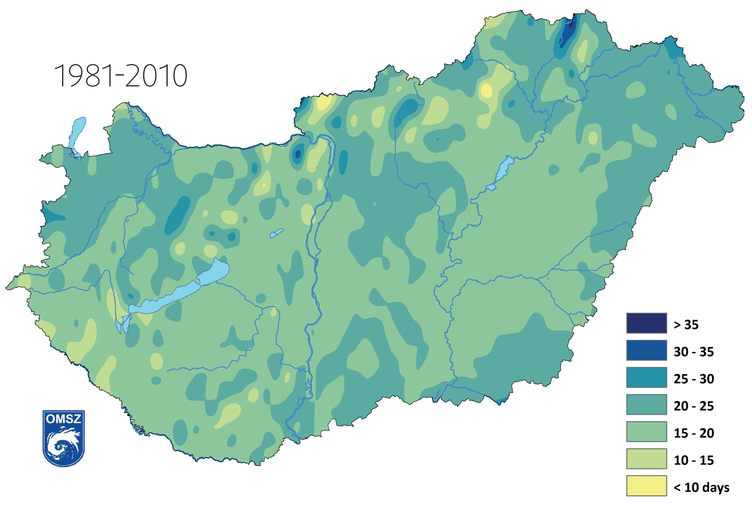
ICE DAYS
(daily Tmax < 0 °C)
number of days

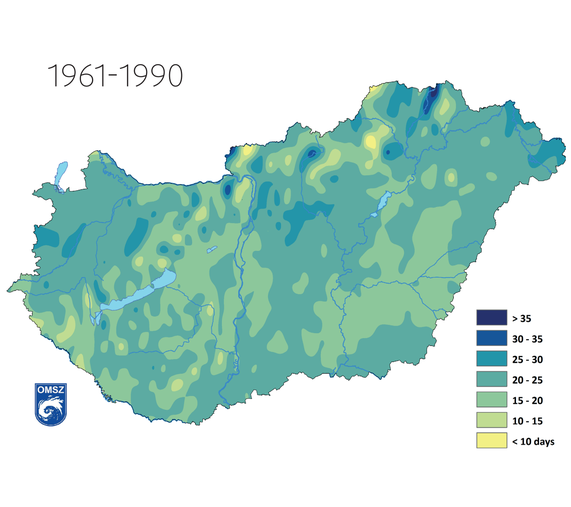


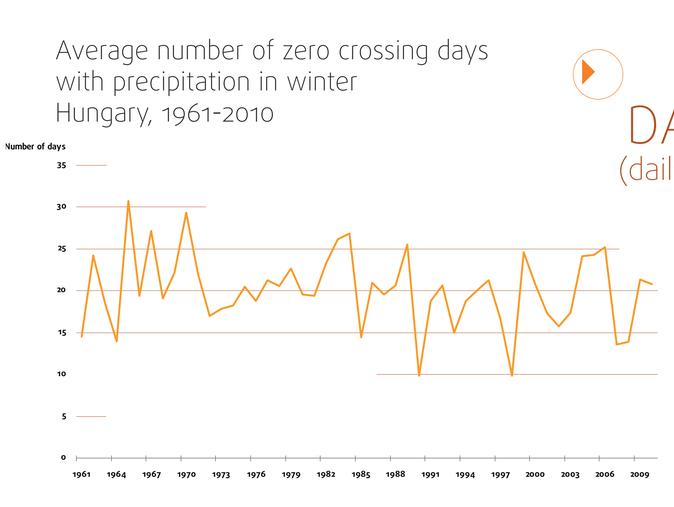




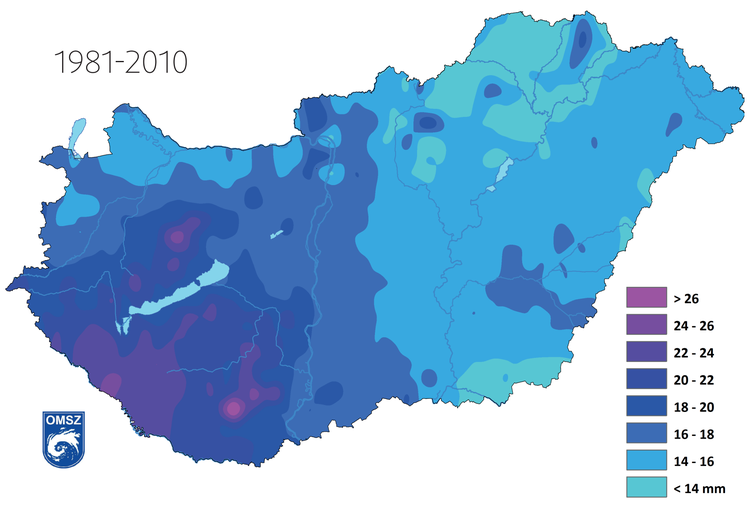
ZERO CROSSING DAYS WITH PREC DJF
(daily Tmin < 0 °C; daily Tmax > 0 °C; daily prec > 0 mm)
number of days

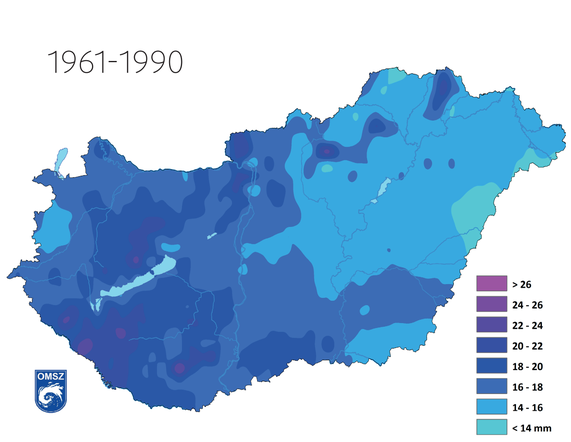


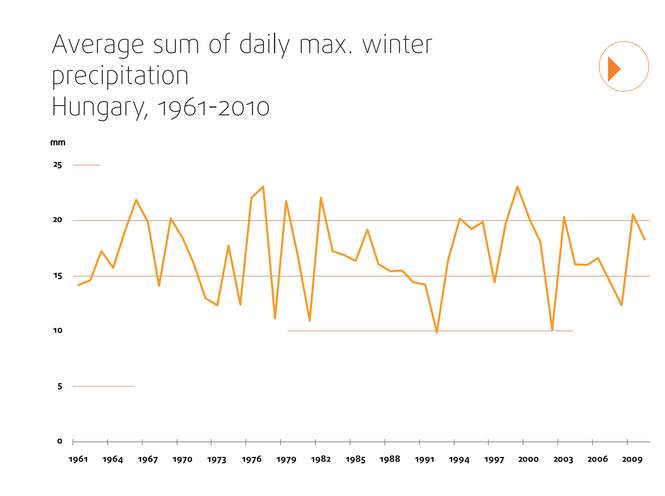




MAXIMUM 1 DAY PRECIPITATION DJF
(mm)







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