EMS Annual Meeting Abstracts
Vol. 9, EMS2012-274, 2012
12th EMS / 9th ECAC

Using numerical weather prediction model to calculate extreme wind climate for landscape modelling

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Extreme wind events belong to the most damaging weather-related hazards in the Czech Republic. Forestry is among the most affected parts of the economy. Recently, a multidisciplinary project was launched to address the role of natural disturbances, i.e. windstorms and bark beetle outbreaks, in dynamics of temperate mountain spruce-dominated forests. A forested area of that type - Šumava Mts (maximum elevation 1456 m) - was chosen as a model domain. This large and compact landscape consists of two national parks that cover 68 000 ha on Czech side and 24 250 ha on German side of the border.

Extreme wind analysis is important part of the project. The main goal of corresponding working group is to provide spatial distribution and frequency of extreme wind speed over the selected area. The first calculations were based on WAsP Engineering methodology, which fits the Gumbel distribution to the observed data and performs spatial calculations with the reference extreme wind speed. The latest calculations are done with a numerical weather prediction model. The widely used model WRF is run to produce a set of patterns of extreme wind speed induced by various situations. The simulated data are combined with available observed time series of wind speed in consequent statistical analysis to obtain the spatial estimate of extreme wind characteristics. The results of both methods are compared and discussed.