EGU21-14602
https://doi.org/10.5194/egusphere-egu21-14602
EGU General Assembly 2021

Evaluation of the reliability of the high-resolution WRF fire danger forecasts in Poland

Marta Gruszczynska[1], Alan Mandal[1], Grzegorz Nykiel[1,2], Tomasz Strzyzewski[1], Weronika Wronska[1], Adam Jaczewski[1], and Mariusz Figurski[1,2]

[1]Institute of Meteorology and Water Management - National Research Institute, Poland
[2]Faculty of Civil and Environmental Engineering, Gdansk University of Technology, Poland

Fires negatively affect the composition and structure of fauna and flora, as well as the quality of air, soils and water. They cause economic losses and pose a risk to human life. Poland is at the forefront of European countries in terms of forest fires. Therefore, Institute of Meteorology and Water Management - National Research Institute (IMWM-NIR) implemented fire danger forecast system based on high-resolution (2.5 km) Weather Research and Forecast (WRF) model. Forecasted meteorological data are used to calculate parameters of Canadian Forest Fire Weather Index (FWI) System: Fire Weather Index (FWI), Initial Spread Index (ISI), Buildup Index (BUI), Fine Fuel Moisture Code (FFMC), Duff Moisture Code (DMC), and Drought Code (DC). Each parameter is presented in one of the classes corresponding to the fire danger – from low to extreme. In this way, a daily 24- and 48-hour fire danger forecasts are generated for the whole area of Poland and presented on IMWM-NIR meteorological website (meteo.imgw.pl).

In this presentation we show analyses of reliability of implemented FWI system. For this purpose, data reprocessing from March to September 2019 were made. Also data on fires occurrence on forest lands: time of occurrence, characteristics and location, from the resources of the State Fire Service were collected. Finally, for the selected period, we obtained a dataset of about 8 thousand events for which we assigned values of FWI parameters. Generally, based on our analysis, correlation between number of fires and averaged value of FWI amounted over 0.8. We found out, the correlation coefficient calculated for regions differ. The correlation is higher in central and northern Poland compared to the eastern part of the country, which also correspond to the number of fires. This may be related to the different forest structure - there is a higher proportion of broadleaf forests in the east. The comparison of 24- and 48-hour forecasts showed that they have similar reliability.