



Abstract

# Site-Specific Wildfire Risk Index in Croatian Wildfire Monitoring and Surveillance System <sup>†</sup>

Darko Stipaničev \*, Marin Bugarić , Ljiljana Šerić , Damir Krstinić and Dunja Božić-Štulić

Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture (FESB) University of Split, 21000 Split, Croatia

\* Correspondence: dstip@fesb.hr

† Presented at the Third International Conference on Fire Behavior and Risk, Sardinia, Italy, 3–6 May 2022.

**Keywords:** wildfire risk; wildfire monitoring; site-specific wildfire risk index

Identifying the danger of fire is important for both wildfire prevention and protection. It can be useful for improving automatic fire detection systems, but also for many other fire-fighting activities that happen before the actual wildfire. The Croatian wildfire risk index is related to estimation of wildfire ignition danger and propagation danger. It is calculated on a micro-location level; therefore, it is a site-specific wildfire risk index. During its development, we have studied the possible influence of various parameters on risk index value using the correlation analysis with past wildfires in Split-Dalmatia County. Finally, two categories of parameters have been chosen:

- Static parameters: vegetation (fuel fire sensitivity), terrain configuration (elevation, slope, aspect) and anthropogenic parameters (settlements, roads, transmission lines);
- Dynamic parameters: wind speed and direction (correlated with slope and aspect) and Canadian Forest Fire Weather Index (FWI). Dynamic parameters are provided by the Croatian Meteorological Service once a day with 24 h forecast by ALADIN model in a 3 h time scale. The relative influence of specific parameter to overall risk index value were optimized by genetic algorithms.

In its present version, it is integrated with the Croatian online wildfire intelligent monitoring and surveillance system (OIV Fire Detect AI) installed in Croatian Dalmatian counties and has been used by Croatian firefighters in everyday practice since 2016.

Currently, we are working on its further improvement through the H2020 FirEURisk project, particularly in parts dedicated to propagation danger and wildfire vulnerability, but also in more accurate determination of parameters' influence and new user-friendly visualization.

In our research, we will describe in more detail how the Croatian wildfire risk index is calculated and used, including its statistical evaluation, but also how it will be improved through FirEURisk project.

**Author Contributions:** Conceptualization, D.S. and M.B. and L.Š.; methodology, D.S. and L.Š.; software, M.B.; validation, D.K., D.B.-Š.; investigation, D.K.; resources, L.Š.; data curation, D.B.-Š.; writing—original draft preparation, D.S. and M.B.; writing—review and editing, D.S. and M.B. All authors have read and agreed to the published version of the manuscript.

**Funding:** This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003890.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Conflicts of Interest:** The authors declare no conflict of interest.



**Citation:** Stipaničev, D.; Bugarić, M.; Šerić, L.; Krstinić, D.; Božić-Štulić, D. Site-Specific Wildfire Risk Index in Croatian Wildfire Monitoring and Surveillance System. *Environ. Sci. Proc.* **2022**, *17*, 34. <https://doi.org/10.3390/environsciproc2022017034>

Academic Editors: Pierpaolo Duce, Donatella Spano, Michele Salis, Bachisio Arca, Valentina Bacciu, Grazia Pellizzaro and Costantino Sirca

Published: 9 August 2022

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).