

Abstract

Emerging Challenges of Wildfire Risk Management in the Islands of the Aegean Archipelago [†]

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

Keywords: wildfire simulations; minimum travel time; values-at-risk; burn probability



Citation: Palaiologou, P.; Kalabokidis, K. Emerging Challenges of Wildfire Risk Management in the Islands of the Aegean Archipelago. *Environ. Sci. Proc.* **2022**, *17*, 49. <https://doi.org/10.3390/environsciproc2022017049>

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

Published: 10 August 2022

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The islands of the Aegean Archipelago in Greece face challenges regarding their social and natural systems from tourism, the recent immigration crisis, the ongoing rural exodus, changes in the established agricultural and livestock farming practices, urban expansion to natural areas and the post-2010 economic environment, which, in turn, affect wildfire occurrence, spread and intensity. Approximately 5000 ignitions burned 50,000 ha over the last two decades in the large islands (i.e., Lesbos, Rhodes, Chios, Samos, Icaria and Karpathos) of the eastern Aegean Sea. These large islands previously had extensive areas covered with *Pinus brutia* forests, but, after half a century of repeated wildfires, these forests have receded to a large extent. For example, large wildfires occurred during the summer of 1994 in Lesbos (2500 ha burned), 2000 in Samos (14,500 ha burned), 2008 in Rhodes (13,000 ha burned) and 2012 in Chios (15,000 ha burned).

In this work, we used the Minimum Travel Time (MTT) fire-spread algorithm incorporated in the FConstMTT software to simulate over 100,000 fires for each of the most-forested and prone to large-scale wildfire islands, under varying weather conditions and ignition locations. We produced estimates of annual burn probabilities and conditional flame length and used the simulated fire perimeters and ignitions to map the spatial scale and complexity of wildfire exposure. We also assessed the exposure of important values-at-risk, such as the Petrified Forest in Lesbos Island, important bird habitats, drinking water resources and protected areas. In addition, fire exposure was assessed for medieval villages, communities, areas of tourism development and high-amenity wildland–urban interfaces. The results were used to understand where large wildfires are expected to appear in the near future, and prioritize areas for fuel management, targeting the locations that are most prone to produce destructive wildfires.

Author Contributions: Conceptualization, P.P. and K.K.; methodology, P.P.; validation, K.K.; formal analysis, P.P.; writing—original draft preparation, P.P.; writing—review and editing, K.K.; supervision, K.K.; project administration, K.K.; funding acquisition, K.K. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Project “Coastal Environment Observatory and Risk Management in Island Regions AEGIS+” (MIS 5047038), implemented within the Operational Programme “Competitiveness, Entrepreneurship and Innovation” (NSRF 2014–2020), cofinanced by the Hellenic Government (Ministry of Development and Investments) and the European Union (European Regional Development Fund).

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data and results are available upon request to the corresponding author.

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