Plinius Conference Abstracts
Vol. 18, Plinius18-58, 2024, updated on 02 Nov 2024
https://doi.org/10.5194/egusphere-plinius18-58
18th Plinius Conference on Mediterranean Risks

Adapting to change: evaluating the effects of fire prevention approaches in response to climate change

Virgílio A. Bento, Carlos C. DaCamara, Ana Russo, Sílvia A. Nunes, Pedro M.M. Soares, and Ricardo M. Trigo
Universidade de Lisboa, Faculdade de Ciências, Instituto Dom Luiz, Lisboa, Portugal (vabento@fc.ul.pt)

Climate change imposes a substantial strain on global societies, compelling pragmatic, and timely adaptation measures to secure future prosperity while mitigating the impact of increasingly frequent and intense extreme events, such as wildfires. Compound drought and heatwaves further amplify the wildfire challenge, potentially impacting human health through a decrease in air quality. This underscores the need for concentrated attention and action. These events, with repercussions spanning continents and biomes, pose challenges for authorities striving to prepare effective responses. Our focus is on mainland Portugal, situated in the Mediterranean climate change hotspot, where we analyze the influence of diverse adaptation strategies on wildfire risk.

Using a weighted ensemble of regional climate models from the EURO-CORDEX initiative, we project the Fire Weather Index (FWI) and Fire Radiative Power (FRP) across various Representative Concentration Pathways (RCPs). Our findings indicate a potential three-fold increase in the occurrence of highly energetic fires, with energy releases surpassing 1000 MW, contingent upon the chosen RCP. Even under robust mitigation scenarios, the probability of megafires — those with energy releases exceeding 1000 MW — experiences a notable upsurge of approximately 1.5-fold. This emphasizes the imperative for proactive adaptation measures irrespective of ongoing mitigation endeavors.

We introduce three distinct mitigation strategies designed to simulate fire prevention policies targeting the most intense fires in diverse climate change scenarios. The most promising outcome entails a reduction in wildfires exceeding 1000 MW by 20 to 60%, an achievement realizable through preventing 95% of hotspots in regions characterized by extreme fire danger. This suggests that an immediate imposition of overly restrictive and costly policies throughout the summer months may not be imperative. Instead, implementing targeted strategies in critical fire danger areas could substantially mitigate the occurrence of destructive megafires.

This work was funded by the Portuguese Fundação para a Ciência e a Tecnologia (FCT) I.P./MCTES through national funds (PIDDAC) – UIDB/50019/2020 (https://doi.org/10.54499/UIDB/50019/2020), UIDP/50019/2020 (https://doi.org/10.54499/UIDP/50019/2020) and LA/P/0068/2020 (https://doi.org/10.54499/LA/P/0068/2020). This work was performed under the scope of project https://doi.org/10.54499/2022.09185.PTDC (DHEFEUS) and supported by national funds through FCT. AR acknowledge FCT I.P./MCTES for the FCT https://doi.org/10.54499/2022.01167.CEECIND/CP1722/CT0006. The authors would like to acknowledge the project "CEASEFIRE: Envio e disseminação de alertas automatizados de gestão de perigo meteorológico de incêndio", financed by The Navigator Company.