

Comment on egusphere-2026-4656

General comments:

The paper addresses a relevant scientific topic and falls within the scope of NHESS. It provides an important step toward improving fire risk assessment in Greece, particularly under climate change scenarios, where fire activity is likely to increase. It is clear that the authors have dedicated considerable effort to provide an extensive analysis. I do, however, have concerns regarding the overall structure of the paper, especially the clarity, transparency and organization of the Methods section.

The flow of the Methods is somewhat confusing. I believe the structure could be improved by incorporating Section 2.1 into Section 2.2. As it currently stands, Section 2.1 introduces the datasets without clearly explaining how they are integrated and used to estimate the different risk components. More generally, I recommend introducing each dataset alongside the component and methodological step in which it is used. This would make the overall workflow and the relationship between the datasets and the risk components much clearer.

As I understand, the study validates the calculated fire risk with the burned area datasets described in section 2.1.3. This is not a robust validation, given that it compares different metrics (fire risk versus BA). In fact, BA is not even included as a variable of the fire risk approach proposed. Validation here would be more appropriate using, for example, observations that directly represent the fire risk metrics being used and modelled, or by clearly framing the comparison with burned area as an assessment of the model's relationship with observed fire activity rather than as a validation.

Methods also misses a section explaining how the future scenarios were handled. Further, I suggest adding a flowchart (by expanding Figure 1, for example, or adding an additional figure) of the whole methodological process at the very end of the Methods section, to make it easier to understand the steps undertaken.

Similarly, the reader does not know which municipalities are included or where they are located until the Results section. I suggest adding a map earlier in the Methods section, or even in the SM, as the municipalities are mentioned throughout the text, but their geographic location is not clear to the reader.

The Results section should follow the order presented in the Methods more closely. A substantial part of the Methods describes how the H, E, and V datasets were developed, normalized, and validated. However, the Results section moves directly to the AHP results, leaving the reader with limited information on the outcomes of the preceding steps. Figure B1 provides some indication of these results. I suggest moving this figure to the Results and providing more detail on the results of the processes used to develop, normalize, and validate the datasets. This would make the progression from the input datasets to the final results clearer.

Finally, the Discussion section currently reads more as a description of the results rather than a discussion of their broader implications and relevance. Several key questions remain unclear. For example, how does the proposed fire risk assessment compare with approaches used in other studies? What are the main limitations of the proposed

methodology? What other metrics or indicators could have been used to estimate fire risk? Are there alternative approaches that could have been used for validation?

More broadly, it would be useful to discuss how the findings compare with previous studies, not only from Greece but also from the broader Mediterranean region and Europe. This would help place the results in a wider context and strengthen the connection with how the study is framed in the Introduction.

I therefore suggest expanding the Discussion to engage more explicitly with the existing literature, adding relevant references, and comparing the results and methodological choices with those of previous studies. This would help clarify the contribution of the study and better demonstrate how it advances or complements existing fire risk assessment approaches.

Specific comments:

Page 2, Lines 38-41: Improve readability of these two sentences: First, you mention a 10-fold increase in probability of catastrophic wildfires for southern Europe, then you mention a ~2-fold increase in the probability of extremely large fires (occurrence?) for the Mediterranean. I understand that the difference here refers to the geographic region, and not to the type of event itself. I suggest using the same terms (either "catastrophic wildfires" or "extremely large fires") to avoid confusing the reader.

Page 2, Lines 41-42: Add reference for EUCRA - what year are these findings from?

Page 2, Line 47: RCP is mentioned here, but the study uses SSP scenarios. Please mention and briefly explain the SSP scenarios somewhere in the intro.

Page 2, Lines 58-61: Is suppression the only action taken to control fire? A few sentences/paragraph should be added here to describe the practices currently being implemented to control wildfires in Greece. This would bring context to this study, reinforce the gap that this paper seeks to address and further highlight why the study is needed.

This is particularly important for fire-prone ecosystems in the Mediterranean and elsewhere. Including these practices would help emphasize that suppression is not the only approach to wildfire mitigation and that, as climate change intensifies wildfire risk, a broader range of fire management strategies will become increasingly important.

Page 3, all of Sections 2.1.1 and 2.1.2: CMIP6 and ERA5 are cited as climatic inputs to calculate hazard, but then section 2.2.1 mentions that the GCMs were actually used to result in the FWI components, which were further downscaled using ERA5. I suggest moving CMIP6 and ERA5 to the hazard component (2.2.1) and better explaining the methodological flow of this process.

Pages 3-4, all of Section 2.1.3: Fire statistics may not be the accurate term here, since no statistical analysis is described here.

More information is needed here regarding the datasets Hellenic Fire Service, Google Earth and BSM. for example: Are the data derived from satellite imagery? If so, which satellites and sensors are used? What is the spatial resolution of each product?

Please make sure to adequately describe each of the products being used. This is important for understanding why these were chosen instead of other burned area products available, for assessing whether the datasets are comparable and whether the comparisons made in the study are appropriate.

It is also unclear where the “fire statistics” data are used in the study. From the Methods, they appear to be used only for the “validation”. If this is the case, I suggest moving the description of these data to the validation section, where their role in the analysis can be clearly explained.

Page 3, Line 95: Please provide reference for the Hellenic Fire Service.

Page 3, Line 96: fire or wildfire? The approach is for wildfire risk assessment, but it seems that all burn scar were considered for “validation”. How were wildfires separated from other types of fire? This is an important distinction that should be made clearer.

Page 5, Lines 142-144: Please name the forest area classes so the reader knows what land covers are being considered. This could go into the main text or SM.

Page 5, Table 1: Tables 1 and 2 could be joined.

Page 6, Lines 157-159: Explain why these were chosen, or why are they are more important to wildfire occurrence in Greece than other aspects (e.g. proximity to roads, proximity to cities etc)

Page 6, Line 158: Please use “aboveground biomass” instead of “fuel load” to unify terms. Or change the title on Line 168 to “fuel load”. In either case, a sentence should be added explaining that live and dead AGB of trees are being used as a proxy for fuel load.

Page 6, Lines 161-163: Add reference.

Page 6, “Aboveground biomass” section: Why only trees are being used to estimate AGB? How are the different forest classes mentioned in lines 140-144 being considered in this estimation? Please clarify.

Page 7, Lines 178-181: Confusing. Did Daily dead biomass also come from ECMWF? Please provide reference. Also, aboveground live biomass from both datasets were added? If so, how was live AGB not double-counted? Or was it only live from one dataset and dead from the other? Please clarify.

Page 7, Lines 184-185: Add reference.

Page 8, Lines 210-213: How was this indicator calculated?

Page 8, Line 213: The same density (from 2023) was used for the whole reference period? Please clarify.

Page 8, Lines 216 – 218: This is a debatable statement. Is there published material to support the idea? This is important to support why occupation was added as a key indicator of fire risk.

Page 8, Lines 223 – 225: This is a debatable statement. Is there published material to support the idea? This is important to support why educational level was added as a key indicator of fire risk.

123 Page 8, Lines 228 – 230: This is a debatable statement. Is there published material to
 124 support the idea? This is important to support why GPD was added as a key indicator of
 125 fire risk.

126 Page 9, all of 2.3 Section: The organization of this section is quite confusing. Organizing
 127 it in the same order as previous sections (first explain hazard, then exposure, then
 128 vulnerability) could improve readability.

129 Page 10, Lines 251 – 252: Please write this in order (0, 60, 80, 100).

130 Page 10, Line 258: What are the operational thresholds? Please expand so the reader
 131 understands your methodological process.

132 Page 10, Lines 261 – 272: This should come together with the other vulnerability
 133 indicators.

134 Page 10, Line 277: “Mean value” of the pixels within the municipality? Please clarify.

135 Page 12, Lines 314 – 321: This paragraph should be moved before the preceding
 136 paragraph.

137 Page 12, Lines 323 – 325: What is meant by “observed wildfire occurrence”? Is it the BA
 138 data (Section 2.1.3)? Please clarify.

139 Page 12, Lines 325 – 328: This should be placed together with the previous paragraph,
 140 where the explanation of OWA is.

141 Page 12, Lines 329 – 330: Please add reference for “Jenks natural breaks classification
 142 method”.

143 Page 13, Lines 336 – 337: Again, what is meant by “observed wildfire occurrence”? Is it
 144 the BA data (Section 2.1.3)? Please clarify.

145 Page 13, Line 342: The reader does not know where Attica region is, nor what the
 146 municipalities are, until the results section. I suggest adding a map of the research area
 147 in the methods or SM.

148 Page 13-14, all of Section 2.6: Please refer to the general comments on the robustness
 149 of the validation process.

150 Page 17, Line 433: This is the first time that the total number of municipalities is
 151 mentioned (304). This information should come earlier on the Methods.

152 Page 18, Figure 2: This map needs improvement. As it is the first map shown, it needs
 153 more detail (e.g. scale, a broader map of Europe for context etc).

154 Page 20, all of Section 3.5: The Methods should include a Section on future projections,
 155 so the reader understands the scenarios and its methodology before showing the results
 156 of projected shifts.

157 Page 24, Lines 549 – 542: What do other papers say?

158 Pages 25 – 26, all of Section 4.4: this Section has potential to be expanded and
 159 discussed in more details.

160 Pages 23 – 26, all of Discussion: As of now, it is more of a description of your results
161 rather than a discussion. Please refer to the general comments for more details.

162 Page 26, Lines 592 – 600: The limitations should come in the Discussion, and discussed
163 in more details, rather than being cited in the Conclusion.

164 **Technical corrections:**

165 Page 2, Line 36: Exclude “both”.

166 Page 2, Line 50: “parts” instead of “part”.

167 Page 3, Line 78: “two”, not “multiple” climate change scenarios.

168 Page 6, Line 156 (Title): Sensitivity Capacity (word “Capacity” is missing)

169 Page 6, Line 168: Please correct the spelling of “aboveground” throughout the text.

170 Page 6, Line 177: Please delete “and moisture content data” as this was not used in the
171 study.

172 Page 8, Line 216: “adaptive indicator” instead of “sensitivity indicator”?

173 Page 10, Line 250: Delete “classification” (already written in previous line).

174 Page 11, Line 288: Table 3 instead of Table 5?

175 Figures: please upload high-resolution figures.