

Interactive comment on “Modeling anthropogenic and natural fire ignitions in an inner-alpine valley” by Giorgio Vacchiano et al.

Anonymous Referee #1

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General comments:

The manuscript focuses on a relevant issue for the thematic area of natural hazards, being dedicated to understand fire ignition drivers in an alpine region. Overall, it is well written and attempts to describe the analysis procedure in detail. However, there are some conceptual choices that are not adequately justified, the results and discussion do not fully reflect the objectives defined and some assumptions presented are not totally supported by the results.

Major specific comments:

Introduction

The assumption that the increase in total area burned by fires larger than 10 ha in

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1981–2000 relative to 1961–1980 must be duly justified; how the authors have separated the influence of climate change from the other socioeconomic and environmental changes occurred since the 60's? The objectives and hypothesis presented in this section are not fully explored/justified in the following ones; further work is required to improve the manuscript by adjusting the concepts and references presented to the ideas and assumptions presented in the results and discussion.

Methods

Overall, the conceptual design of the study is not properly explained, in what concerns the creation of individual datasets and the interpretation of the results obtained. The conceptual choice of dividing the fire ignition data by land cover type (grassland or forest) only for winter fires is not properly justified. Why is this choice made? It can be a valuable option, considering the specific characteristics of alpine fires, but they are not explained. This changes the interpretation of the results and the assessment of the implications for fire management. Furthermore, since land cover types were also used as predictors in the model, how can their influence in fire ignition patterns be evaluated independently, considering that they were already applied as criteria for creating separate datasets of the dependent variable? The categories of independent variables included in the model are unbalanced, i.e., there are 15 climatic variables, 5 related to land cover (with the issues presented beforehand), 3 regarding topography and 3 for anthropogenic conditions. How is this reflected in the weighting of their importance in the analysis? The choice of the regularization coefficient of 1.5 is based on previous studies, preliminary assessment?...

Results

What is the proportion of ignitions for which there is no known cause? How does that affect the dataset included in the model? Were only the ignitions with known causes included? In the PCA analysis, land cover variables are mentioned, but which type of land cover is represented (out of the 5 categories defined) and which ones are collinear

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with other variables are not presented.

Discussion

The discussion is generally organized by natural and anthropogenic fires, a structure that is not followed in the other sections nor steered the creation of separate datasets (winter + landcover / summer), despite being presented in the title. The interpretation seems to be made by the authors based on the results obtained and the influence of specific variables, as described in the results section, but it does not support the overall structure of the article nor helps evaluating the prior results presented nor the objectives defined in the introduction. Also, some assumptions are made that are not entirely supported by the results presented, such as the areas with higher agricultural population being more prone to fire (page 8), with no obvious relation with the variables included (which variables integrated in the analysis have based this assumption?). The authors mention as an objective that the results of the analysis can be used by land managers to inform fire prevention actions (P2), but this is not explored in the discussion and is only very briefly mentioned in the conclusions. What are the implications of these results for fire prevention and mitigation? Were the options regarding summer/winter fires related to fire management practiced in the study area? How does the cause of fire (natural/anthropogenic) affect fire prevention in an alpine area?

Tables/Figures

The Tables/Figures presented are generally explicit, but do not cover all the desirable components; a table with the sources and scale of the variables integrated and how they were normalized would be useful; maps with the spatial distribution of the most important variables (and the classes defined) would be helpful. - In legend of Fig 2 – Is it Corine Land Cover 1990 used, or 2006, as mentioned in text? - Scale of graphs of fig. 7 should be all the same to facilitate comparison

Further technical corrections are not presented at this stage, since these major issues should be dealt with first.



ANSWERS TO REVIEW QUESTIONS: 1.Does the paper address relevant scientific and/or technical questions within the scope of NHESS? R: YES

2.Does the paper present new data and/or novel concepts, ideas, tools, methods or results? R: YES

3.Are these up to international standards? R: YES

4.Are the scientific methods and assumptions valid and outlined clearly? R: NO

5.Are the results sufficient to support the interpretations and the conclusions? R: NO

6.Does the author reach substantial conclusions? R: NOT SUFFICIENTLY CLEAR

7.Is the description of the data used, the methods used, the experiments and calculations made, and the results obtained sufficiently complete and accurate to allow their reproduction by fellow scientists (traceability of results)? R: NOT SUFFICIENTLY CLEAR

8.Does the title clearly and unambiguously reflect the contents of the paper? R: YES

9.Does the abstract provide a concise, complete and unambiguous summary of the work done and the results obtained? R: OK, BUT CAN BE IMPROVED, FOLLOWING REQUIRED CHANGES IN RESULTS/DISCUSSION

10.Are the title and the abstract pertinent, and easy to understand to a wide and diversified audience? R: YES

11.Are mathematical formulae, symbols, abbreviations and units correctly defined and used? If the formulae, symbols or abbreviations are numerous, are there tables or appendixes listing them?

12.Is the size, quality and readability of each figure adequate to the type and quantity of data presented?

13.Does the author give proper credit to previous and/or related work, and does he/she

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indicate clearly his/her own contribution? R: YES

14. Are the number and quality of the references appropriate? R: YES

15. Are the references accessible by fellow scientists? R: YES

16. Is the overall presentation well structured, clear and easy to understand by a wide and general audience? R: CAN BE IMPROVED, ADJUSTMENTS REQUIRED TO CONNECT ALL SECTIONS AND THE ASSUMPTIONS PRESENTED

17. Is the length of the paper adequate, too long or too short? R: ADEQUATE LENGTH, BUT REQUIRES ADDED MATERIAL, CAN BE LONGER (RESULTS)

18. Is there any part of the paper (title, abstract, main text, formulae, symbols, figures and their captions, tables, list of references, appendixes) that needs to be clarified, reduced, added, combined, or eliminated? R: YES, SOME PARTS NEEDS REVISIONS, SEE SPECIFIC COMMENTS

19. Is the technical language precise and understandable by fellow scientists? R: YES

20. Is the English language of good quality, fluent, simple and easy to read and understand by a wide and diversified audience? R: YES

21. Is the amount and quality of supplementary material (if any) appropriate?

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