

## Referee 2

The authors have adequately addressed my comments and concerns from the first review round. In particular, I appreciate the added clarity between fire hazard and fire risk presented in the manuscript. The research questions on page 4 are also a valuable addition. Finally, the clearer description of DAG is really helpful, and the inclusion of strength of influence is excellent. I have just a couple of very minor comments to be addressed below.

### Minor comment:

In the response to reviewer document, there is a missing discussion of what was completed for one comment. Specifically:

**"L55: The comment about "biodiversity is lost" is completely opposite to L22 where the introduction mentions "fires increase biodiversity". Please explain or correct this inconsistency. The positive or negative consequences of wildfires mainly depend on their size, intensity, and frequency. We will clarify the revised version as follows:"**

**- I did not find the same inconsistency when reading through the manuscript again. However, it would be great to get a summary of how this was addressed from the authors.**

Thank you very much for the suggestion. The sentence was not sufficiently clear, so we have added an additional sentence to enhance the understanding of how biodiversity or ecosystem services can be compromised through fire. As explained by various authors (Daily et al., 1997; Roces-Díaz et al., 2022; Tedim et al., 2020; Pausas et al., 2008; Regos et al., 2014; Castellnou et al., 2019), human intervention has significantly altered both ecosystems and fire regimes. In the case of ecosystems, two distinct phenomena have caused disruption: 1) The overprotection of ecosystems, coupled with the absence of herbivores, has resulted in an accumulation of fuel, particularly in Mediterranean ecosystems. Consequently, when a fire occurs, it burns with greater intensity due to the increased availability of combustible material. And 2) Overexploitation and degradation of certain areas have rendered some ecosystems highly fragile, making post-fire recovery more challenging.

Regarding fire regimes, the main issues are as follows: 1) The efficacy of fire suppression, leading to the phenomenon known as "fire trap" (Arno and Brown, 1991), which causes a shift in the natural fire regime. This alteration results in increased horizontal fire continuity (larger fire-prone areas) and further accumulation of fuel in forests (associated with ecosystem disruption and overprotection of forests). And 2) Human-caused ignitions, whether intentional or due to negligence, can affect highly degraded areas or areas with a substantial build-up of fire events.

The sentence has been modified in the revised manuscript as follows:

The consequences of wildfires exceed the loss of forest cover, vary over time and can be long-lasting. Some ecosystem properties and functions that deliver benefits to humans (Daily et al., 1997; Roces-Díaz et al., 2022), including biodiversity, may be lost. This diminish might happen when natural fire regimes and forest ecosystems are strongly altered by human intervention (Tedim et al., 2020; Arno and Brown, 1991), leading to an increase of fire extent, intensity and severity (Pausas et al., 2008; Regos et al., 2014; Castellnou et al., 2019).

References:

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Daily, G., Postel, S., Bawa, K., and Kaufman, L.: *Nature's Services: Societal Dependence On Natural Ecosystems*, Bibliovault OAI Repository, the University of Chicago Press, 1997.

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Regos, A., Aquilué, N., Retana, J., Cáceres, M. D., and Brotons, L.: Using Unplanned Fires to Help Suppressing Future Large Fires in Mediterranean Forests, *PLOS ONE*, 9, e94906, <https://doi.org/10.1371/journal.pone.0094906>, 2014.

Roces-Díaz, J. V., Santín, C., Martínez-Vilalta, J., and Doerr, S. H.: A global synthesis of fire effects on ecosystem services of forests and woodlands, *Frontiers in Ecology and the Environment*, 20, 170–178, <https://doi.org/10.1002/fee.2349>, 2022.

Tedim, F., McCaffrey, S., Leone, V., Delogu, G. M., Castellnou, M., McGee, T. K., and Aranha, J.: 13 - What can we do differently about the extreme wildfire problem: An overview, in: *Extreme Wildfire Events and Disasters*, edited by: Tedim, F., Leone, V., and McGee, T. K., Elsevier, 233–263, <https://doi.org/10.1016/B978-0-12-815721-3.00013-8>, 2020.

**Technical corrections (line numbers are based on the tracked changes document):**

**L922: modeling, L924 modelling**

Thanks for the suggestion, we changed in the revised manuscript.

**L920: being 2012 → 2012 being**

Thanks for the suggestion, we changed in the revised manuscript.

**L1421: However, fires can not always be...**

Thanks for the suggestion, we changed in the revised manuscript.