

***Interactive comment on* “Exploring spatial-temporal dynamics of fire regime features at mainland Spain” by Adrián Jiménez-Ruano et al.**

Anonymous Referee #2

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This temporal analysis of fire regimes features in Spain may be a very valuable addition to the fire science field, as it considers traits of fire regime characterization not contemplated before, beyond the usual number of fires and burned area, from a temporal perspective. There are many previous studies on how climate, topography, vegetation, and land use influence fire regimes, characterized by number of fires or fire frequency, severity/intensity, size of burned area or pattern. As there is abundant previous work on fire regimes characterization, the factor that set this analysis aside and merits publication is the application of change and trend detection procedures to fire features of special interest in Spain (i.e. large fires over 500 ha), and the PCA-Varimax Rotation applied to summarize trends. Procedures, though, may be applied elsewhere at different spatial and temporal scales.

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However, the authors state that their temporal analysis aims “to refine and improve the spatial outline of fire regimes” and has an “ultimate goal of characterizing fire regimes”. How it is proposed that their temporal variability in fire regime features is considered when defining fire regimes ? (line 50). It is unclear how they propose this to be done, or how their stratifications in space (three regions, provinces NUT3 level) and time (two fire seasons in winter-spring and summer, line 140) correspond to fire regime stratifications in Spain by other authors like Moreno & Chuvieco 2012 (four regimes), or official Spanish reports (that need citation (line 120)). Other partitions of the territory were possible, and these pyroregions need better justification and definition. Some descriptive statistics of the fire database in the 2.2 Fire data section would probably help to justify the spatial and temporal stratification used.

Methods are well described and applied, though the use of fires over 1ha eliminates from the analysis a very large number of fires that would largely influence results related to number of fires features in the paper. However, this has been done also in other work i.e. Moreno & Chuvieco 2012 based on lack of accuracy of these data in older reports in the study period. Lines after 185 explain three algorithms for change point detection. Why settings were determined to find at least one, but no more than two breakpoints in PELT, and one ($Q=1$) in BinSeg? This makes sense for comparison purposes with AMOC and Pettitt, but is there not a risk to miss other significant changes?

There are some other minor issues that should be considered:

-The authors refer to CCAA in Spain the international readers will not be familiar with, i.e. Andalusia, Galicia or Asturias, not in Figure 1. Labels seem to be missing. What is the black line crossing the land cover map?. Regarding Figures 4 and 5, Sen's slope values are hard to distinguish.

-Why is the level for correlation in table 3 set to 0.43? Please explain.

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