

Interactive comment on “Global fire activity patterns (1996–2006) and climatic influence: an analysis using the World Fire Atlas” by Y. Le Page et al.

Anonymous Referee #1

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Thanks to satellite derived fire information much is known about spatial patterns and interannual variability of fire. The authors use the longest timeseries available and apply sophisticated statistical techniques to further decipher spatial and temporal patterns. The paper certainly deserves to be published in ACP because of the thorough analysis and the highly interesting statistical techniques used, which confirm some expected and also highlight new less expected patterns which are of interest to a wide range of people interested in fire. The paper is well written and the authors make good use of existing literature on the subject. I found the introduction lacking some coherency though, especially the first three paragraphs could be written more to the point and towards the objectives of the paper.

The strength and innovative part of the paper may also be its weakness; the statistical approach to better understand the spatial and temporal fire dynamics are exciting but they also leave the reader often wondering what their meaning and implications are. Everyone understands EOF1, but how about the less obvious ones, what physical basis or implications do they have? A more thorough discussion than currently provided (for example similar to those about the different clusters) would improve the interpretability of the paper.

Because this point is also brought up by another reviewer I would encourage the authors to address this during the open discussion time frame. By making full use of the ACP interactive discussion the paper may be further strengthened.

Another point of criticism would be that the ATSR data only detects fires at night time. Also, fires are only detected when the sky is cloud free. This itself already amplifies the number of fires seen during drought periods which are often accompanied by more cloud-free days. Both points are briefly addressed in the text, but it left me wondering what the influence really is. One potential solution is to also do the analysis with TRMM fire count product (Giglio et al., 2003), which sample the whole diurnal cycle and are corrected for clouds, and see whether the patterns are similar to those derived from ATSR. A caveat would be that 1997 is not included in the TRMM product and that it only covers the tropics and subtropics. Not sure how much the shorter time period would impact the analysis, although it would also be interesting to see how the analysis would change when excluding the extreme 1997-1998 period. If this can be done without too much work, it may improve the impact of the paper.

Minor points: - Justify more clearly why LEV is used, this gives more weighting to extreme events which are certainly more interesting, but this may make for an under-representation of the dominant fire patterns

- 17310: "The relatively low value of retained variance indicates that the dimensionality of space-time patterns of global fire anomalies is intrinsically high."; Please discuss

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what this in less abstract terminology means, i.e. what implications does this have?

- 18310 "exclusively in regions" -> exclusively on regions

- 17311 "in equatorial Asia and northern South Brazil". I assume you mean northern South America here?

-17304: "During the years 1940 to 1998, 15 out of the 17 biggest fire years occurred under moderate to strong El Niño and were responsible for 63% of the whole period." Add that this applies to Alaska, the reader may think it concerns the globe

17305: "MODIS is only available since November 2000" early 2000 is also available

17305: "This product inherently screens out small, short duration fire events, mostly set for land use management. This was not considered very limiting since by considering anomalies" Daytime fires are not only limited to land use management fires, also other fires show a very strong diurnal cycle. In general, savanna fires have a stronger diurnal cycle than forest fires so these forest fires may be overrepresented in the ATSR product. This should be acknowledged in the text, and the implications acknowledged. Even though the authors base their analysis on anomalies I still think the potential overrepresentation of forest fires may impact the analysis

17307: "There is another depression in the data over the equator, in spite of the strong 1997-1998 ENSO, because those fires are sporadic, only occurring under strong droughts, while at tropical latitudes, extensive savannah burning occurs regularly on an annual basis" Please split into two or three sentences.

Fig 1. Negative anomalies are not shown, please consider replacing the graph with a color graph or add this caveat to the figure legend

Fig. 6: please add a legend to the x-axis

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