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Interactive comment on “Multi-scale meteorological conceptual model of observed active fire hotspot activity and smoke optical depth in the Maritime Continent” by J. S. Reid et al.

Anonymous Referee #2

Received and published: 6 October 2011

General Comments:

In their manuscript, “Multi-scale meteorological conceptual model of observed active fire hotspot activity and smoke optical depth in the Maritime Continent”, Reid et al., describe how regional and global tropical phenomena influence burning activity on the Maritime Continent. Specifically, they address how the seasonal monsoon, various climate phenomena such as ENSO, the IOD and ENSO-Modoki, the MJO, diurnal variability and even tropical cyclones affect fire occurrence and burning activity. The manuscript definitely advances the science of understanding links between fire and climate in equatorial Asia. Many of the findings, especially with respect to the sensitivity

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Discussion Paper

Interactive
Comment

of regional fire activity to MJO, are highly relevant and very interesting. This manuscript should be considered for publication with very minor revisions.

In general, the manuscript is a bit lengthy and could be shortened to reach a maximum audience. For example, much of the results section could be shortened to only the presentation of data, and any conclusions or discussion of the results be included only in the Discussion section. This would eliminate redundancy throughout the manuscript.

The question of a 2-peak burning season in Central Sumatra is not really answered in the manuscript. Previous studies, including this one, showed high correlation between ENSO and burning in southern Sumatra and Borneo. Might the MJO explain the inter-annual pattern of burning in Central Sumatra instead (you assert that this region shows a high sensitivity to MJO variability)? Also, perhaps the coincidence of strong positive MEI values with strong positive IOD values explains why fire continues into fall during these years? Might this relationship (between ENSO and IOD) be biasing your analysis of 'post-warm phase precip' mentioned in Fig. 6 and section 4.1? For example, what is the Dec-May precip for 2005?

Specific Comments:

pg. 21103, line 6-7 – Why is there a 1-month lag? Is there a threshold? If so, what is the threshold?

pg. 21105, lines 5-10 – you might check Tosca et al., (2011; JGR) which computed something like 70 or 80% of fire counts were in peat swamps, to bolster this section? Additionally, I believe Tosca et al. showed little correlation between Sumatra fire and ENSO – supplementing the comments made above re: the Central Sumatran burning season timing.

pg. 21105, lines 21-30 – just a thought: might the differences in the timing of the burning season in Sumatra be due to population density/distribution on the island?

pg. 21119, lines 13-19 – This should probably be included in the methods section

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instead. In general, I think the Conclusions could be more concise.

Minor Comments:

pg. 21098, line 1 – 'Maritime Continent' is already defined by this point.

pg. 21104, line 24 – should “July-November” be “June-November to correspond with figure?

pg. 21108, line 13-14 – this sentence is confusing. I suggest revising it to better clarify the point.

pg. 21111, line 18 – 'Fig 6c, d' – do you mean e & f? 6 d is the 'cold neutral anomaly' yet the text references the 'warm phase'.

pg. 21115, line 17 – Sumatra, Malaysian Borneo should instead read: “Sumatra AND Malaysian Borneo”

pg. 21117, line 13-14 – The wording for this sentence is confusing. I might suggest rewriting to better clarify.

pg. 21117 , line 17 – eliminate “When,”

pg. 21121, lines 11-12 – remove “)” after 2008 and add “,2008” after Meittinen et al. Also, line 14 – change “is” to “are”.

pg. 21122, line 25 – This sentence could be revised to a less jarring transition to a new topic.

pg. 21133, line 4 – Check the punctuation here.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 21091, 2011.

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