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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Vertical distribution of aerosols over the Maritime Continent during El Nino" *by* Jason Blake Cohen et al.

Anonymous Referee #2

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The paper titled "Vertical distribution of aerosols over the Maritime continent during El Nino" authored by Jason Blake Cohen, Daniel Hui Loong Ng, Alan Wei Lun Lim, Xin Rong Chua presented the vertical structure of aerosols and fire radiative power during a large-scale fire events over the Maritime continent. They have observed that simple plume rise model underestimate the aerosol layer heights during the fire events and the fire radiative power is underestimated by ∼20%. As authors mentioned, generally satellites and models have significant bias in simulating aerosol properties, especially the vertical distribution. Authors didn't mention about the aerosol-retrieval uncertainties over the land, especially during large-scale fire events. How good are MODIS and MISR retrievals over Southeast Asia? What is the mean AOD observed during the fire events? Whether authors validated satellite and plume-rise model prior to this study? Why did authors use AOD and FRP from two different satellites instead a single

satellite? How does the atmospheric stabilization due to direct effect of aerosols affect the vertical transport of aerosols? By changing the fire radiative power, authors are able to reasonable reproduce the central height of the plume but failed to reproduce the other features. This may be attributed to several other reasons, as such this simple exercise doesn't warrant publication.

Minor comment The title of the manuscript is not apt (misleading also) for this study. This has nothing specific to about El Nino, general to all large-scale fire events. Line 16: Authors mentioned that "our results are significantly different from what others are using". However, it is hard to find any discussion on this topic in later sections. Provide references to justify the statement. Line 39-46: Poor clarity and readability Line 58: hydroscopicity or hygroscopicity? Line 101-107: Rewrite the sentence. Message is not clear. Line 110: What is the "reasonable approximation" mentioned here? Line 128: What do you mean by "best solution at 0.55 micron"?

Due to lack of clarity and inadequate data to support the scientific conclusions reported in this study, I would not recommend this manuscript for the publication in Atmospheric Chemistry and Physics

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