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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Assessing the contribution of ENSO and MJO to Australian dust activity based on satellite and ground-based observations" *by* Yan Yu and Paul Ginoux

Anonymous Referee #2

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This study investigates variability of Australian dust and how ENSO and MJO contribute to the dust variability by using dust optical depth proxies from satellite remote sensing measurements (MODIS-Terra, MODIS-Aqua, and MISR) and dust index(DSI) from weather stations. The study includes two parts: (a) inter-comparisons of remote sensing measurements of dust, and (2) regression analysis of MODIS dust optical depth upon Nino index and MJO index. The paper would be a significant contribution to the study of Australian dust (which has been understudied). But authors should fix grammar errors (asking a native speaker of English to proofread the paper or through copy-editing service), clarify data used, and improve quality of figures.

line 29: "surroundings" should be "surrounding". change "aerosol loading to the atmosphere" to "aerosol loading in the atmosphere". line 35-36: awkward sentence. line 38: "largely determine" may be changed to "affect" line 41-42: awkward sentence line 116-117: could you elaborate how MODIS DOD is derived? line 127: people usually use MISR non-spherical AOD to approximate dust optical depth. Here coarse-mode AOD is used instead. Because of MISR's limited spectral range, MISR coarse-mode AOD may have large uncertainties. Could you comment on which one is a better proxy for dust optical depth? line 146-147: better to mention the temporal resolution of AERONET observations. line 167: Will the regression analysis offer causal-effect relationship? line 184-185: don't quite understand this sentence. line 232: "temporal correlations" is confusing. it is simply hourly DOD scatterplot between MODIS and MISR, right? line 251: "at various antecedent time"....For those regression maps, what "antecedent time" is used? Figure 2: denote panels with a, b, c, d, e, and f. How did you get "peak" month if DOD has no statistically significant seasonal variation? In fact, figure 3 shows seasonal variation more clearly. Figure 3: the figure is too small and has bad quality. I would suggest that 1st and 5th panels in top row be removed because these two sites only have 1 or 3 monthly data. Then you will have 16 stations. You can split 16 stations to 4 rows by 4 columns , enlarge the figure. Also try to avoid using "yellow" line. Figure 4: can you provide correlation coefficients? change y-axis "error" to "Satellite-AERONET DOD" Figure 5: how about change "temporal correlation between collocated DOD ...." to "Correlation between collocated hourly DOD from AERONET and satellite measurements..."? "A missing circle in (c) indicates ....." which one is (c)? Figure 6: again, "Temporal correlation" is not easy to understand. Why does MISR nsAOD have less data points thanMISR nsAOD? Figure 8: "Regression of .....at different antecedent time". For (a, c, e, g, f, l), I can understand that 7 different time has been used to calculate the regression. But for those maps (e.g., a, c, e, g, i, k), what antecedent time has been used? Maybe you could consider to split the figure into two, one for line graph and one for map. Figure 9: same comments as in Figure 8. Figure 11: add "surface" before "wind speed".

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