

## ***Interactive comment on “Satellite observations of aerosols and clouds over South China from 2006 to 2015: analysis of changes and possible interactions” by Nikos Benas et al.***

### **Anonymous Referee #1**

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This study used multi-source data to investigate the aerosol and cloud properties over South China and discussed the potential mechanism. This work is meaningful; however, it lacks innovation in technical regard and some conclusions/discussions are incorrect. From the satellite remote sensing, the authors may misunderstand the definition of CALIPSO aerosol type (see major comments). I also find some flaws/errors. The specific comments are as following:

Major comments: The author listed three CALIPSO aerosol types in section 3.1: smoke, polluted dust, and dust. Aerosol type is related to the optical properties of aerosol. Although “polluted dust” is the mixture of dust and smoke, “polluted dust” is

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a type of aerosol, not the simple integration of “smoke” and “dust”. However, it seems that authors regarded “polluted dust” as the simple integration of dust and smoke, and on this basis, they made conclusions/discussions in Section 3.1, e.g., deduced “the decrease in polluted dust AOD can also be attributed to biomass burning aerosols” and “the changes in polluted dust should also be attributed to reductions in biomass burning aerosols”. For example, if dust and smoke did not change, but total AOD and polluted dust decreased. In this case, how to explain?

The other specific comments: 1. Page 3 line 4-10: please point out the scientific dataset’s name for cloud data.

2. Page 3 line 22-25: please rewrite this sentence. “initial and final” may cause misunderstanding.

3. Page 3 line 24-26: why not use slope of the regression line to examine the change?

4. Page 3 line 35: rewrite this sentence. Biomass burning is not the only aerosol source in South China.

5. Page 4 line 8-10: please explain why the differences in March and April reached the maximum?

6. Page 4 line 28: not recommend cite an ACPD paper. A paper which is under review may have errors. There are other papers, like Ma Z. et al (2016) and He Q. et al (2016).

7. Page 4 line 40-44: what is “C” emissions? It means GFED? Why GFED partially agrees with the total AOD change pattern can infer aerosols over the study area is transported from neighboring region? There is no any other type of emission? All aerosols in South China come from biomass burning?

8. Figure 1: the horizontal axis may start in July and ends in June.

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