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## ***Interactive comment on “The Bihar Pollution Pool as observed from MOPITT (version 4), CALIPSO (version 3) and tropospheric ozone residual data” by J. Kar et al.***

### **Anonymous Referee #1**

Received and published: 17 October 2010

#### General Comments:

In this paper authors highlights the high levels of pollution observed over the eastern part of the Indo-Gangetic Basin (IGB) during winter using observations from various platforms, namely, MOPITT, CALIPSO, and TOMS. The paper demonstrates that the improved retrieval of carbon monoxide (CO) from MOPITT is consistent with the observed pattern of pollution over the study region. The vertical structure of atmosphere observed by CALIPSO has been used to discern the various aerosol types. At one point, author say that the higher levels of pollution, in the absence of biomass burning, is attributed to the local anthropogenic activities which is not fully true. In addition to the

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local vehicle and industrial emission, biomass burning is a major source of particulate matter in this region during winter.

Authors coined here the term 'Bihar Pollution Pool' to describe the high levels of pollution observed over the IGB. This is misleading. I strongly suggest to replace the term 'Bihar Pollution Pool' with something like, 'IGB pollution' or so. Authors state that high levels of pollution was observed over the state of Bihar, West Bengal as well as over Bangladesh. There are hundreds of satellite images of aerosol optical depth from MODIS, MISR, TOMS, and OMI show higher values of aerosol optical depth over the entire IGB compared to rest of India during winter. See d'Girolamo et al., GRL, 2004 for example. Bihar is a state in India. Attributing this to one particular state may not be appropriate. Authors need to be more technical here and should not adopt the terminology created by some authors earlier.

Specific comments:

Title and Abstract: I strongly suggest to replace the term 'Bihar Pollution Pool' with something like, IGB pollution or so. Authors state that high levels of pollution was seen over the state of Bihar, West Bengal as well as over Bangladesh. There are hundreds of satellite images of aerosol optical depth from MODIS, MISR, TOMS, and OMI show higher values of aerosol optical depth over the IGB compared to rest of India during winter. Attributing this to one particular state may not be justified. Author needs to be more technical here and should not adopt the terminology created by other authors.

Introduction:

Page 20890, line 1-2: "While the phenomenon was initially noted in the MISR aerosol optical depth data,...". The higher levels of aerosols were also noted in MODIS, TOMS, and AERONET data (Jethva et al., 2005,2007).

Page 20892, line 24-25: "In absence of any significant biomass burning in this area in winter, these enhanced CO levels are generated by anthropogenic activities". What is

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rationale in stating that the higher levels of CO is generated by anthropogenic activities? Biomass burning also can anthropogenic in nature. I have seen plenty of MODIS RGB images during winter over many years which show that the haze seen from satellite is a result of widespread emission (vehicle, industrial, bio fuel) as well as biomass burning (those thick spots of smoke).

Page 20894, line 10-15: Provide reference on influence of biomass burning in South East Asia and within India during pre-monsoon months (Apr-May-Jun). In my opinion, authors may drop this figure from the manuscript as the spatial distribution of MOPITT CO shown in Figure 2 is sufficient here Section 3.2: BPP in CALIPSO data.

Page 20894, line 25: Jethva et al. (2005), their conclusion was based on the fact that TOMS Aerosol Index is less sensitive to the absorbing aerosol layer situated at lower levels of atmosphere, i.e., within boundary layer.

Page 20895, line 5: How confident authors are here about the classification derived by CALIPSO? Any validation? Please justify and describe.

Page 20895, last paragraph: How does CAD scheme define 'Polluted Dust' and 'Smoke'? Is polluted dust=smoke+dust? The maximum contribution of 'smoke' in the month of august is surprising. The concentration of smoke particle should be higher in winter (due to biomass burning)

Page 20896 : I don't understand the significance of Figure 10 in this paper. Authors may drop this figure.

Page 20896, last paragraph : I don't understand the significance of Figure 10 in this paper. Authors may remove this figure.

Page 20897 : Author may also drop Figure 13, as it is an established fact that the pollution over the IGB is a persistent phenomenon with some temporal and spatial variability within region.

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