

## ***Interactive comment on “Is global dimming and brightening in Japan limited to urban areas?” by Katsumasa Tanaka et al.***

### **Anonymous Referee #1**

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The paper describes that the decadal trend of the surface solar radiation (global dimming and brightening) in Japan is a phenomenon by local air pollution or the large scale changes in background aerosols. This is an important point to investigate a cause of the global dimming and brightening. The authors separate the observatories into the polluted and pristine stations by carefully checking the historical land use map, population time series, satellite image, and actual site visits. This approach is reliable and would be useful in studying the cases in the other countries. The paper is generally well written and fits the scope of ACP. I think the paper could be published after minor changes.

Technical comments:

1. Check all the in-text citations. For example, “(Ohmura and Lang, 1989)” in P2, L3

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should be written by “Ohmura and Lang (1989)”.

2. Figs. 3, 4, 5, 6, and 7. The scale bars are not clear.
3. Figs. 5, 6, and 7. The legends indicating the urbanization (e.g., residential area) are necessary.
4. P15, L21-28. The references of Ramanathan 2007a and 2007b are same.

General comments:

1. P3, L24-30. The approach using both the population data and the land use map is a reliable method. However, if the population data is enough to show the urbanization, it is useful to classify the observatories worldwide into the polluted and pristine stations. The change in the population is strongly related to the land use. The population does not increase without the increases of the residential area and the commercial facilities. Is the land use map necessary in the classification?
2. P11, L19-24. The trends of the transmittance are in line with those in the surface solar radiation. I would like to know the change in the transmittance can explain the changes in the surface solar radiation quantitatively. Could you estimate the change in the surface solar radiation from the change in the transmittance? I think that the direct component of the surface solar radiation can be estimated roughly but it is difficult to estimate the diffuse component.

The annual means of the transmittance are calculated from the data under the clear sky condition. Such data may not be a representative of aerosols in a year. Please show how many days of the transmittance data are used to calculate the annual means.

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