Response to reviewer 3 - Reviewer's comments are italicized; response are not.

The paper "Critical evaluation of cloud contamination in the MISR aerosol products using MODIS cloud masking products" by Shi et al. (2014) performed careful assessment of cloud contamination on MISR aerosol products using MODIS cloud masking product. Cloud contamination on satellite aerosol retrieval is an important issue and needs to be studied and documented for each satellite aerosol products. The study on this issue by an independent research team other than the original satellite aerosol team is especially critical and welcome by the user community. The study performed in this paper is through and the results are convincing and should be very useful for the users of MISR aerosol product. The paper is already in a very good shape and I only have five minor comments below for authors to consider.

We wish to thank the reviewer of his/her suggestions and comments.

Comment 1: *The results of this study clear indicate the AOT bias due to cloud contamination from non-thin cirrus cloud is even bigger than that caused by thin cirrus cloud. For example, global AOT bias due to non-thin cirrus cloud contamination can be up to 0.03 over ocean and 0.015 over land (see Fig. 4). Why do authors only emphasize the bias (0.01) due to thin cirrus cloud (see the abstract and conclusion section)? I think both biases from non-thin cirrus and thin cirrus should be emphasized in abstract and conclusion. Otherwise, it can be miss-leading to casual readers that only thin cirrus cloud contamination exists in MISR AOT product.*

Answer: While it is easier to identify the impacts of thin cirrus clouds on the MISR AOD data, the use of MODIS cloud mask for cloud filtering of non-thin cirrus clouds has its limitations. This is because heavy aerosol plumes could be misidentified as clouds by the MODIS cloud mask products. Thus some of the large impacts are indeed resulted from this misidentification, such as the low bias over the West coast of North Africa. It is a well-known issue and we have discussed this issue in the conclusion section of the paper.

Comment 2: *A nice general review on the existing studies of cloud contaminations on aerosol retrievals is provided in the introduction. Instead of causing bias in retrieved AOT values,*

another important consequence of the contamination is on the long-term trend of aerosol loading and the studies on this consequence is missing in the review and should be added.

Answer: We have added discussions as suggested in the text.

"This is in stark contrast to the accuracy requirement commonly professed by climate scientists of 0.01 (CCSP, 2009) and may impact our understanding of long-term aerosol trends (Zhao at el., 2013)."

Comment 3: *According to MODIS aerosol team (see Martins et al., "MODIS Cloud screening for remote sensing of aerosols over oceans using spatial variability", GRL, 2002), the MODIS cloud mask product (MOD35) is not sufficient for selecting clear-sky pixels for aerosol retrieval and additional tests (such as uniformity tests) need to be added for better cloud screening. However, current paper indicates the parameters (such as F_{cc}) contained in the MODIS MOD35 cloud mask product can be used to screening the cloud contamination effectively. Hope some clarification can be provided to clear my confusion.*

Answer: One of the reasons for applying the spatial variability test for the MODIS DT team is that heavy aerosol plumes can be misidentified as cloudy pixels by the MODIS cloud mask products. The use of the spatial variability test over oceans can "rescue" some of the heavy aerosol plumes. Here we demonstrated a concept for using MODIS cloud products to cloud-clear MISR pixels. Although not used in this study, the spatial variability test can be applied to the MODIS data for cloud clearing of the MISR aerosol retrievals.

We added the following discussion in Section 4. "The misidentification of thick dust and smoke scenes as cloud scenes by the MODIS cloud mask products, however, has a lesser effect on operational MODIS aerosol retrievals. For example, Levy et al., 2013 discussed an approach to restore thick dust and smoke scenes that are misidentified as clouds by the MODIS cloud screening method. A regional based cloud screening method, such as a spatial variability test, may be needed for rescuing these misidentified heavy aerosol polluted scenes, through the combined used of MODIS and MISR data at the radiance level."

Comment 4 *(page 12, line 5): Regarding the unknown reason for the suppression in AOT found in high latitude northern oceans. Cloud contamination over broad regions of winter storm tracks in high latitude northern oceans may be the explanation, which is very similar to the cloud contamination over elevated AOT belt of southern oceans. This winter cloud contamination may still evident in annual mean plot of Fig. 3. To confirm this suggested*

explanation, authors can check the seasonal plots (especially for winter) in addition to the annual plots in Fig.3.

Answer: Thanks for the suggestion, we have checked the seasonal plots and changed the discussions to "Similar suppression in AOD is also found in high latitude northern oceans, which could be partially related to the broad regions of winter storm tracks."

Comment 5 *(page 17, line 25): Reference Zhao et al. (2013) should be updated "J. Geosphys. Res.-Atmos., 118, 2849-2857, doi:10.1002/jgrd.50278, 2013".*

Answer: Done.