

Interactive comment on “Northern Hemisphere Contrail Properties Derived from Terra and Aqua MODIS Data for 2006 and 2012” by David P. Duda et al.

Anonymous Referee #3

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We thank reviewer #3 for their review and comments. They have helped to improve our manuscript.

General comments: This paper compare the linear contrail coverage, optical property, and radiative forcing data over the Northern Hemisphere (NH) 2006 and 2012 year of Terra and Aqua MODIS imagery. In the section of Methodology, authors said they employ the optimized CDA algorithm with different contrail masks, while the mid-range Mask B have the best overall balance between falsely detected and missed contrails.

Specific comments: Different with other two Referees, I have such the following specific suggestions: 1. The CDA and modified CDA had made lots of great works, and the detection efficiency raise up all the time. But authors did not release their source code and date sets. It is different to compare their result for other scientists, for example different contrails detection method with the same datasets, or the CDA and modified CDA with other satellite imagery.

A release of the source code and data sets is not reasonable. Relatively few contrail detection papers have been published due to the difficulty in processing such large satellite datasets. It is not feasible to upload the hundreds of gigabytes of satellite data processed in this study. The source code is experimental and not easily implemented by someone unfamiliar with the programs. In addition to contrail detection, we also retrieve contrail optical properties and radiative forcing with additional code and processing systems.

2. Two new masks (labeled Mask D and E) were developed to estimate contrail cirrus coverage. Please illustrate the difference among different masks. How the post-processing method detect non-linear contrail cirrus missed by the CDA, whether could be verified with Geostationary satellite in local region?

An example of Mask D and E is presented in Figure 11. A description of the post-processing method and the reasoning used to estimate contrail cirrus coverage appears in Section 2.1. As described in the text, visual analysis by a human observer of several MODIS granules was used to verify and to optimize the post-processing method. The visual analysis was limited due to the labor-intensive nature of the assessment, which required several rounds of analysis while the post-processing method was developed. We expect that loops of geostationary satellite data would be helpful in future development of the contrail cirrus mask, but this

would require another study altogether.

3. Author said that the total contrail cirrus coverage visible in the MODIS imagery may be three to four times larger than the linear contrail, how to make sure that.

The total contrail cirrus coverage estimate is based on the results of Masks D and E. The assessment of contrail cirrus remains an open problem and requires additional study. We have already included text in the manuscript explaining that the estimates are preliminary and require additional refinement. In the final section of the paper, we have proposed how the contrail cirrus estimates may be improved by using loops of geostationary data to define contrail cirrus coverage better.

I suggest the authors could release the source of contrail detection and the data sets, while carefully revise the paper with more comparisons and more restrictive conclusions. With the source code and data sets as supplementary materials, I think more and more scientists will participate the research how the contrails impact radiative forcing, even climate change.

Please see the comment above regarding the release of the satellite data sets.