

## ***Interactive comment on “Temporal co-registration for TROPOMI cloud clearing” by I. Genkova et al.***

### **Anonymous Referee #2**

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Genkova et al. have investigated what could be the maximum time difference between spaceborne cloud measurements used for cloud masking and trace gas/aerosol measurements which need the cloud information in their retrievals. This is an important topic because almost all spaceborne trace gas and aerosol measurements require cloud free conditions and cloud contamination can introduce large errors to the final products. For the upcoming TROPOMI instrument, this information is vital because it is not possible to do sufficient cloud masking based on instrument's own measurements. In addition, this information can be helpful when considering synergistic use of multiple satellite observations.

The paper is mainly well written and easy to follow. However, the structure of the next needs revising. In addition, parts of the discussion require clarification.

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#### Comments:

1. The abstract is way too long. Introduction of the TROPOMI project does not have to be so extensive.
2. I feel that the comparison to results of Krijger et al. on page 6256 is not thought through. First of all, the you should mention the value that Krijger et al. got. Secondly, does the difference between the percentage values mean anything? Your data sets are from 2006 and they contain 72 days and 1 day from SEVIRI and GOES-10, respectively, for specific locations, whereas Krijger et al. used global data from 2004 for 48 days. Due to these significant differences in the data sets, I'm not sure if you can draw any conclusions based on the differences in the amount of clear pixels? Why should they be the same?
3. The structure of the section 3 needs revision. For example, the paragraph on page 6257, l. 16-23 is a bit out of place here. It would fit better to section 2. Then, the next paragraph (from line 24 onward) should be moved to page 6256 because it concentrates Fig 4 while the surrounding paragraphs are about Fig 5.
4. You should consider adding the percentages of affected pixels to Tables 1-6, even though they can be calculated from the current version.
5. What is the reason for the larger difference between Cases A and C in GOES-10 data when compared with SEVIRI data (page 6258, l. 2)? Could the differences in the data coverages explain it? SEVIRI has 7 times larger area than GOES-10 and the temporal ranges are also significantly different, so they might cause differences in the results.
6. page 6258, l. 9: Could the difference be also explained by the different cloud data used in the analysis?
7. I do not understand the reasoning in the last paragraph on page 6258. The relative size of SEVIRI and GOES-10 pixels stay the same for all the Cases (their ratio is the

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same), thus the pixels grow in a similar fashion for both instruments when moving from Case A to Case C. So, how can the pixel growth explain the differences between the instruments?

8. If 1%-2% of the retrievals are allowed to contain cloud contamination how does it affect the accuracy of the aerosol and methane products? Overall, I think this should be thought the other way around; how much cloud contamination can be allowed until the errors in the aerosol or methane products grow too large?

9. The second last paragraph in the section 4 could be moved to second paragraph of the section.

Technical comments:

p. 6250, l. 1: planed → planned

p. 6250, l. 12-13: is it S-5P or S5P?

p. 6250, l 21: define AVHRR

p. 6251, l. 25- p. 6252, l. 3: give references for the different instruments.

p. 6252, l 3: CALIPSO → CALIOP (CALIOP is the lidar while CALIPSO is the satellite)

p.6256, l. 9: Table 1 for the MSG SEVIRI → Tables 1-3 for the MSG SEVIRI

p.6256, l. 10: Table 2 for the GOES-10 → Tables 4-6 for the GOES-10

p.6256, l. 23: Mention here that the data in Fig. 4 is for the 15 min time difference.

p. 6257, l. 27: Fig. 3 → Fig. 4.

p. 6257, l. 28: 5 % → 5 % units (actually, based on my calculations it should be 6 %).

p. 6258, l. 1: 24 % → based on my calculations it should be 23 %

p. 6260, l. 4: This sentence sounds a bit contradictory.

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Tables: Mention the instrument used in the caption.

Fig 4: Mention the time difference in the caption. Check the y-label.

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Interactive comment on Atmos. Meas. Tech. Discuss., 4, 6249, 2011.

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