

Interactive comment on “The effect of sensor resolution on the number of cloud-free observations from space” by J. M. Krijger et al.

Anonymous Referee #2

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General comments The paper is relevant for the planning of space missions observing tropospheric trace gases. The results are new and clearly presented.

Specific comments 1. ch. 2.2: it is not clear how the MODIS cloud indicator is related to retrievability of trace gases in the uv-vis-nir. 2. ch. 2.3: what is an “along-track column” ? 3. Question: is figure 3 correct ? In Northern Europe, fall is shown as sunny as summer ? 4. Figure 4: more interesting than the reduction of useless observations should be the increase of cloud-free ones. 5. Figure 4: legend and caption/text inconsistent on the content of upper and lower panel (year vs. summer). 6. ch. 3.1.2: “The drawback for the gain factor is that infinite numbers may occur in grid cells where cloud-free observations are completely absent. Therefore no meaningful geographic images, such as Fig. 4, can be easily shown.” - Instead of gain factors, absolute differences in

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fraction of cloud-free scenes might be shown. 7. ch. 5: the statement “We have also demonstrated that the relative gain in cloud-free observations as a function of sensor resolution is largest in the less cloudy regions and seasons.” does not seem to be supported by tables 1 and 2. Instead, such a statement would apply for the relative reduction in cloudy scenes, as presented in figures 4 and 7.

Technical corrections 1. A language check of the whole paper is recommended. 2. p. 2: smallest Sciamachy footprint is 25x30 km². 3. p. 2, ch. 2.1: swath is across-track by definition. 4. ch. 3.1: GOME-1 on ERS-2 5. ch. 3.1.2: “Instead, our interest being in Ĕ” 6. ch. 3.1.2 last sentence: “Table 1”. 7. ch. 3.1.3: “First we arbitrarily broke up the land-mass of >> northern << South-America into three regions: South (50S.100S), Equator (50S.50N), and North (50N.150N) as indicated by solid >> lines << in Figure 5. 8. ch. 3.1.3: there is some confusion about the latitude bands. They differ in the sentence quoted above from those in figures 5/6/7. In Table 2, four instead of three bands are defined. 9. ch. 4: “In another study by Tjemkes et al. (2003), per season one week of cloud mask data from a geosationary platform per season was studied.” “per season” duplicated.

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