Response to reviewer 1 (Cintia Carbajal Henken) comments.

We would like to thank the reviewer for the very valuable comments and suggestions. We believe that the implementations of these have improved the paper significantly. In the following the reviewer comments (black) and our responses (blue) are given.

General

The paper presents a new dataset derived from long-term satellite measurements that can be used for analysis of spatial and temporal variability of cloud properties. Overall, it is well structured and includes references where necessary. The instrument is introduced, as well as the algorithms used to derive the cloud properties. The figures demonstrate the products available in the dataset and also serve to demonstrate possible applications. Furthermore, efforts have been taken to highlight the main advantage of the instrument compared to other satellite passive imagers, namely the high temporal resolution. Therefore, it serves well as a reference paper for the new dataset and is within the scope of the journal.

Questions/Suggestions
Several issues need some more clarification before final publishing.

Section 3.1 MSGv2010

Fractional clouds means in this case the cloud contaminated pixels? (p26459 l18)
This sentence is incomplete. Here, fractional clouds refer to the cloud type 'fractional clouds' determined in MSGv2010. Only for this cloud type, which are reported to be mainly broken low-level water clouds, no cloud top height/pressure retrieval is done due to too low cloud signal in the measurements.
We will change the sentence "For fractional clouds no attempt is made to retrieve the cloud top parameters." to "For pixels, for which the cloud typing assigns fractional clouds (which are mainly low-level water clouds), no attempt is made to retrieve the cloud top parameters."

In 16x16 SEVIRI pixels region different types of clouds likely exist. How is this translated to RTTOV input where one has to use choose a cloud type and cloud water content per atmospheric layer for an overcast simulation? (p26459 l19)
The MSGv2010 algorithm employs the 'simple' interface to RTTOV in which only the cloud top pressure of a single grey-body cloud is specified; without the need for specifying profiles of cloud cover and cloud condensate. We will clarify this in section 3.1.

Section 3.2 CPP

As a user I would be interested in how much percent of the pixels actually get a climatological value for REFF (and therefore also included in LWP/IWP). Since REFF is not one of the cloud products provided, is there a way to see whether a climatological value has been used or REFF has been retrieved using the LUTs? (p26460 l16)
In the CPP algorithm the effective radius for pixels with COT<8 is not *set to* but *weighted with* a climatological value (as described in the text). Based on analysis of a limited number of SEVIRI images, we find that about 70% of the cloudy pixels has COT<8. These pixels are thus affected by the weighting of REF with a climatological value.
The impact on the cloud water path calculation (CWP, a variable we need the effective radius for), however, is very small. The difference between SEVIRI disk mean CWP, calculated with the un-weighted REFF on the one hand and calculated with the weighted REFF on the other hand, is only 1.2%. For a region dominated by marine trade cumulus the deviation is somewhat larger (5.6%)

because these clouds are much thinner (or more broken) in general. The reason why the REFF-weighting has a relatively small impact on mean CWP, is that mean CWP is mainly governed by the thicker clouds, which are not affected by the weighting.
The following text will be added:
'The weighting of effective radius affects typically 70% of the pixels inside the SEVIRI disk, but has an overall effect of only a few percent on the mean cloud water path, because that is governed by the thicker clouds.'

How is the 3% uncertainty in the VIS/NIR reflectances justified? Are forward model errors quantified and propagated? (p26460 l25)
We inter-calibrated the SEVIRI solar channels with MODIS, which has an estimated calibration uncertainty of less than 2% (Wu et al. 2013). We took a somewhat larger value of 3% to take into account additional uncertainty from the inter-calibration procedure. Forward model errors were not separately taken into account. It should be noted that the main contribution to the forward model error is deviation from the plane parallel assumption, but it is hard if not impossible to quantify this contribution at the pixel level.
The manuscript text will be modified as follows:
'For the retrieved parameters COT, REF, LWP, and IWP, uncertainty estimates are derived by forward propagation of 3% uncertainty in the VIS and NIR reflectances. This estimate of 3% follows from an estimated uncertainty in the MODIS solar bands of 2% (Wu et al. 2013) with some added uncertainty related to the SEVIRI-MODIS inter-calibration.'

Section 3

Could mention the ranges within that the cloud properties are retrieved, for example put them in a table. The choice of allowed ranges can have an impact on computed means etc.
We will include this information in the manuscript.

Section 4.1 Pixel-based products

From figure 2 it looks as if CTP is also derived for cloud-contaminated pixels (P11L24), although in the text it says that the CTP is derived for pixels characterized as cloudy.
In Section 3 (p26458 l11) it said that COT is derived for pixels assigned as cloud filled. Does this include cloud-contaminated or not? Please clarify.
All cloud properties (CTP, COT, etc.) are derived for cloud filled AND cloud contaminated pixels. This information will be added in the 'cloud mask' bullet in Section 3. See response to "-P7, L17:"-comment of reviewer 2.

Section 4.2 Daily and monthly means

For CTP an alternative averaging in log-space is done. Can also be considered for COT, why was this not done? (p26462 l2)
COT was averaged in linear space to be consistent with the LWP/IWP averaging (which is also in linear space). From a radiative point of view, averaging of COT in log space is also useful, and it will be considered for the next CLAAS release (as reported in the text)
We will add the following sentence in Section 4.2 "For this release COT was averaged linearly to be consistent with the averaging of LWP and IWP".

4.3 Monthly mean diurnal cycle

What kind of retrieval artefacts? Is this reflected in uncertainty estimates of L2 products? (p26464 l10)
With 'retrieval artefacts' we mainly refer to deviations from the plane parallel assumption. At high solar zenith angles such deviations have more impact on the retrieval. Deviations from the plane parallel assumption are not taken into account in the retrieval error estimates.
We will add the phrase 'mainly due to deviations from the plane parallel assumption' to the sentence the reviewer is referring to.

Section 4

Only one time there is mention of uncertainty estimates, namely for the CPP products. Are they also provided next to the pixel-based products? Is the uncertainty taken into account when making the higher level products? If so, how is this done?
The uncertainty estimates are provided in the level-2 files (pixel-based, instantaneous data) of CPP products: COT, CWP. The uncertainty is not taken into account for the generation of the higher-level products.
We will add the following at the end of Section 4.1: "For the pixel-based products of COT, LWP and IWP uncertainty estimates are provided. These estimates were not taken into account for the generation of higher-level products in the current dataset edition."

Technical corrections

an -> a (p26454 l19)
Will be corrected.

vertical -> vertically (p26458 l11)
Will be corrected.

additional -> additionally (p26464 l19)
We assume "…histograms are additional layered…" is meant in L24 of that page. Will be corrected.

clouds -> cloud (p26465 l12)
Will be corrected.

sun -> solar (p26466 l24)
Will be corrected.

warmer CTP does not make sense (p26459 l13)
We assume l17 is meant. Will be corrected.

Rephrase "This investigation indicates that the first two moments are often not enough to sufficiently characterize the cloud variability similarly good for all applications " -> E.g. "This investigation indicates that the first two moments are often not sufficient for all applications to characterize the cloud variability." (p26468 l18)
The sentence will be modified to "This investigation highlights on exemplary basis that the sptiotemporal variability of cloud variables often deviates from a Gaussian distribution, which motivates the collection and provision of histogram information in addition to the mean and standard deviations." This modification also accounts for a comment of reviewer 2 on this sentence.

Fig 6, panel c is named b. It says absolute number of occurrence and in the text it says relative number of occurrence.
OK. Relative occurrence is shown in the figures. Text and colour bar title will be corrected.

Indicate in Figure 8 that for CFC and CTP also the +12 hour values where included as it says in the text (p26469 l16)
OK. We will modify Figure 8 and corresponding figure caption.