

## Replies to referee #1

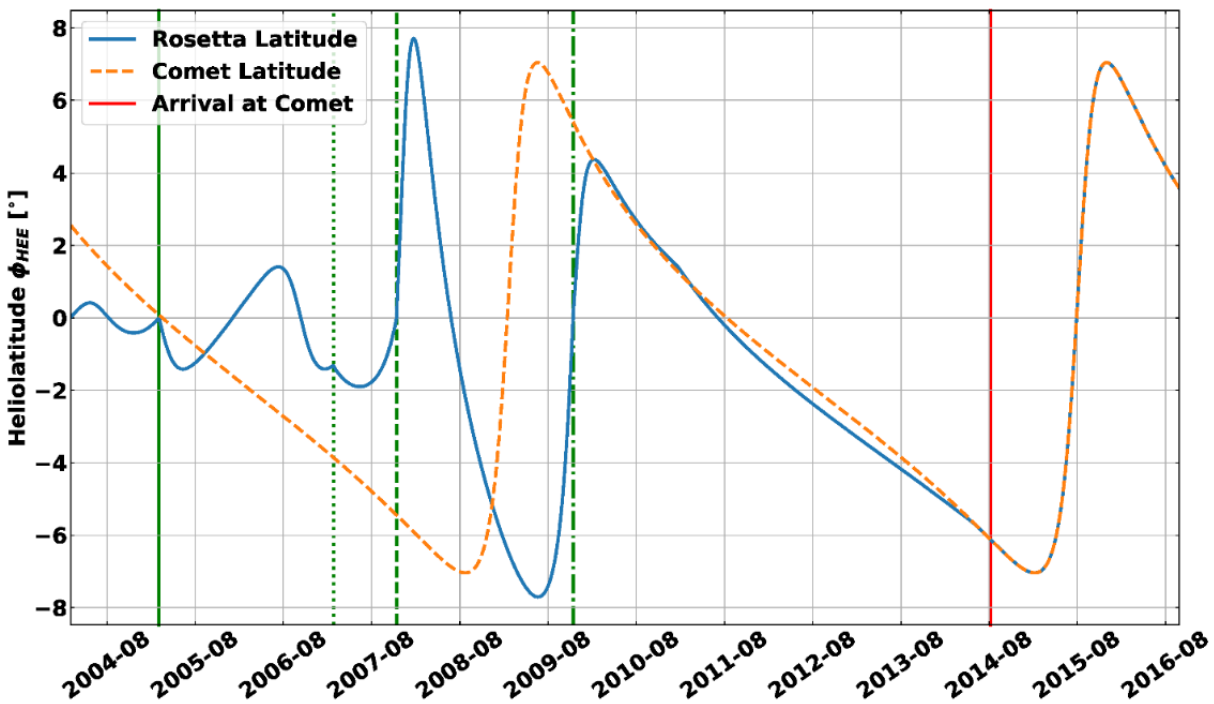
*We thank the referee for the careful review and all these very helpful comments. Our answers are in italic blue colour.*

**Typo: and spacecraft's component material->and a spacecraft's component materials**

*Corrected.*

**Figure 1b the lines are a little difficult to distinguish on the printed page and the dot dash and dashed lines are difficult to distinguish here.**

*Figure 1b has been updated as follows:*



*Figure 1: New Figure 1b*

**p5119 I would like more details on the process to remove SPEs. Anything above a local average is removed? Would a method such as a hampel filter be more appropriate here? I would like a little more detail here.**

*SPEs were removed in two steps.*

*Step 1):*

*Based on the „Solar Proton Event Archive“ (<http://space-env.esa.int/index.php/Solar-Proton-Event-Archive.html>) provided by NOAA SEC, SPEs were removed for all near Earth spacecraft. Following [http://space-env.esa.int/index.php/NOAA\\_SPE\\_Template.html?date=19971104](http://space-env.esa.int/index.php/NOAA_SPE_Template.html?date=19971104) :”The*

Event selection criterion is when the NOAA/GOES-9 five minute averaged  $>10$ . MeV  $p+$  flux exceeds  $2.0 p+/cm^2/s/sr$ . The event is considered to have ended when the flux returns to below  $1 p+/cm^2/s/sr$ . Figure 2 shows an example of SPE period rejection. Since the data is based on geostationary satellites, further SPEs detected by HEND and Rosetta at locations with a significant longitudinal difference with respect to the Earth's heliocentric longitude had to be removed as discussed in step 2).

Step 2):

Numerical outlier detection was applied onto the data sets using a rolling mean outlier detection method. Due to the very noisy nature of the data set it turned out that one would either throw away too much data or would stick with still many outliers. Therefore it was decided to remove all non reported SPEs by hand.

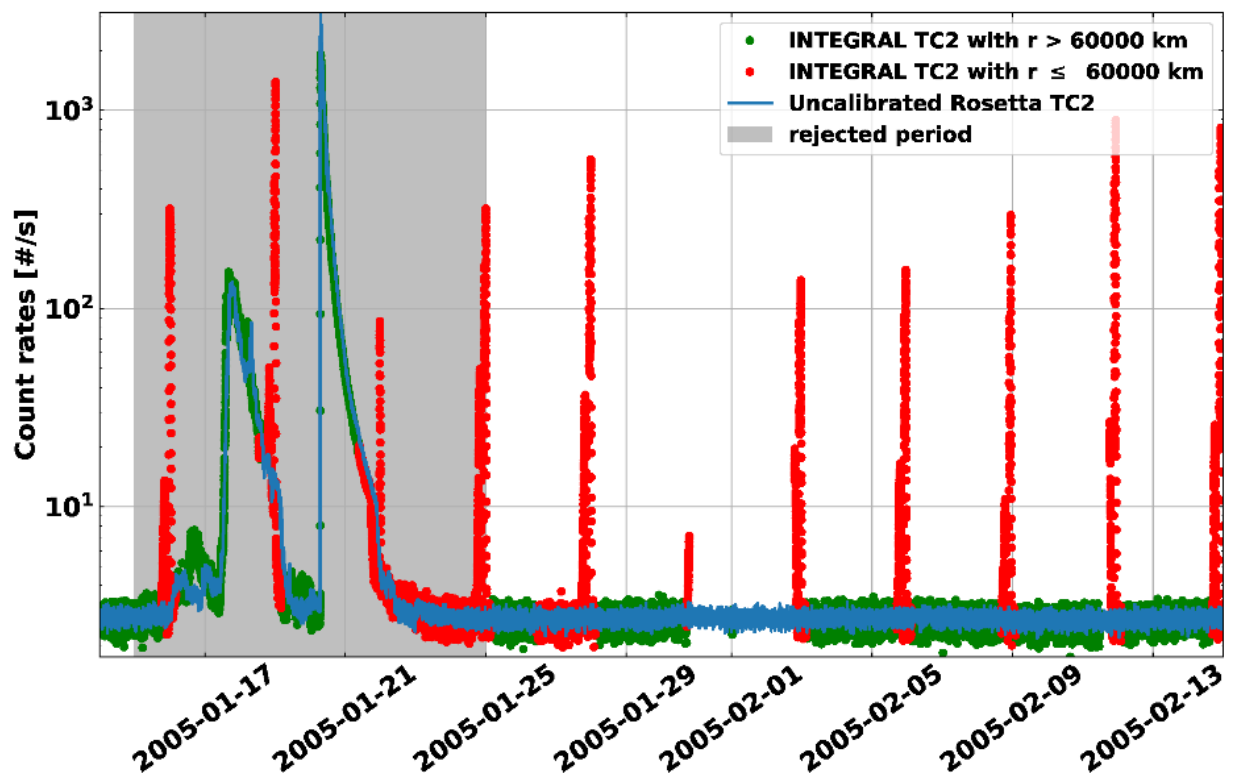


Figure 2: Example of SPE rejection for the INTEGRAL radiation monitor (for the referee only)

We have added the link to [http://space-env.esa.int/index.php/NOAA\\_SPE\\_Template.html?date=19971104](http://space-env.esa.int/index.php/NOAA_SPE_Template.html?date=19971104) in the relevant paragraph.

Figures 2 and 3 can you quote a value for the goodness of fit like  $\chi^2$

The  $\chi^2$  is now included. It is equal to  $\sim 4$  in the case of Rosetta/INTEGRAL, and  $\sim 6$  in the case of HEND/Rosetta.

**Figure 4 and the related discussion the sun spot number is displayed but there is no source for this data. There are several different metrics which can be used as a 'sunspot number' see Lockwood 2014 and refs therein <https://doi.org/10.1002/2014JA019970>**

*Our source was : [https://spitfire.estec.esa.int/ODI/dplot\\_ssn.html](https://spitfire.estec.esa.int/ODI/dplot_ssn.html)*

*This information was added in the acknowledgements.*

**Figure 4 what is the cadence of the data in Figure 4, are these averaged with over 27 days also?**

*Yes, we added labels to the plot stating this.*

**It would be interesting to also plot the variance or the standard deviation for the same window width as the averaging of the magnetic field as a proxy for the fluctuation amplitude of the magnetic field fluctuations.**

*Work is ongoing to see the effect of magnetic fluctuations (effect of turbulence), therefore we leave this activity for the near-future.*