

## ***Interactive comment on “An initial investigation of the long-term trends in the fluxgate magnetometer (FGM) calibration parameters on the four Cluster spacecraft” by L. N. S. Alconcel et al.***

### **Anonymous Referee #1**

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The authors present the long term statistics of the calibration parameters of the out-board fluxgate sensors aboard the four Cluster spacecraft. This is definitely a novelty and very interesting for the space magnetometer community.

However, the very well written paper could be amended based on the following comments.

#### General Comments

Abstract (and conclusion), "... the observed long-term accuracy demonstrated in this initial study gives confidence in the relative accuracy ...": The authors should point

C5

what exactly is meant with relative accuracy. Furthermore, it would be important to get a number for the remaining uncertainty (e.g. spin axis offsets during the phase without calibration) followed by a discussion of its compliance with the initial performance requirements defined for the Cluster mission.

Figure 10 - Figure 14: Plotting the gain and angular drifts with identical scaling could improve the readability.

Fluctuations in gains and angles: It is quite a surprise that the gains as well as the angles fluctuate so much. Was this also measured during ground calibration before flight? It would be very important to list the gain drift parameters due to sensor temperature variations measured on ground. There are fluctuations of the gains in the order of several percent which cannot easily be explained with changes of the sensor as well as maybe the electronics temperature.

The variations in the angles is almost a mystery. The alignment angles are normally sensor specific and should be the same in ALL RANGES; if not in all ranges then at least in the three lower ranges R2 - R4. Here it is definitely not the case and therefore it would be very interesting to have a comparison with the pre-flight calibration. Was it different too?

Conclusion: What would be the goal of future investigations of correlating features observed in the instrument housekeeping and calibration parameters?

#### Specific Comments

What temperature is meant on page 13, line 8? Are the drift parameters similar like those measured during ground calibration?

Page 14: Frequently switching through all ranges in low field would have solved some problems discussed in this part of chapter 3.2.1. Is there a specific reason why this hasn't been done?

Page 16, line 4: The interesting behaviour of the spin plain gains in Fig. 11 are also

C6

seen in the relative azimuthal angles of Fig. 14. The authors might consider it to be a processing artefact since those two parameters are linked in the spin tone correction?

Page 16, line 15: "... spikes of around 0.002 and 0.04° occur ...": Is this a typo because in the figure the spikes are much larger.

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