Response to Interactive comment on "In-situ Calibration of Offsetting Magnetometer Feedback Transients on the Cassiope Spacecraft" by David M. Miles et al. by Anonymous Referee #1 on 03 May 2019.

We thank the referee for the constructive comments which we have incorporated into the manuscript. Referee #2 raised several questions and issues which we address below; the referee's comments are in plain text our responses in *italics* and any content added to or changed in the manuscript are in *"quoted italics*

General comments:

The paper concerns an on-orbit calibration process of the offsetting fluxgate magnetometer on the Cassiope spacecraft. The developed characterisation process for fluxgate magnetometer feedback dynamics allows a significant magnetic interference reduction from the reaction wheels and improvement of the instrument's magnetic field resolution for short time intervals (∼100 ms). The paper is useful for on-orbit refinement of the calibrating process of an offsetting fluxgate magnetometer.

Specific comments:

P. 2, Fig. 1 should be better explained:

1. Whether all broadband noise in Fig. 1a (vertical lines in STFT spectrum for time interval 7:00 . . . 7:50) was eliminated (cf. Fig. 1b) in the same way as for time interval 7:31:22 . . . 7: 31:23 (Figs. 1c-1d)?

The broadband noise in Fig. 1a results from the magnetic feedback transients and they are removed (Fig. 1b) using the techniques described in the manuscript. We have updated the figure caption to clarify this.

Change made – caption for Figure 1 now reads: "These transients introduce bursts of broadband noise that manifest as vertical lines in the uncompensated spectra"

2. Whether the signals near frequencies 17, 34, 51 Hz for time interval 7:00 . . . 7:50 are the 1st, 2nd and 3rd harmonics of magnetic interference from the reaction wheels?

Yes – those signals are the reaction wheel frequencies and their harmonics. We have clarified this in the figure caption.

Change made – caption for Figure 1 now reads: "The magnetic signatures of the spacecraft reaction wheels and their harmonics are visible near 17, 34, and 51 Hz and broaden during spacecraft manoeuvres around 07:05 and 07:50 UTC"

3. In which way the strong interference signal ≈40 Hz in time intervals ≈7:00 . . . 7:10 and ≈7:47 . . . 7:50 (Fig. 1a) was eliminated (cf. Fig. 1b)?

The spacecraft is maneuvering in those intervals causing many rapid updates to the magnetic feedback and the resulting transients. We have added additional clarifying text immediately before Figure 1.

Text added: "The spacecraft manoeuvres around 07:05 and 07:50 UTC resulting in the visible spectral widening of the reaction wheel tones and their harmonics as the various wheel rates change. All components of the magnetometer experience rapid change as the spacecraft rotates requiring many rapid updates to the digital feedback and resulting in the strong interference signal observed in the uncompensated spectra in Figure 1a. Characterizing and correction these transients, as described herein, significantly mitigates this effect resulting in the cleaner spectra shown as Figure 1b."

P. 7, Fig. 6: The curves in temperature range -10 . . . +10°C are almost indistinguishable for the usual page format. So, it is desirable to show these curves in two subfigures, for example in different time scales (or in log time scale).

Figure 6 has been updated as requested. The original plot is shown as (a) and a second panel (b) has been added showing 5-25 ms. The shorter timespan more clearly shows the curves for -10 . . . +10°C.

The caption how reads: "Figure 6: (a) The coefficients used to correct the transient following a DAC update in each instrument channel were found to be temperature dependent. "n" indicates the number of transients averaged in that temperature band. (b) Expanded time-scale to show ordering of the temperature dependent ticks."

Technical corrections

P. 4, Fig. 3: The a), b), c) symbols should be added to appropriate subfigures.

Change made.