

Minutes of Meeting

Meeting Date	11-13/02/2020	Ref	SOSMAG-MM-14-TeamMeeting
Meeting Place	IWF Graz	Chairman	-
Minute's Date	13/02/2020	Participants (via Skype)	W. Magnes (IWF) (WM) M. Delva (IWF) (MD) D. Fischer (IWF) (DF) J. Wilfinger (IWF) (JW) U. Auster (TU-BS) (UA) D. Constantinescu (TU-BS) (DC)
Subject	Processing and Team Meeting	Copy	To all participants

Description	Action	Due Date
Agenda		
-		
1. AC Correction		
Dragos did present the status of the AC cleaning work (see SOSMAG_AC_2019-02-12.pdf)		
<p><i>Midnight (ME) event cleaning</i></p> <p>There is a Type 1 ME which occurs in March (6onT pk-pk in OB) and a Type 2 which shows up in autumn. Type 2 is one part of two elements in type 1 (see picture in the annex).</p> <p>It is cleaned with AMR1.</p> <p>It is not perfectly cleaned as also shown by the Korean plot.</p> <p>We have the following residuals:</p> <ul style="list-style-type: none"> a) Dips around the pos. and neg. edges. (wiggles) b) DC shifts c) Residuals of the main step (Korean plot and annex) <p>It is explained in Figure 2; 2 nT pk-pk in attached Figure (principal axes) but 4 nT in Korean plot (PEN coordinates). It is biggest in the – OSRF-Z (H-N).</p> <p>Must be kept as is at the moment.</p> <p>Possible solution could be using higher order during the AMR correction phase. Uli: Use the first edge isolated from the rest first?</p> <p>Ideas to clean the spikes and steps first with a different approach.</p> <p>Wiggles and remaining ME step have different sources (see picture in annex). To correct for the DC step (Korean step) would change the parameters so much that the rest gets very bad. This means it is likely a different source.</p> <p>Type 2 is correctly cleaned (see data from 26-12-2019). Does this need confirmation?</p> <p>Type 1, when it appears, leaves the Korean step behind.</p>	TU-BS	03-03-2020

Description	Action	Due Date
<p><i>Big Steps which also only show up around equinox season</i></p> <p>Periodic steps are not fully cleaned in OB. Cleaning in IB is better.</p> <p>See flag discussion further down.</p>		
<p>It was decided to do the correction of the orthogonality before the AC cleansing is started.</p> <p>Magda to process a new data set with OB ortho/scale factor at about -40°C and IB -10°C.</p>	IWF	21-02-2020
Inter sensor alignment is to be checked until end of June.	IWF	30-06-2020
2. AC Correction Residuals		
<p><i>Low frequency oscillations in OB/IB difference</i></p> <p>It is mainly seen in OB Y so far; it is rather related to out of spec temperature ranges;.</p> <p>OB-IS raw and AC cleaned is plotted in Figure 1:</p> <ul style="list-style-type: none"> - Oscillations in difference are not removed by the cleaning process and copy from OB to IB - 2-3 nT pk-pk - It is seen in all components but there is no correlation between the components and so it is not from the S/C. - It is probably more in OB which needs to be confirmed with the AMR 2 comparison. - It is also seen on other days . - It is not visible during the warm plateau in the beginning of the day and it starts during cooling down around an OB sensor temperature of zero degC. - Do we have data files from Magnetsrode during cooling and warm-up which could explain the higher oscillations on OB-Y? - <p><i>V-structure during the first hours during a UT day (warm and cooling down)</i></p> <p>This could be the biggest residual (up to 6 nT in the OB/IB difference) but maybe is removed with max var method?</p> <ul style="list-style-type: none"> - It is there every day - It is not obvious in the AC cleaned data - Evaluation has shown that it is bigger in IB (plots in appendix) than in OB and it is obviously at least reduced during cleaning. - In the difference OB raw minus AC cleaned we clearly see the correction of the V-structure. 	TU-BS	03-03-2020
<p><i>Finding</i></p> <p>There is a short very quiet period for about 10 minutes during each day.</p>		
3. AC Correction Future Work		
<ul style="list-style-type: none"> - ME edge wiggle (2-3 nT pk-pk; <10 min.), - ME remaining rectangular step (4nT pk-pk; 1-2 hour) <p>Consolidate the work that has been done to prepare for the workshop. Two solutions will be worked on: a) playing with AMR 1 and 2 coefficients (Dragos is not optimistic) and b) super epoch analysis and reduce by subtraction (impact on GP). It is the goal to find the better way until end of June but not the final technique for the processing. This is probably something to be shared between TUBS and IWF.</p>	TU-BS TU-BS (IWF)	03-03-2020 30-06-2020

[illegible]

Description	Action	Due Date
5. Paper		
<p>We submit two papers: a) method paper and b) instrument paper</p> <p>Method Paper:</p> <p>It includes the max var method only.</p> <p>Only small modifications will be done to the version from October last year.</p> <p>Submission most likely to Geoscientific Instrumentation, Methods and Data Systems (GI) of EGU.</p> <p>Title should include: method, principal system, cleaning, multi-sensor magnetometer</p> <p>SOSMAG is only seen as test case</p> <p>Long term statistics from SOSMAG is kept short.</p> <p>Might include an outlook also to problems on other missions (e.g. Bepi – reaction wheels)</p> <p>Dragos will distribute an updated version until end of March</p> <p>Instrument Paper:</p> <p>Will be submitted to Space Science Reviews</p> <p>Classical instrument paper</p> <p>Shall be submitted before end of March; should be ideally online when data get officially released.</p> <p>Absolute error -> error.</p> <p>Science requirements are just linked to Space Weather Science (final product) and not Space Weather Products which rely on the real time data.</p> <p>Design requirements split instrument and science requirements</p> <p>First draft distributed with this minutes.</p>		
6. GP status and input for GP		
<p>Data types:</p> <ul style="list-style-type: none"> - Real time data are based on one minute of data and released within 5 minutes - Preliminary data are processed on the next day. - Final processed after several weeks (98 days ;14 weeks) <p>Flag strategy:</p> <ul style="list-style-type: none"> - ME Type 1 (5nT pk-pk; change of DC level within 1-2 minutes which compensated after 1-2hours) <p>Detect the crossing of a certainly level on AMR1 and set the flag for the full period.</p> <ul style="list-style-type: none"> - Temperature driven oscillations (3nT pk-pk; 2min-60min) <p>Flag is set when temperature is below a certain temperature. Exact temperature is to be evaluated (see oscillation related action above).</p> <ul style="list-style-type: none"> - Regular (big) steps (<0.3nT pk-pk (TBC); period TBC) <p>Edges need to be detected via AMR2 and only the edges are flagged.</p> <p>Ramp up the data processing:</p> <p>Definition of week: Saturday – Friday</p> <p>Week 1/2020: Monday 30 Dec. 2019 – Sunday 5 January 2020</p>		

Description	Action	Due Date
<p>Delivery is Sunday midnight.</p> <p>Dragos first delivery on Friday week 8 (21 Feb.)</p> <p>Magda does the offsets right in the week after to have the data ready for the meeting with ESA.</p> <p>It need to be submitted by end of week 12 (20th March).</p> <p>Flag will have to be submitted too.</p> <p>Dragos sends the 2019 average parameters to David.</p> <p>David does an example file based on the average parameters and sends it to Dragos (Action).</p>	TU-BS IWF	Done? 15-02-2020?
<p>Next parameter upload</p> <p>Dragos to send average 2019 parameters to Christian.</p> <p>Christian to prepare next release of upload procedure and the SOB file</p>	TU-BS Magson	21-02-2020 03-03-2020
7. Meeting with ESA		
<p>We start on 03-03-2020 at 09:30.</p> <p>Tentative agenda</p> <ul style="list-style-type: none"> - AC cleaning with a discussion of the interferences which are not fully cleaned at the end (ME related, oscillations and big steps) [Dragos] - DC and alignment calibration [Magda] - Data link to GP, quality flags, ramp up of parameter delivery [David] - Future work with a) until 30-06 and b) beyond. [Werner] - Monthly reporting in the future [Werner] 		
<p><i>Template of Report</i></p> <p>David will derive content from the GP</p> <p>Uli: Let's include the excel file with the disturber and Kp information</p>		
8. To be discussed with KMA		
Next parameter upload		
Would it be possible to do a delta commissioning to check the sensors and improve the oscillations		
Discussion of disturbers		
Regular updates possible?		
9. AOB		
Next team meeting is tentatively scheduled at IWF 8-9 June (11 th is holiday in Austria)		

Annex A: Plots

Plots about pulsations:

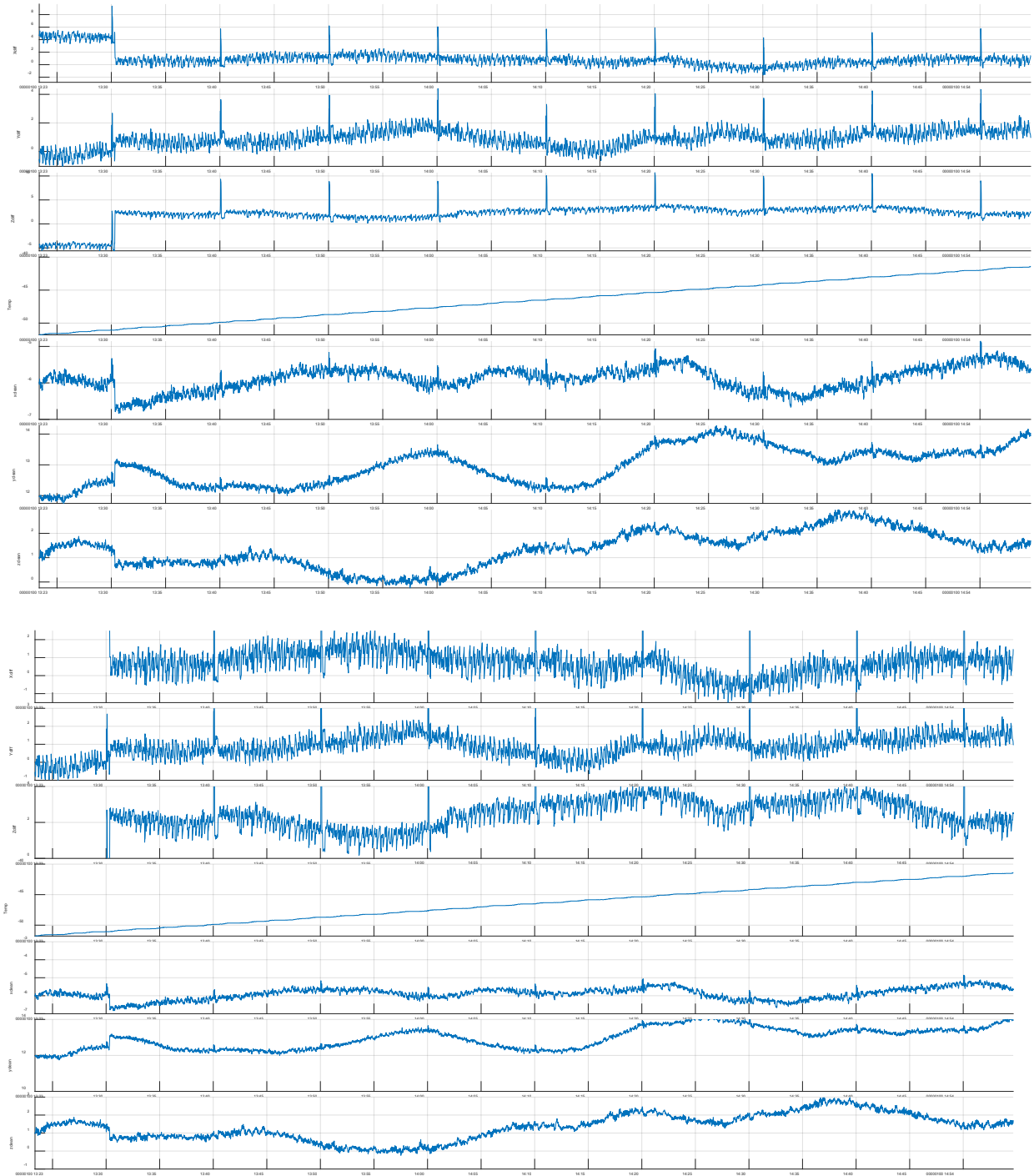


Figure 1, Two version of OB-IB raw and AC clean on 13 October in OSRF just before the midnight event (ME); There is also an oscillation in X and the pk-pk is 2 nT.

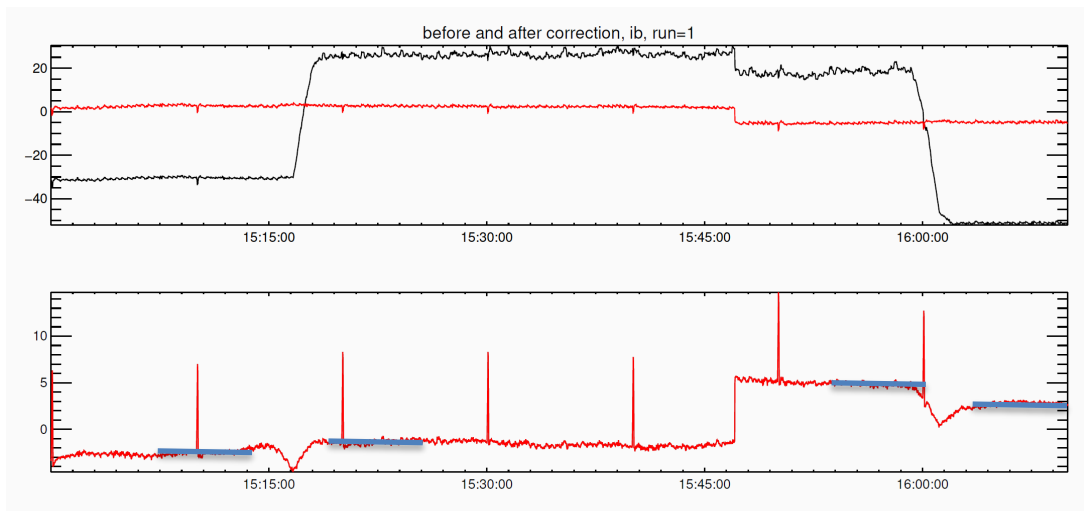
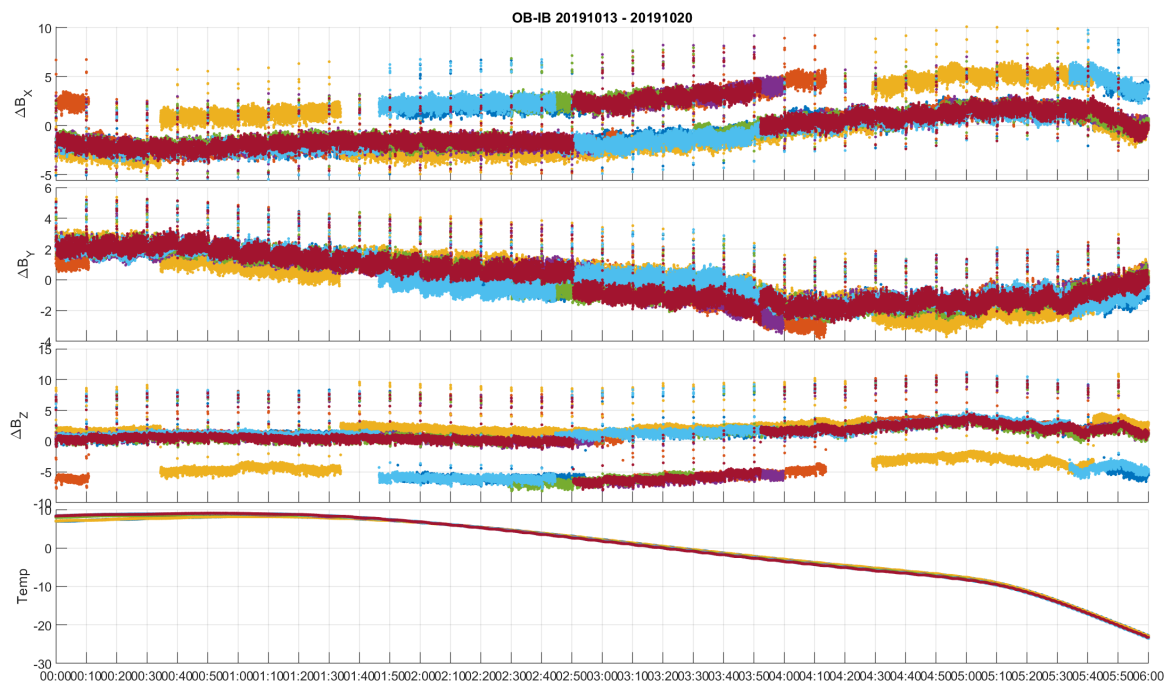


Figure 2, Explains the remaining main structure of the ME event in the AC cleaned data. It is due to the increase of the main part in the intermediate axis of the principal system.

Plots about V-shape drift in the beginning of a day



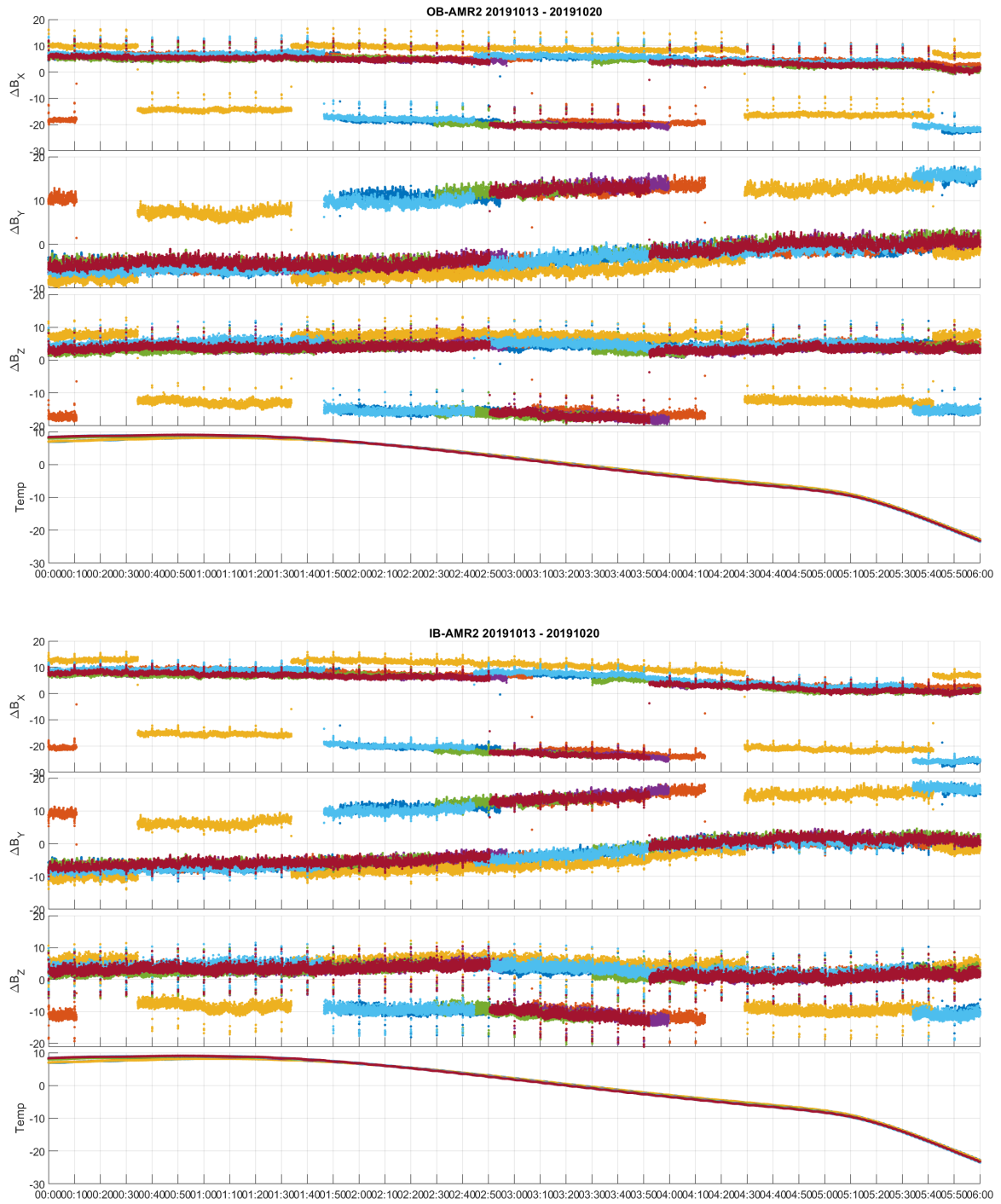
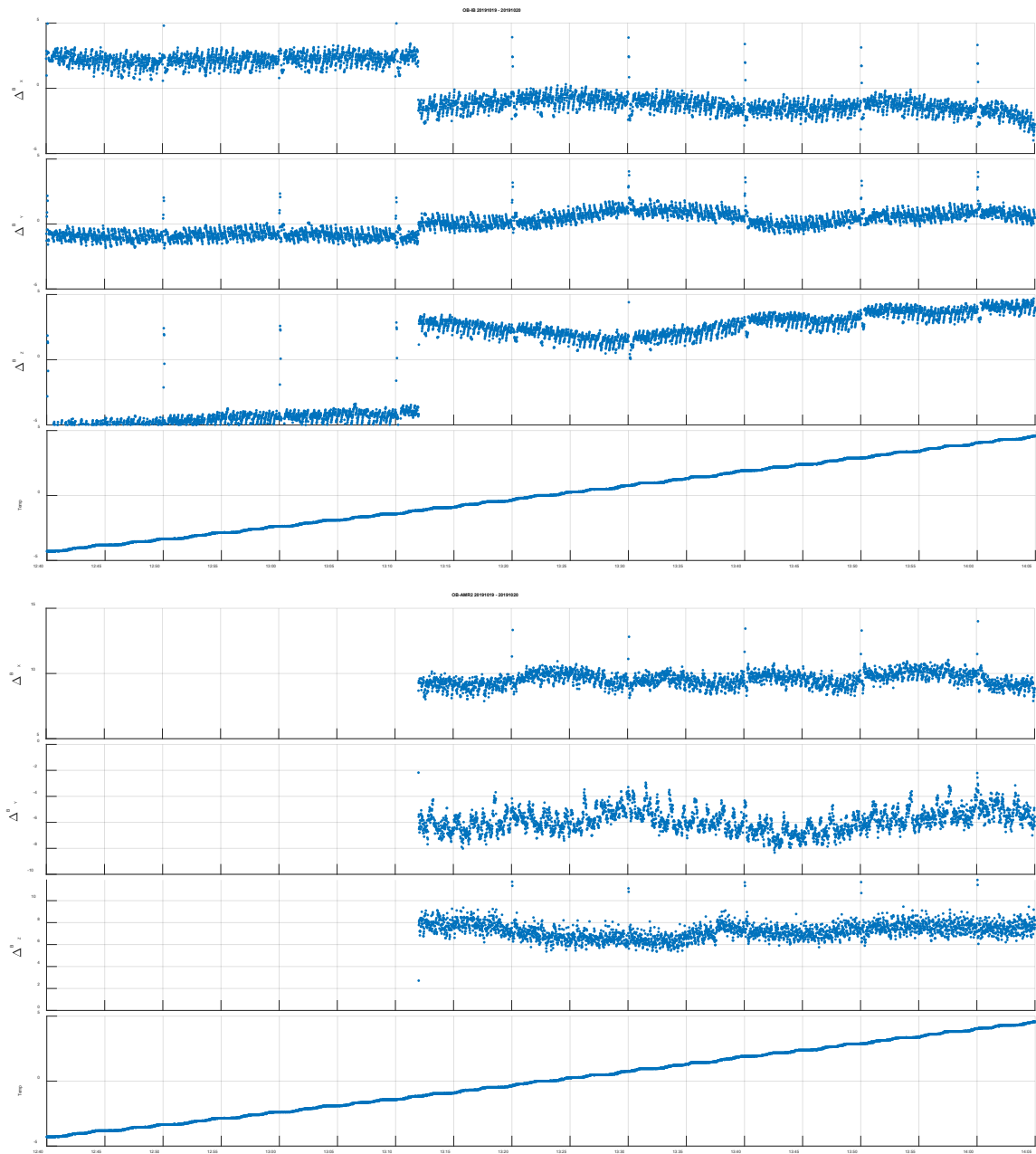


Figure 3, Set of plots that confirm that the V-shape interference comes from the S/C and is bigger in IB.

Plots about Oscillations:



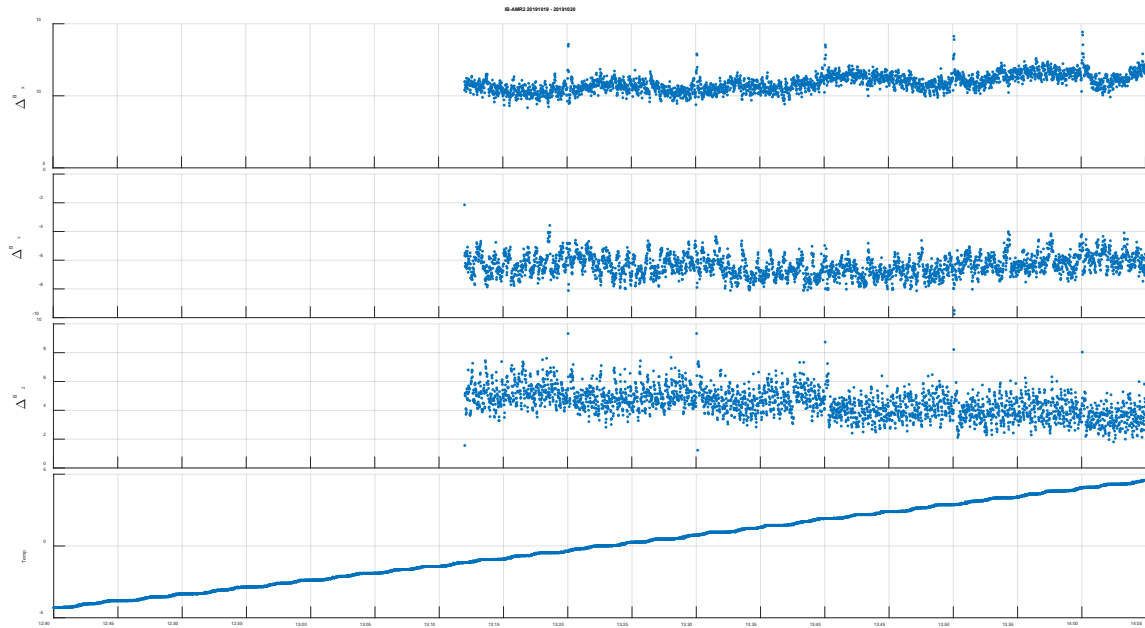


Figure 4, Set of plots that confirm that the oscillations are mainly in OB and that is not an interference with the S/C

About Midnight Type 1 and 2:

Type 2 is the second curve from the bottom. Type 1 is the combination of Type 2 and the rectangular signal at the bottom. Type 3 are the wiggles. Type 4 is what remains as Korean step.

