15th CAA Cross-Calibration Workshop /17-19 April 2012

University College of London

STAFF Report

STAFF Report

1. Status of data delivery
2. Delivery Plan
3. Status of data pipeline
4. STAFF/FGM cross calibration
5. Conclusions

1. Status of data delivery:

a. STAFF-SA

Product	Content	Level	Num. of files	Produced	Delivered to CAA
C?_CP_STA_AGC	Automatic Gain Control	1	1 file/ 1 sat./24h	V04: 01/01/2001 to 31/12/2010 V05: 01/01/2011 to 31/12/2011	V04: 01/01/2001 to 31/12/2010 V05: 01/01/2011 to 31/12/2011
C?_CP_STA_PSD	Power Spectral Density	2	1 file/ 1 sat./24h	V04: 01/01/2001 to 31/12/2010 V05: 01/01/2011 to 31/12/2011	V04: 01/01/2001 to 31/12/2010 V05: 01/01/2011 to 31/12/2011
C?_CP_STA_SM	Spectral Matrix	2	1 file/ 1 sat./24h	V04: 01/01/2001 to 31/12/2010 V05: 01/01/2011 to 31/12/2011	V04: 01/01/2001 to 31/12/2010 V05: 01/01/2011 to 31/12/2011

1. Status of data delivery:

a. STAFF-SA

Product	Content	Level	Num. of files	Produced	Delivered to CAA
C?_CQ_STA_SA_ NOT SRP_ CAVEATS	PSD/SM Caveat	2	1 file/ 1 sat./24h	V01: 01/01/2001 to 31 Sep 2011	V01: 01/01/2001 to 31/12/2011
C?_CQ_STA_SA_ PSD NEG_ CAVEATS	SM Caveat	2	1 file/ 1 sat./24h	V01: 01/01/2001 to 31 Sep 2011	V01: 01/01/2001 to 31/12/2011
C?_CP_STA_PPP	Polarisation and Propagation Parameters	3	1 file/ 1 sat./24h	V04: 01/01/2001 to 31/12/2009	V04: 01/01/2001 to 31/12/2009
C?_CQ_STA_SA_ UNDEFINED_MFA _ CAVEATS	PPP Caveat	3	1 file/ 1 sat./24h	V01: 01/01/2001 to 31/12/2009	V01: 01/01/2001 to 31/12/2009

1. Status of data delivery:

b. STAFF-SC: NBR and HBR mode

Product	Content	Level	Num. of files	Produced	Delivered to CAA
C?_CP_STA_DWF	Decommutated Waveform	1	1 file/mode/ 1 sat./24h	V02: 01/01/2001 to 31/12/2006 V03: 01/01/2007 to 31/12/ 2009 V04: 01/01/2010 To 31/12/2011	V02: 01/01/2001 to 31/12/2006 V03: 01 Jan. 2007 to 31 Dec. 2009
C?_CP_STA_CWF	Calibrated waveform	2	1 file/mode/ 1 sat./24h	Few test files	None
C?_CP_STA_CS	Calibrated Spectra	2	1 file/mode/ 1 sat./24h	V02: 01/01/2001 to 31/12/2005 V03: 01/01/2006 to 31/12/2010	V02: 01/01/2001 to 31/12/2005 V03: 01/01/2006 to 31/12/2009
CL_CG_STA_SC_ SPECTRO	Spectrograms Plots	3	1 file/ 4 sat./3h	V01: 01/01/2001 to 31/12/2011	V01: 01/01/2001 to 31/12/2011

2. Delivery plan:

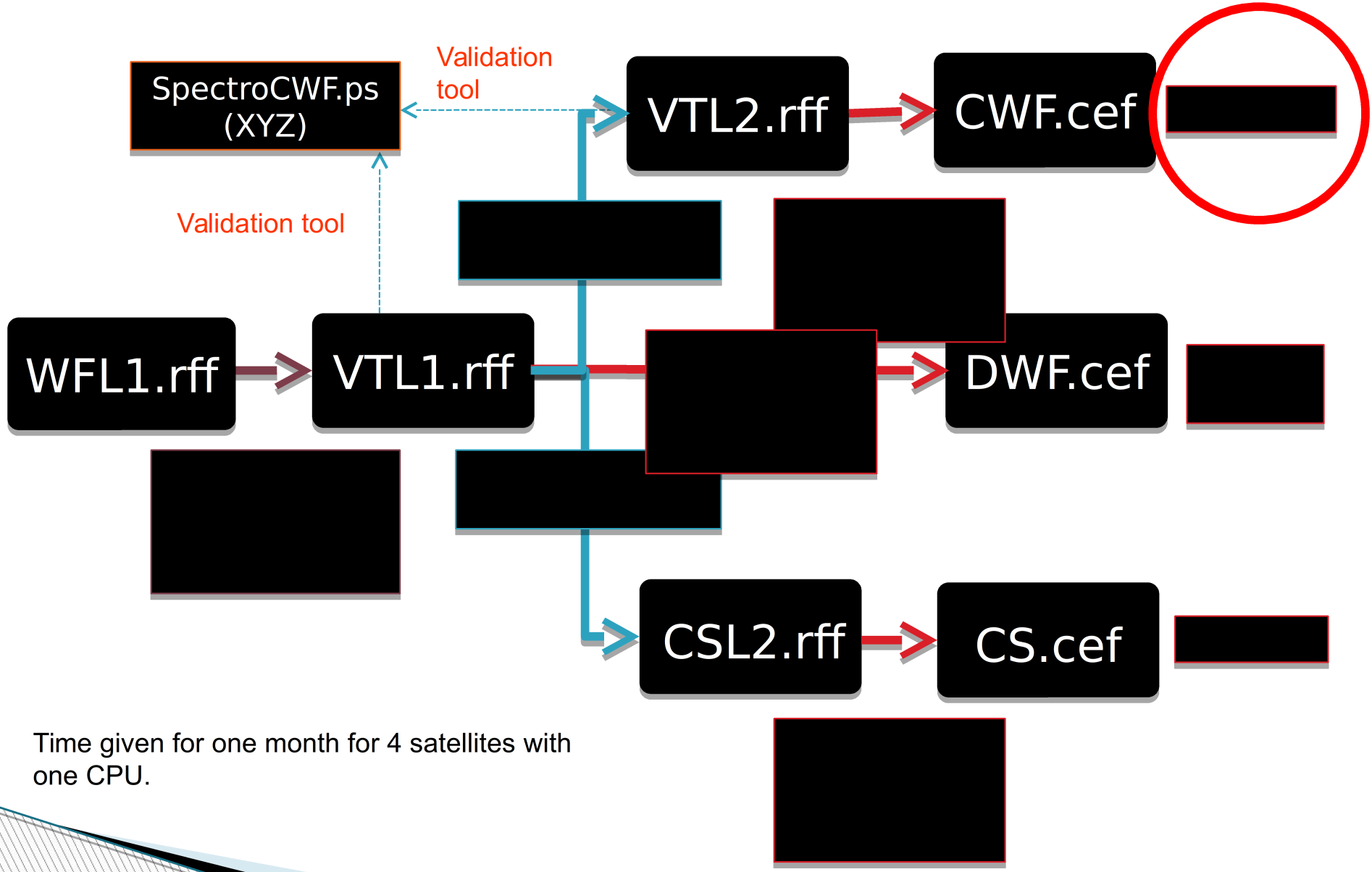
Product \ Year of delivery	2012	2013
SC DWF Version 4	2010-2011 2001-2009	2012
SC Complex spectra V 4	2010-2011 2001-2009	2012
SC Images	2012	
SC CWF New	2001-2006	2007-2012
SA AGC/ PSD / SM/ Version 4	-	2012
SA AGC/ PSD / SM/ BE products = Version 5	2011 2001-2005	2006-2010 2012
SA Polarisation/ Propagation	2010-2011	2012

3. Status of data pipeline:

- SA:
  - Data pipelines are operational.

- SC:
  - DWF pipeline was rebuild in order to add new elements needed by CWF data.
  - CS pipeline need to be updated according to new calibration tables.

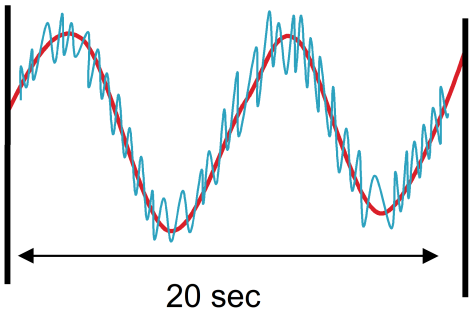
  → All these data will be reproduced and delivered to CAA for the complete mission period.
  - CWF pipeline is close to be completed. It is ready for ISR2 but it needs a patch to produce in the same time data in ISR2 and in GSE. This pipeline was delayed due to the comparison between FGM and STAFF, in order to validate the new calibration process.



Time given for one month for 4 satellites with one CPU.

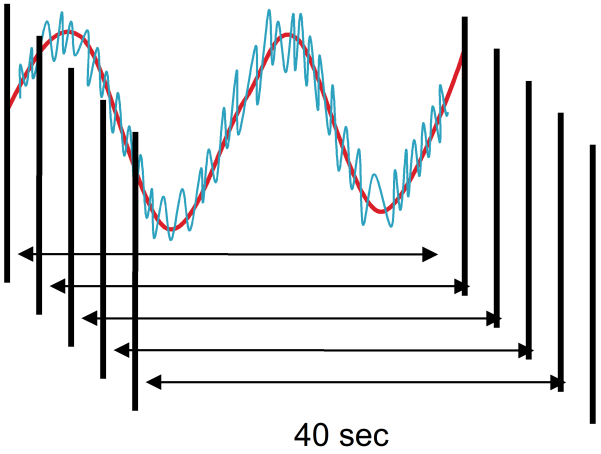
4. STAFF-FGM Cross-Calibration:

a. The old calibration



- Fit of Bx and By components in spinning system by a sine signal at spin frequency give estimate of Bperp amplitude and phase angle ϕ.
- Amplitude assumed to be constant during the window sampling.
- B_{DC} sample rate must be > 1 spin period.

b. The new calibration



- Sliding windows, giving continuous estimate of B_{DC} and B_{waves}
- Final CWF are the sum of B_{DC} and B_{waves}
- Initial sample rate preserved.

4. STAFF-FGM Cross-Calibration:

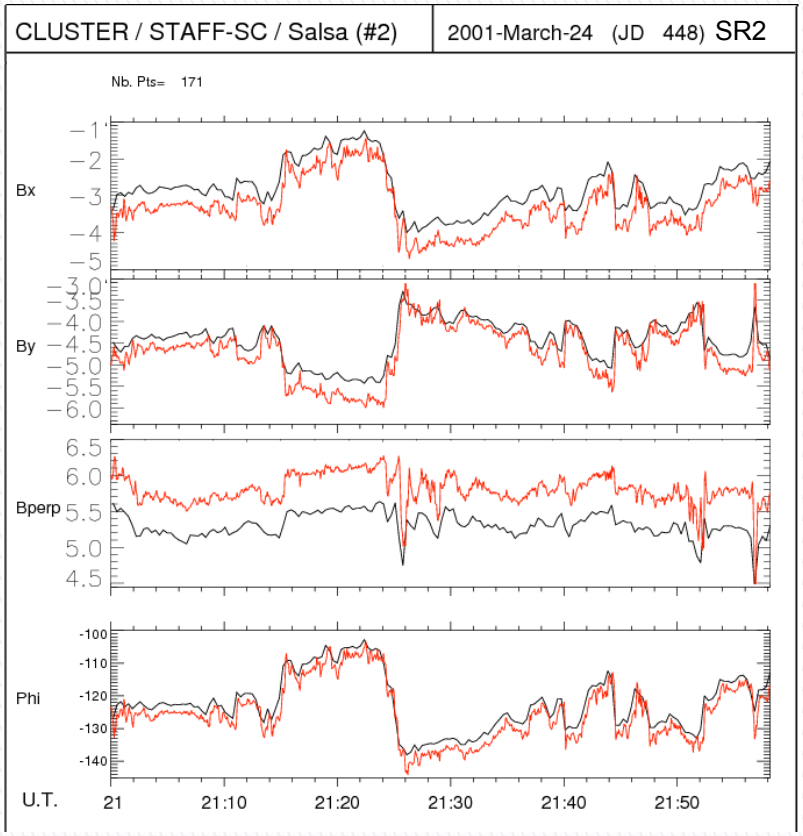
b. The new calibration

Problem with the original ground calibration of the instruments, due to non circular Helmoltz coils (time degradation).

→ New measurements done in Chambon-la-forêt by the technical team with new Helmoltz coils lead to new calibration tables and new transfer functions.

4. STAFF-FGM Cross-Calibration:

b. One event comparison



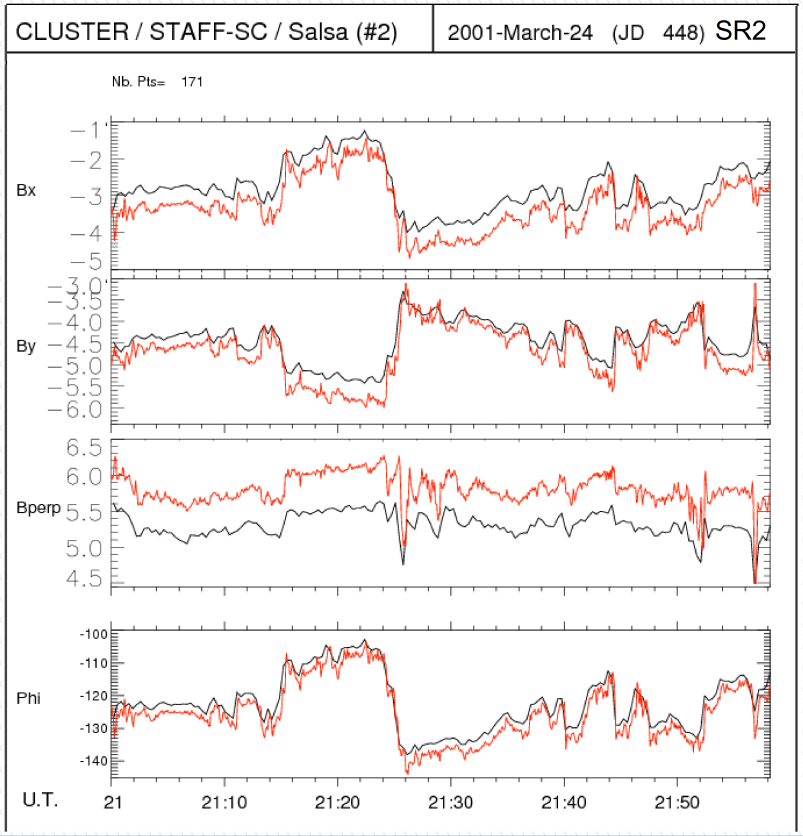
FGM: PPD 4s / STAFF Despin Software 20s

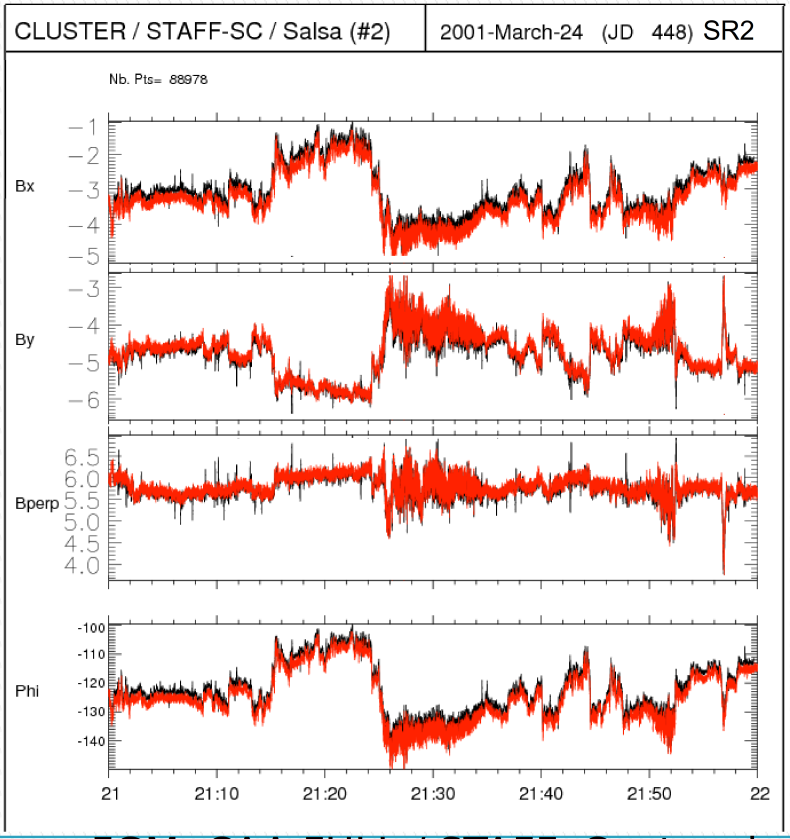
$<\Delta B\perp/B\perp> \pm \sigma B\perp/B\perp$

$\simeq$ **10%±2%**

4. STAFF-FGM Cross-Calibration:

b. One event comparison





FGM: PPD 4s / STAFF: Despin Software 20s

$<\Delta B\perp/B\perp> \pm \sigma B\perp/B\perp$

$\simeq$ **10%±2%**

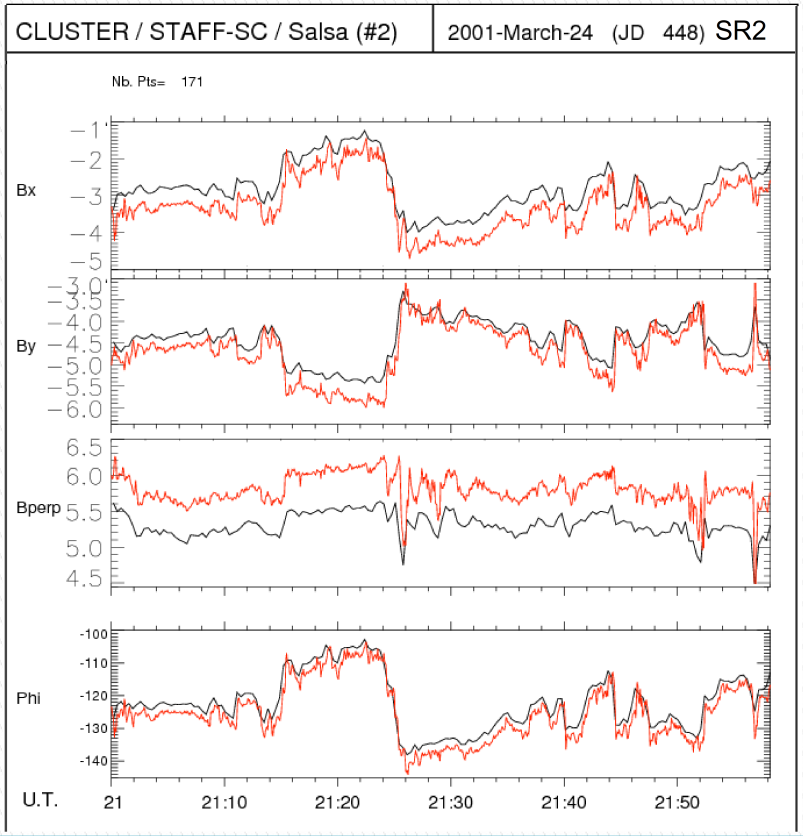
FGM: CAA FULL / STAFF: Cont. cal. method

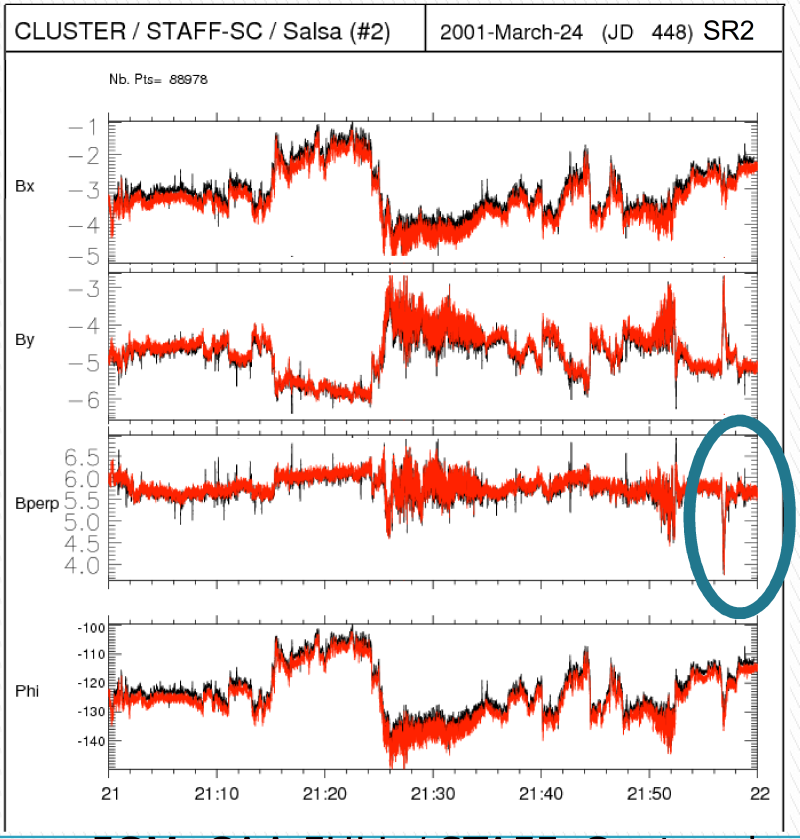
$<\Delta B\perp/B\perp> \pm \sigma B\perp/B\perp$

$\simeq$ **1%±1%**

4. STAFF-FGM Cross-Calibration:

b. One event comparison





FGM: PPD 4s / STAFF: Despin Software 20s

$<\Delta B\perp/B\perp> \pm \sigma B\perp/B\perp$

$\simeq$ **10%±2%**

FGM: CAA FULL / STAFF: Cont. cal. method

$<\Delta B\perp/B\perp> \pm \sigma B\perp/B\perp$

$\simeq$ **1%±1%**

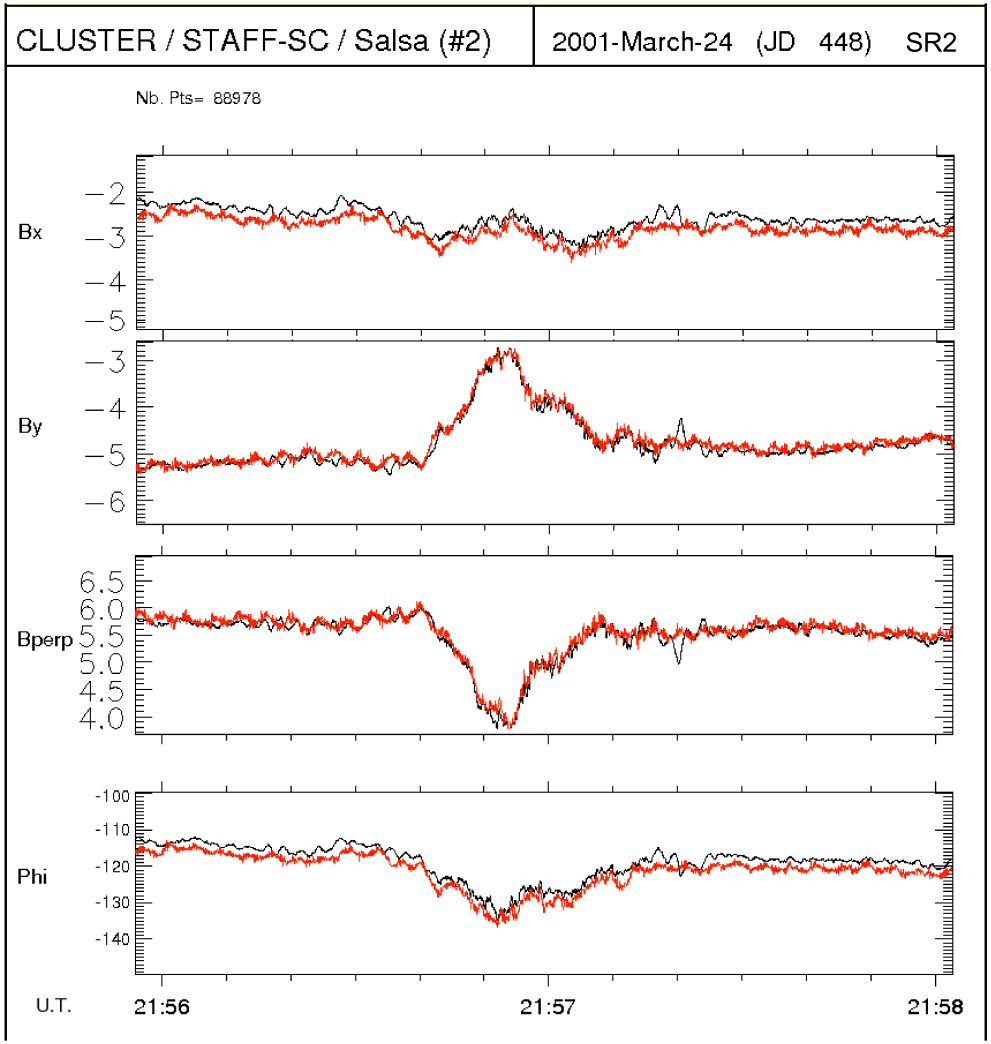
4. STAFF-FGM Cross-Calibration:

b. One event comparison

Continuous calibration works well even on short time scale.

$\Delta B\perp/B\perp < 1\%$

$\Delta\varphi \simeq 3°$ → under study.

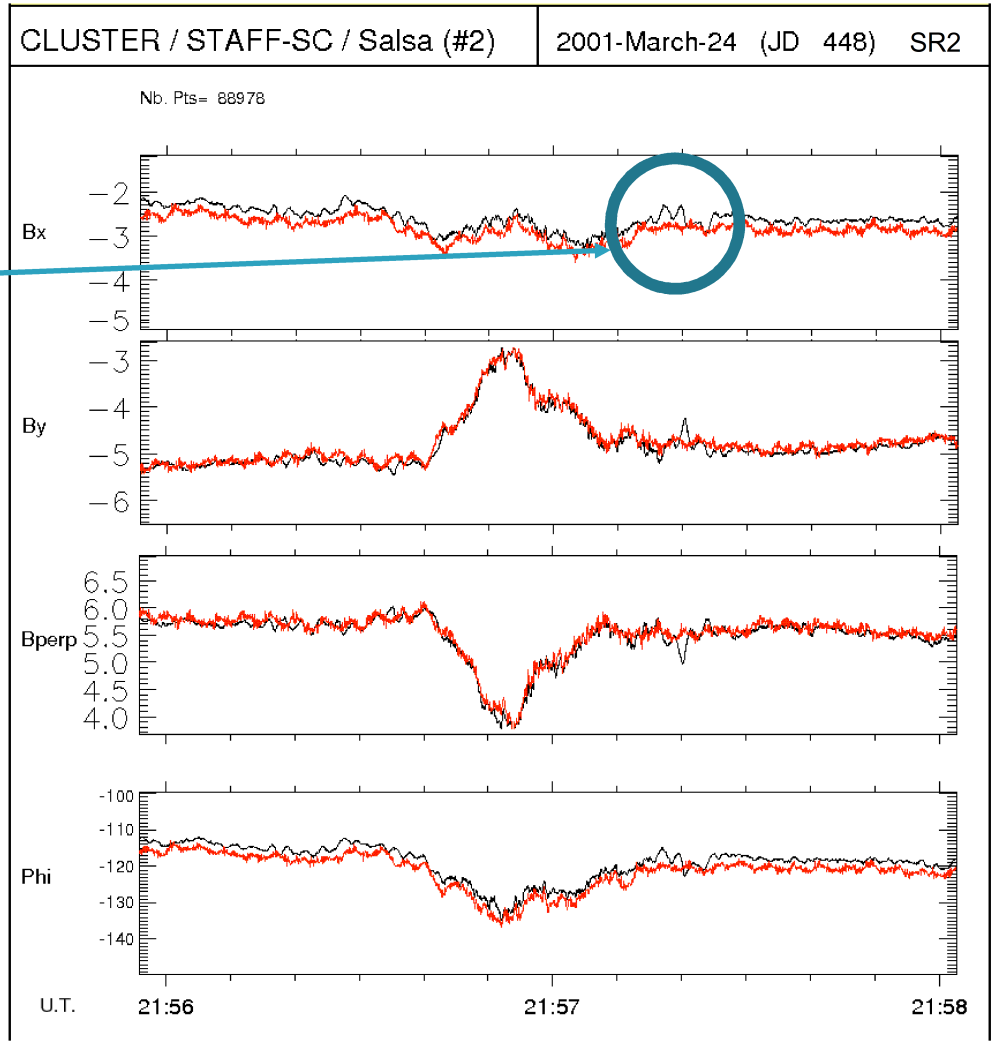


4. STAFF-FGM Cross-Calibration:

b. One event comparison

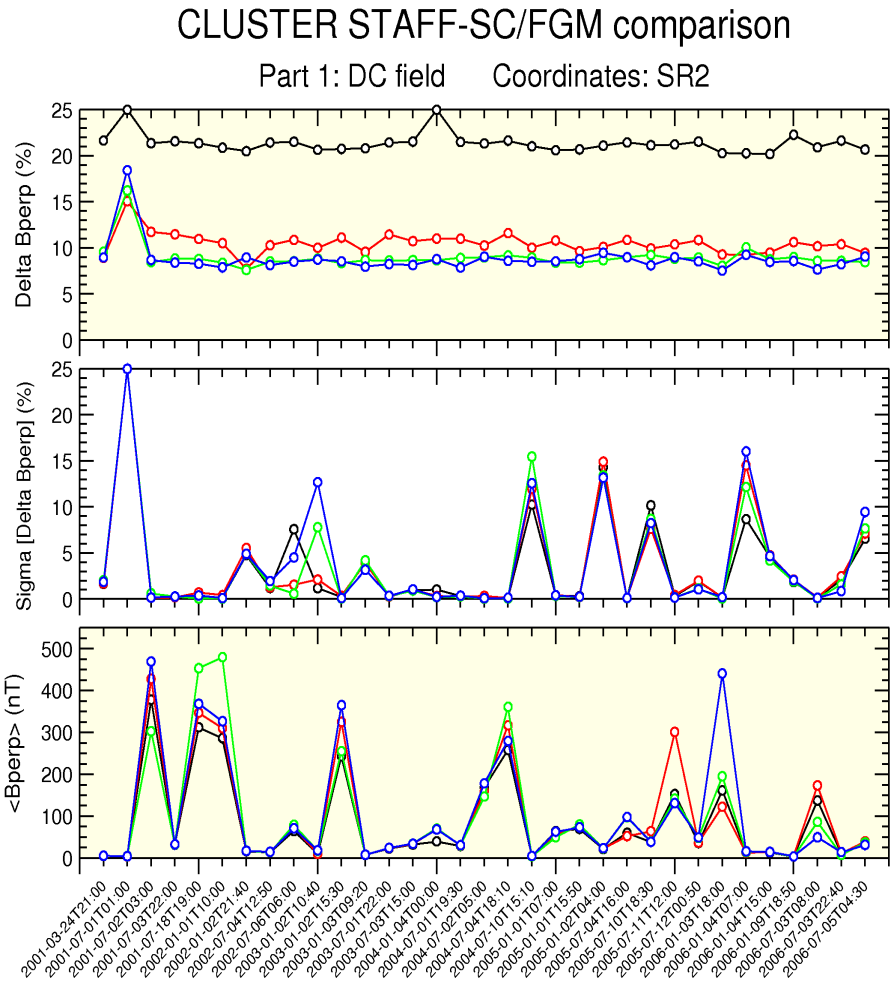
Spin residue

It could be removed in next update but it is still under discussion.



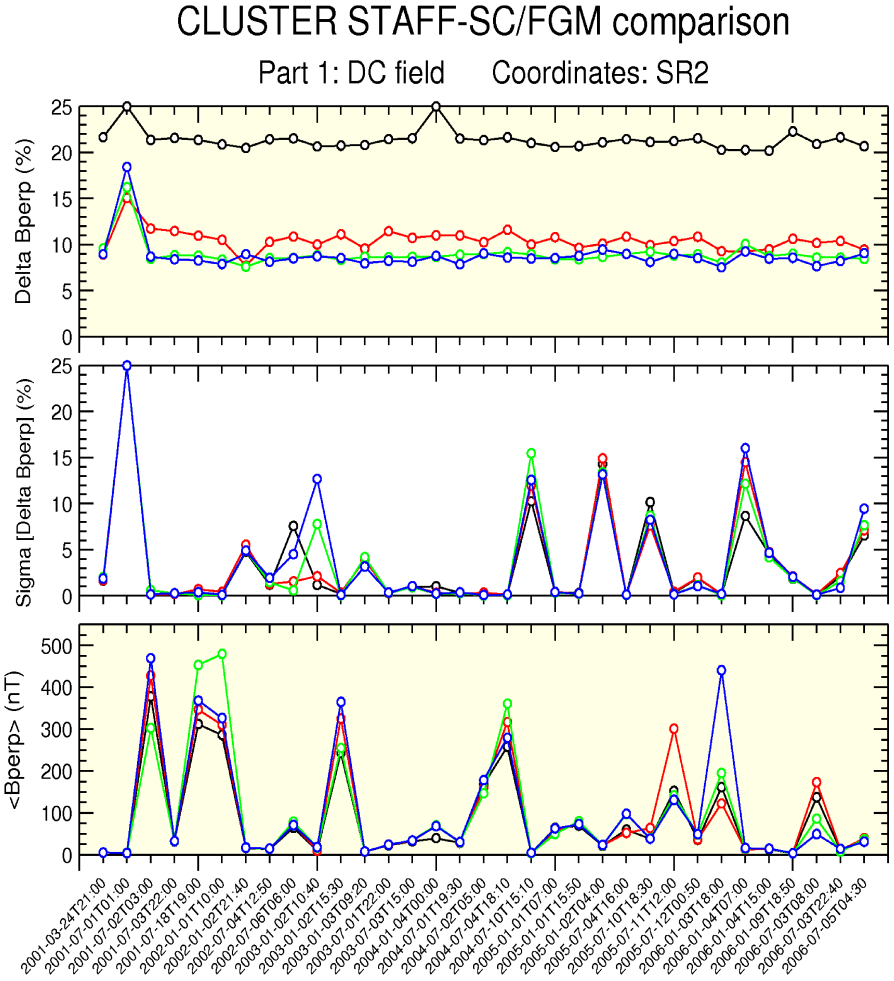
4. STAFF-FGM Cross-Calibration:

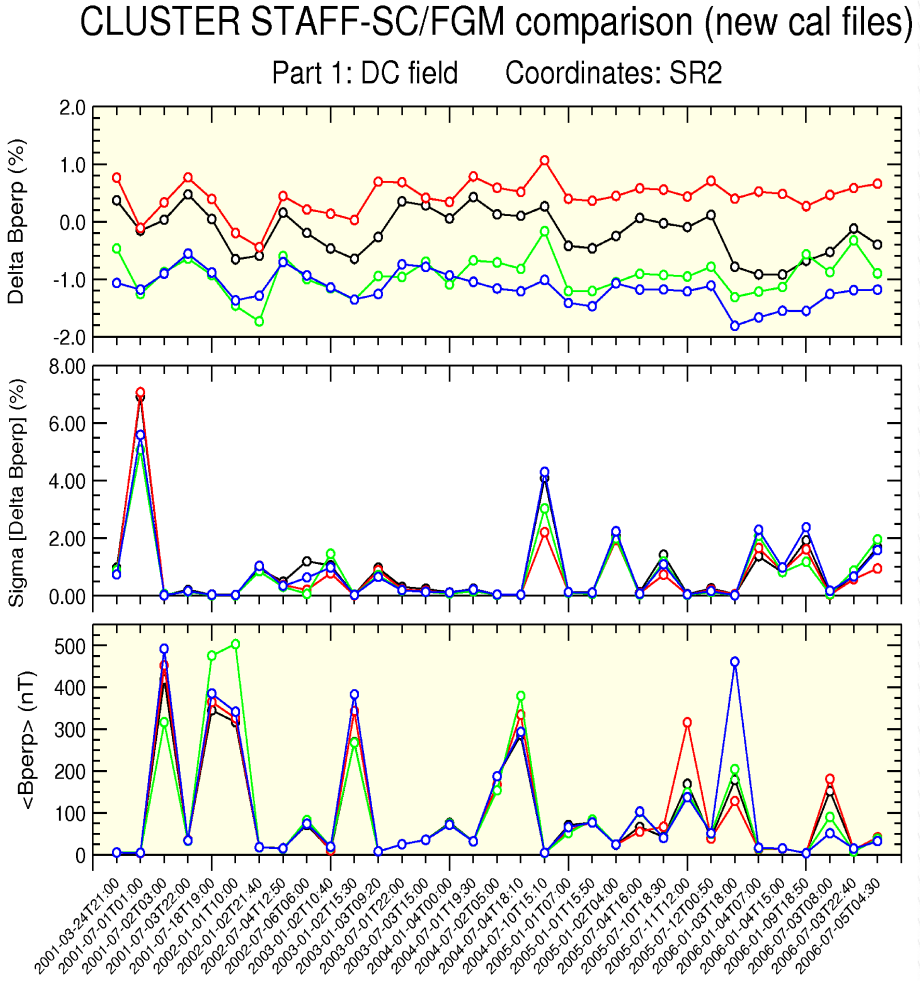
b. Statistical comparison



4. STAFF-FGM Cross-Calibration:

b. Statistical comparison





5.Conclusions

- Data delivery:
  - SA OK.
  - SC a little late, due to the validation process of the new calibration method, that include a 6 years comparison of FGM and STAFF data.

- Cross calibration SC / FGM
  - Very good new results due to
    - ✓ New calibration tables
    - ✓ New calibration method.

  S/C # 2, 3 and 4 : 10% → 1%

  S/C # 1 : 20% → 1%

  - Still pending:
    - ✓ spin residue at 2 fs.
    - ✓ $\Delta\varphi \simeq 3°$ to be confirmed.