

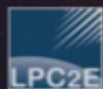


RPW / SCM

The RPW/Search Coil Magnetometer onboard Solar Orbiter

Matthieu Kretzschmar
and the SCM team

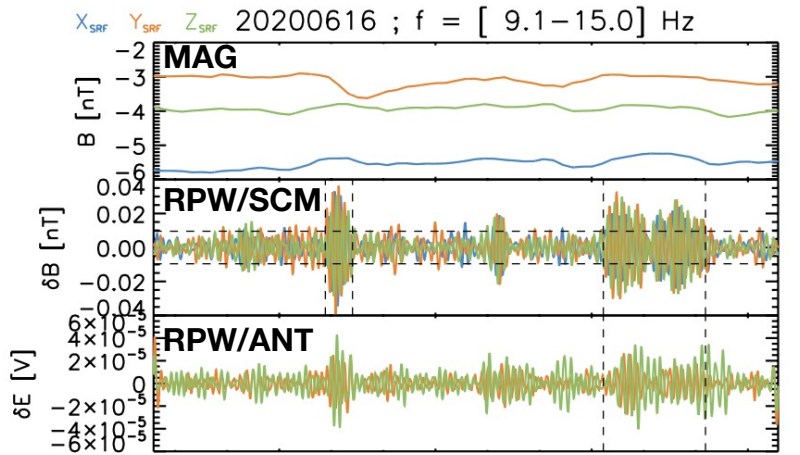
Volodya Krasnoselskikh, Jean-Yves
Brochot, Guillaume Jannet, Thierry
Dudok de Wit, Milan Maksimovic,
Thomas Chust, Olivier Le Contel, Jan
Soucek, David Pisa, Antonio Vecchio,...





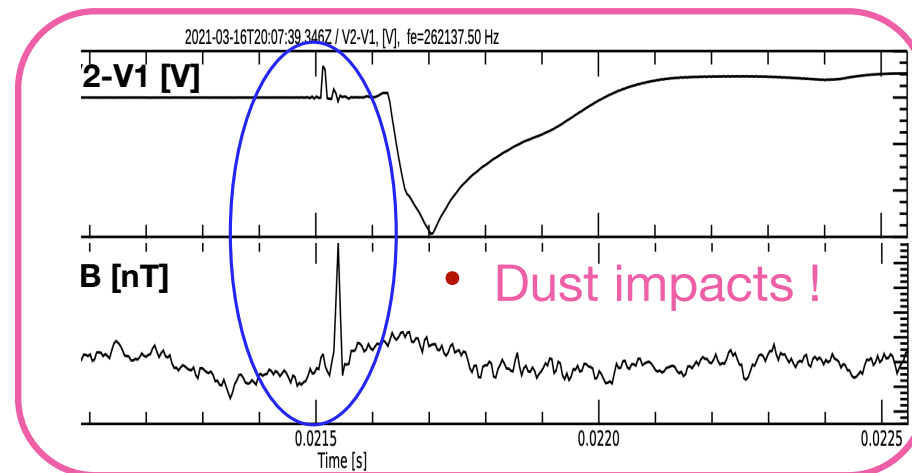
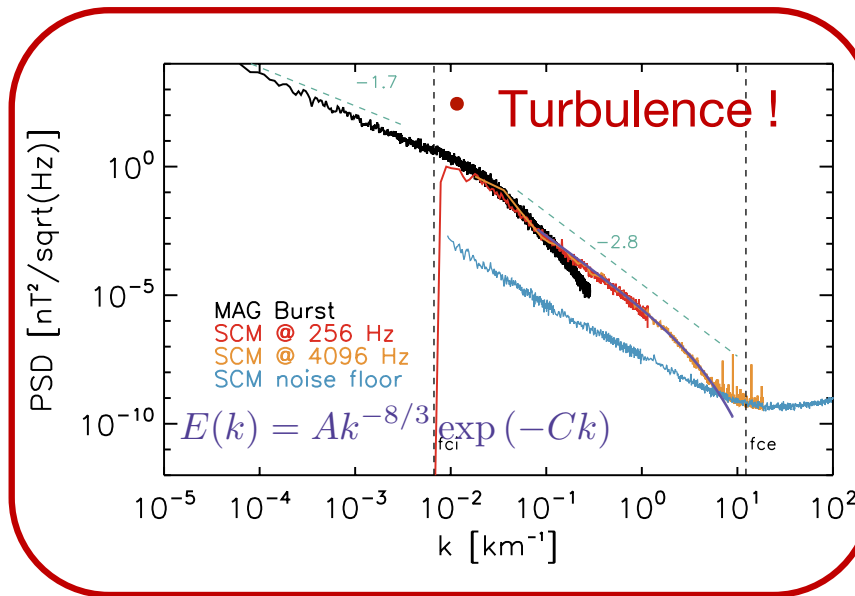
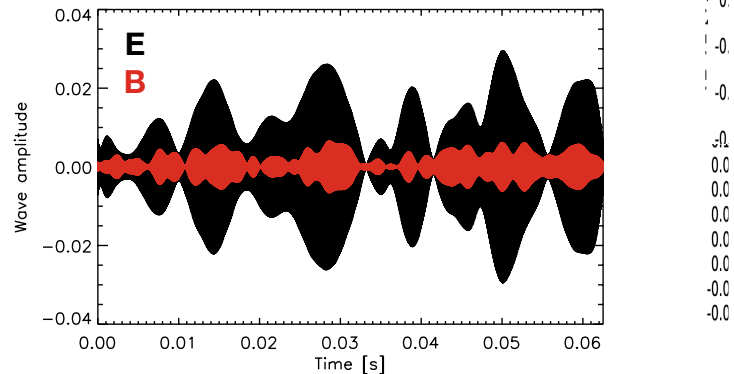
SCM advertising

• 'LF' waves !

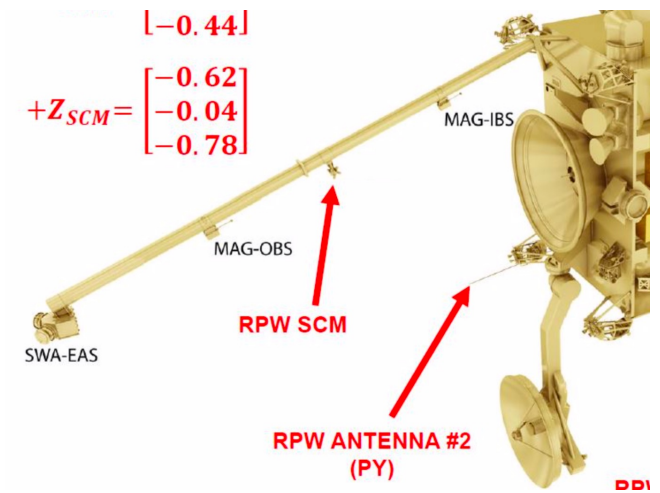


15:30:16 15:30:18 15:30:20 15:30:22
+Talk by L. Colombari tomorrow

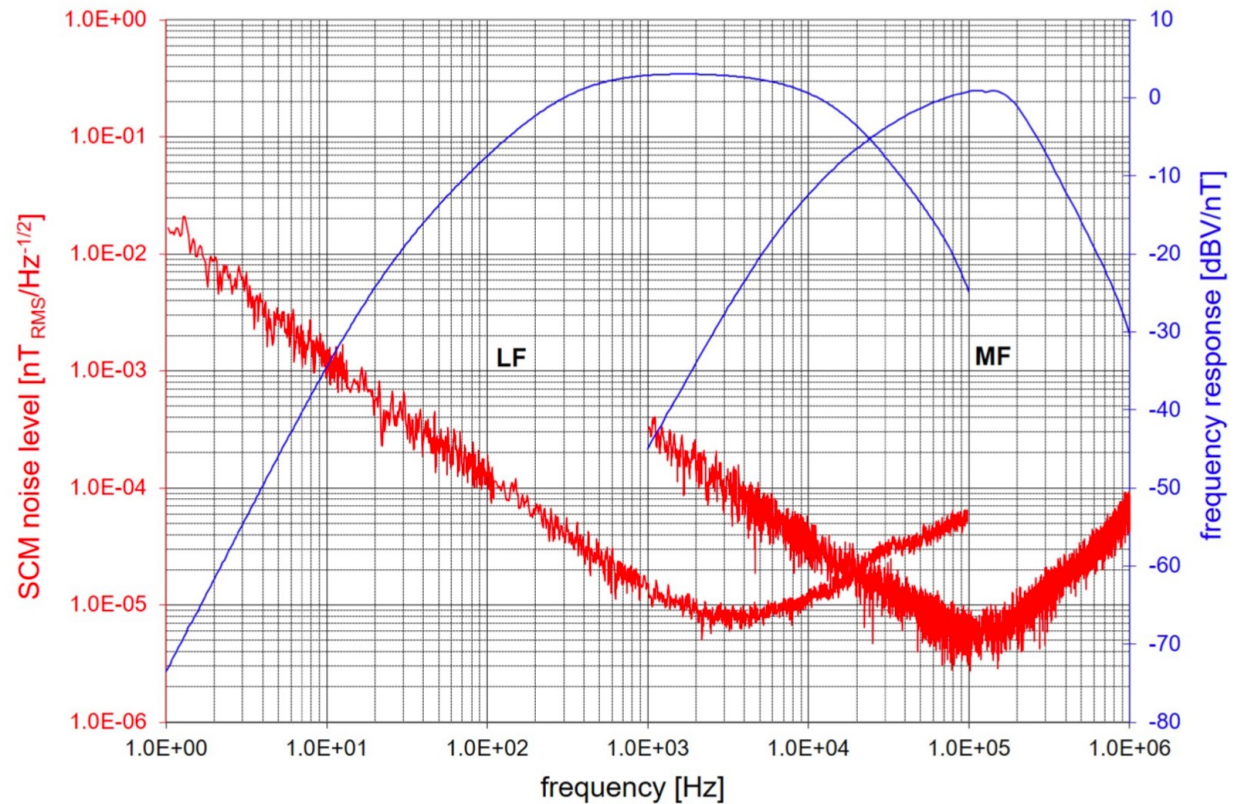
• HF waves !



Basics of SCM



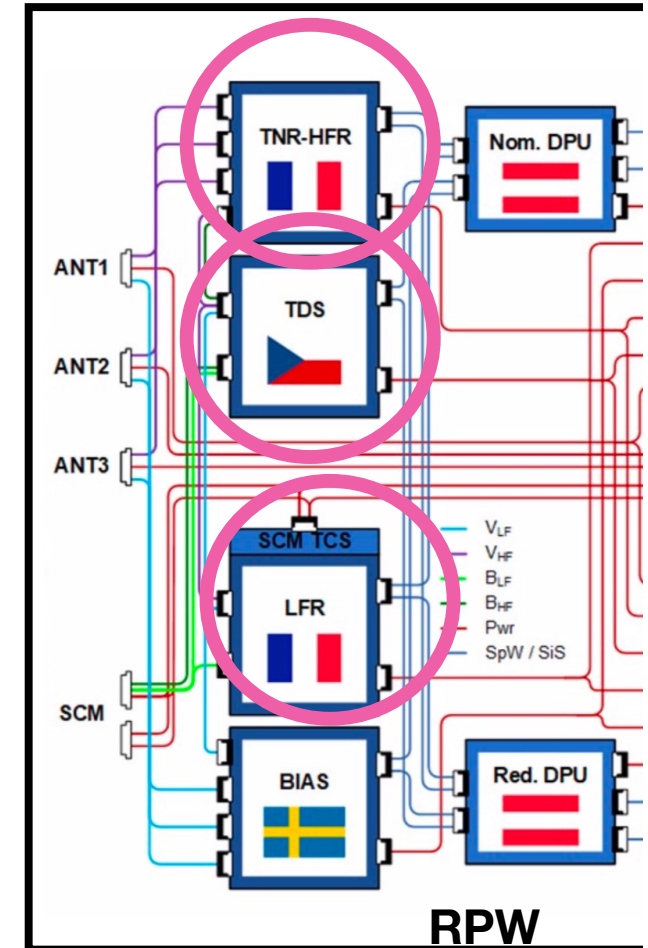
- Lenz law: $e = d\Phi/dt$
- 3 LF axes: 1Hz to 50kHz
- 1 MF axe (SCM X): (10kHz-500kHz)



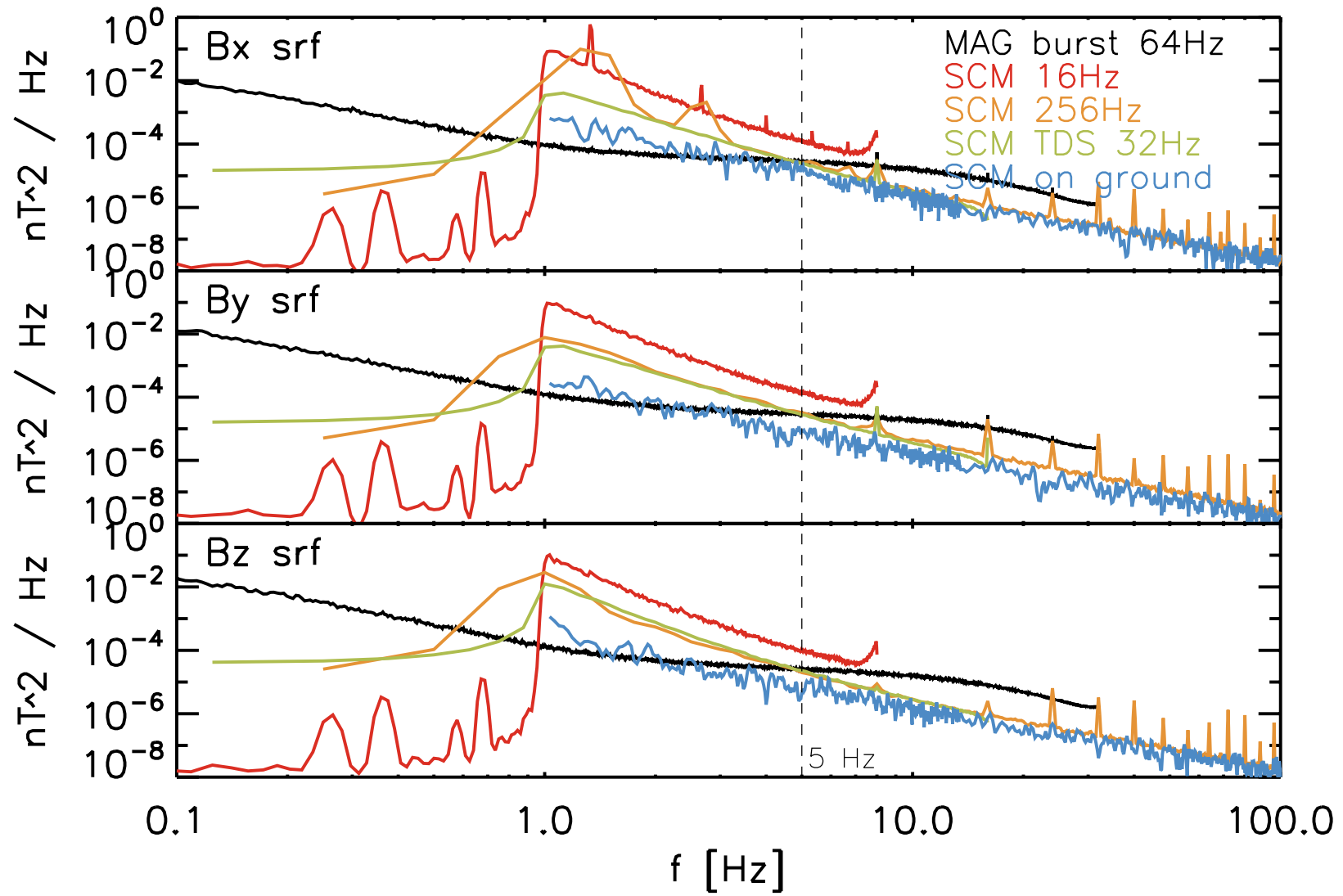
Relevant analyzers and data products

SCM data goes through:

- **LFR**: 3 LF channels, waveform & spectral products (+onboard calibration)
continuously: CWF@16Hz
every 5 minutes: SWF@256Hz, 4kHz, 25kHz
Sbm1, sbm2
- **TDS**: MF channel snapshot waveform. (can receive LF channels if LFR fails)
every seconds: RSWF@542kHz or 262kHz.
triggered snapshot (TSWF) LFR redundancy
- **TNR/HFR**: MF channel spectrum. Ask Antonio



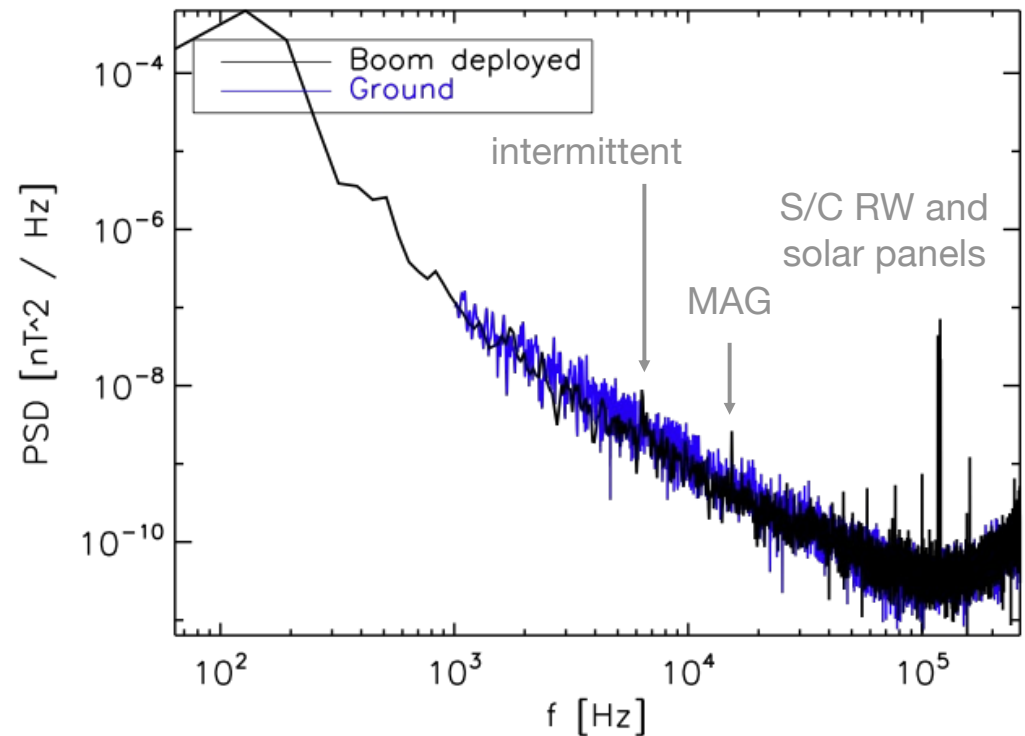
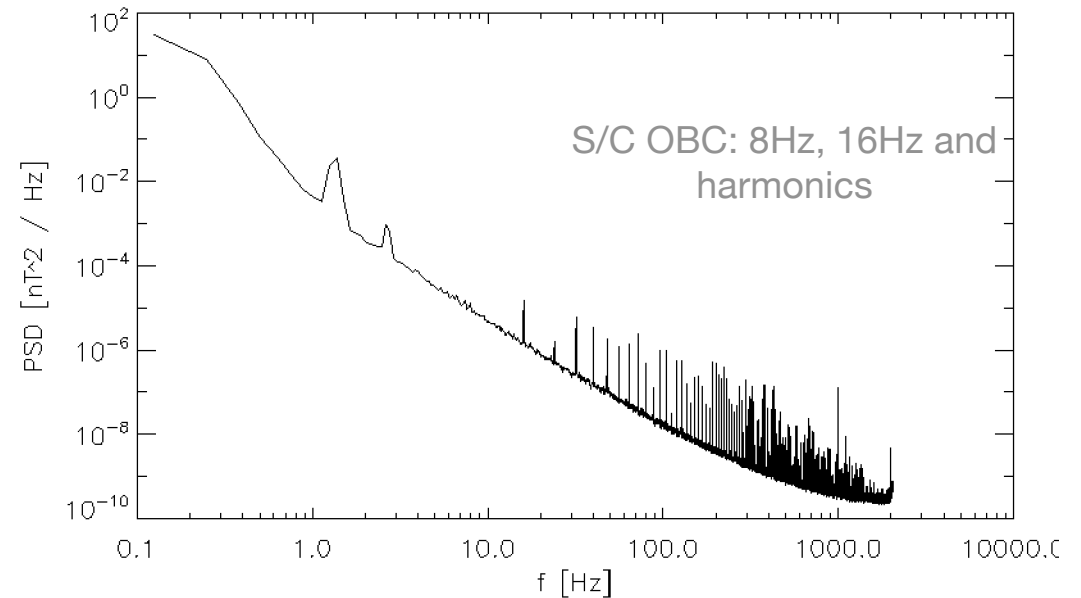
New calibrated files (L2) are coming



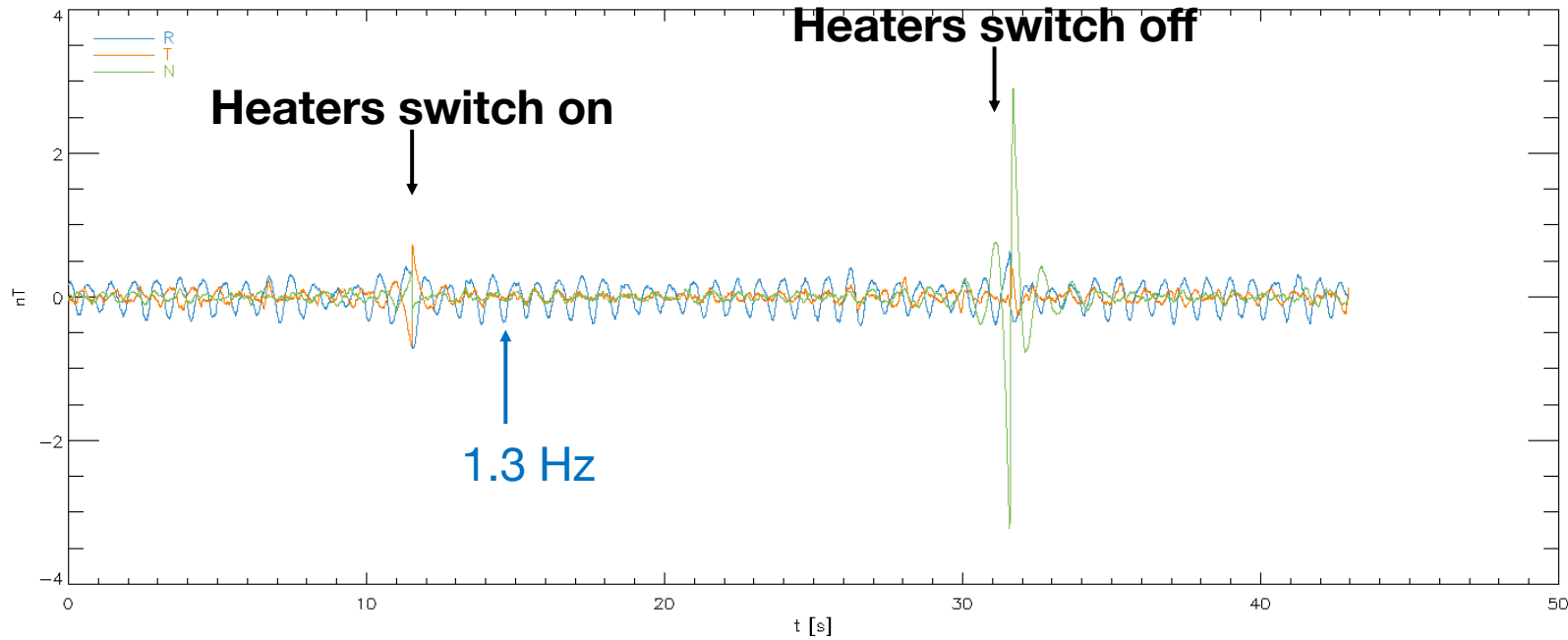
- Use SCM when interested in fluctuations above ~5 Hz
- Do not use CWF at 16 Hz

Artefact signals

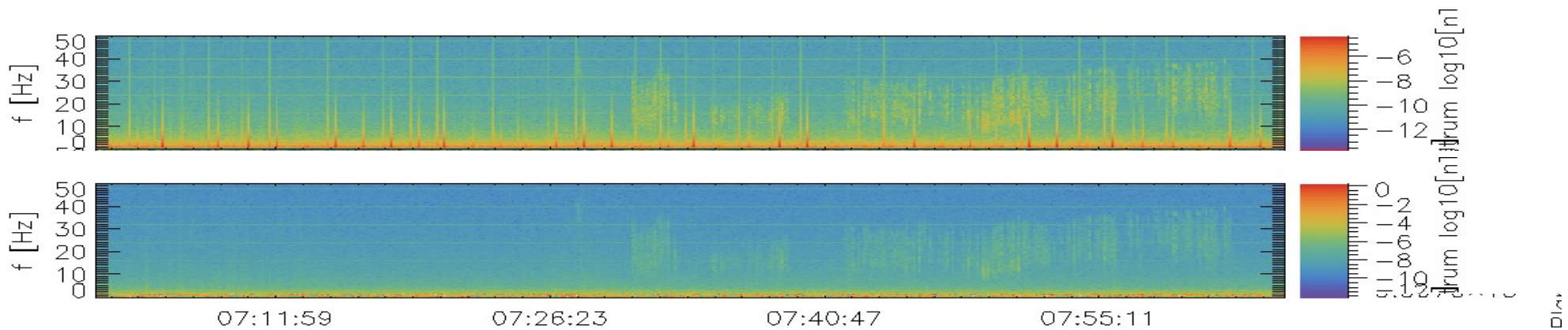
- Internal : 1.33 Hz and harmonics
- OBC (8Hz, 16Hz and harmonics)
- MAG driving frequency (15.36kHz and harmonics)
- RW DC converter for RW (80kHz)
- Solar Panel DC converter (120kHz)
- SCM heaters



Artefact signals : SCM heaters

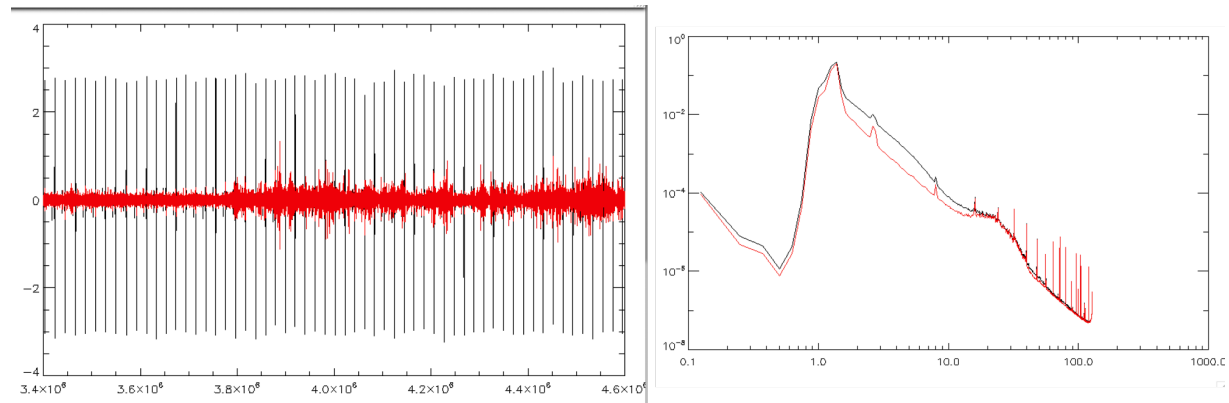


Occurs every ~ 90s

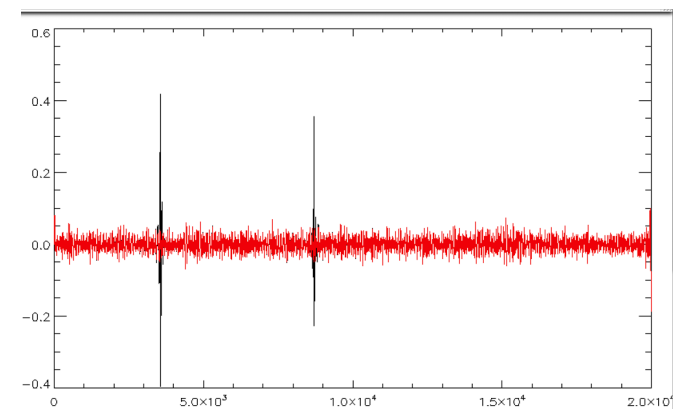
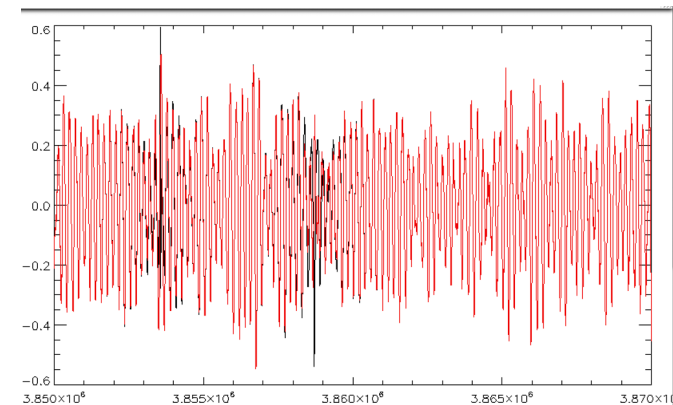


New calibrated data to come

1. SCM heaters corrected
Nb : corrected data will still be flagged

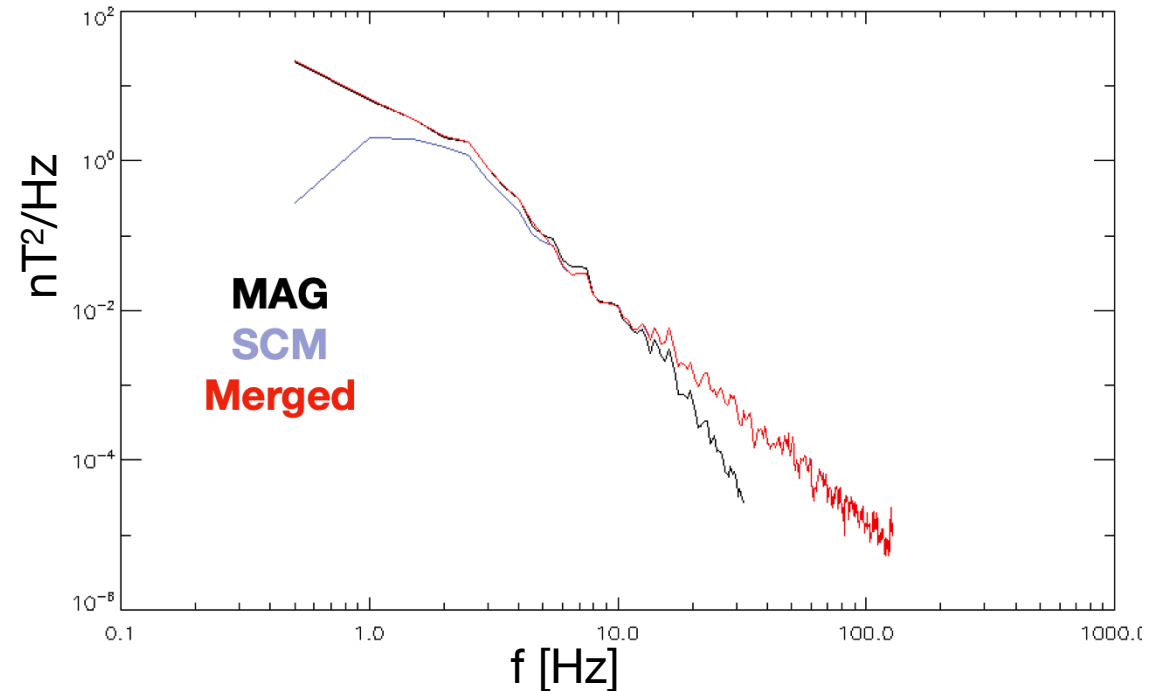


2. High pass filtered > 3 or 4 Hz
To get rid of the 1.3 Hz and induced HF noise



SCM & MAG Merging

- We are working on a merged data product
- Need some thoughts about which data product to merge
 - Consider only MAG burst data
 - With which SCM data product?

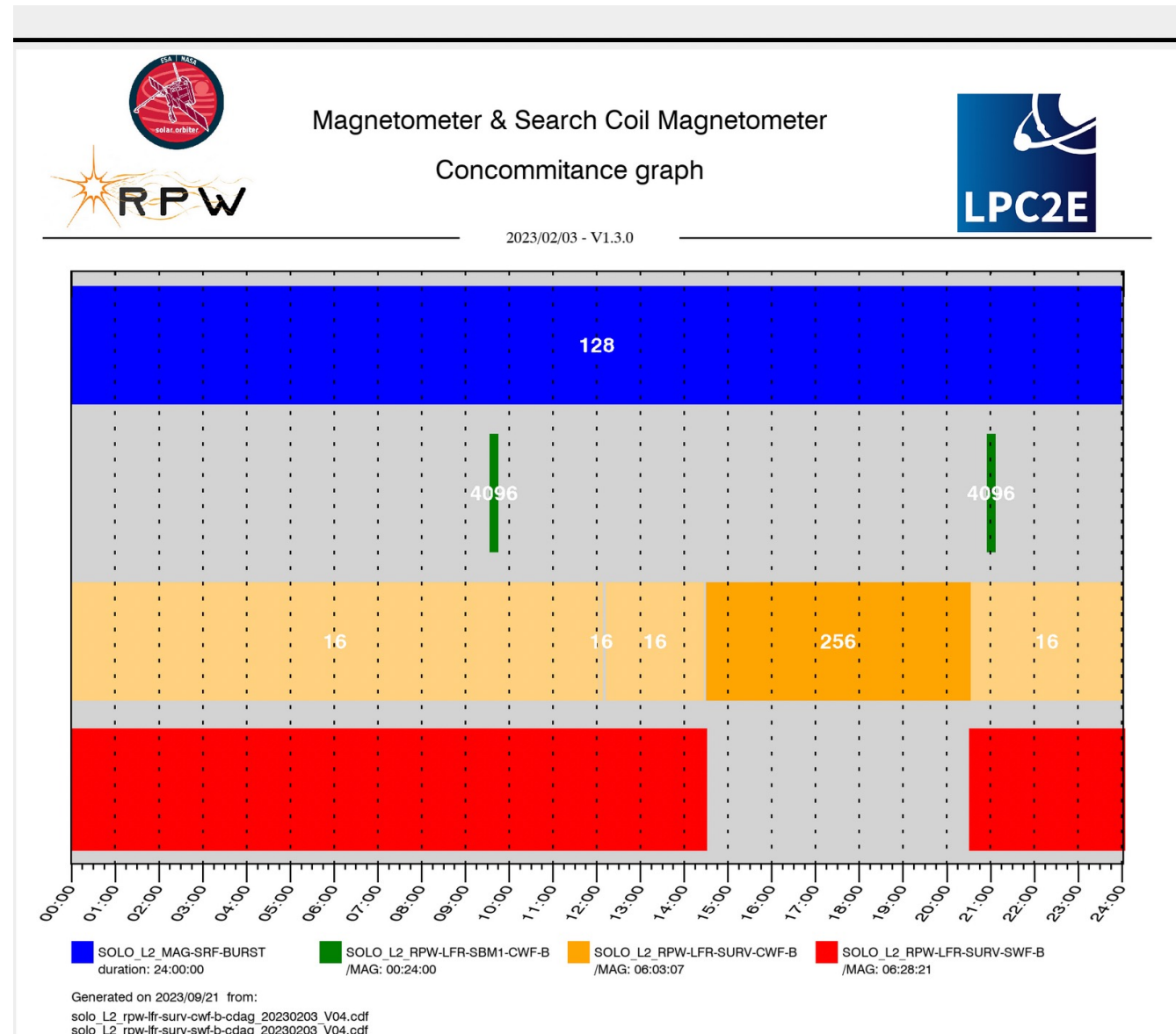


Mergeable SCM/MAG data 2020-2022:

LFR-SBM1 4096 Hz : 75 h
LFR-SURV-CWF 256 Hz : 5261 h
LFR-SURV-SWF 256 Hz : 1861 h

SCM & MAG Merging

- CWF & SWF never together
- Sbm1 & SWF can be together



Most relevant RPW / LFR Data Product

- RPW: one survey (normal) mode, two burst modes (SBM1, SBM2)
- Low Latency data, L0, L1, L2

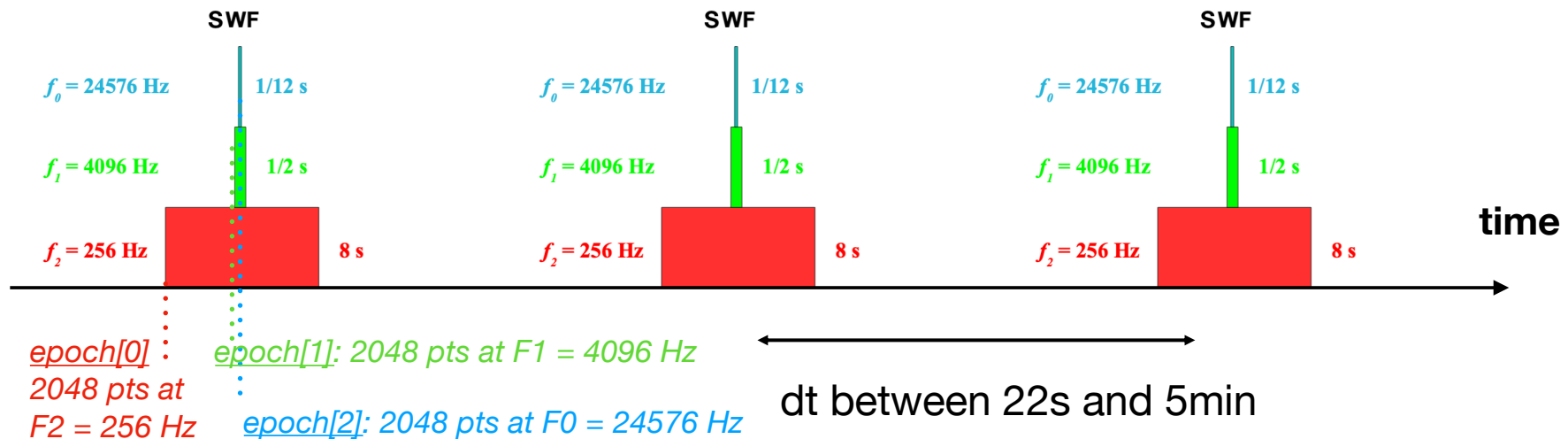
• WAVEFORMS

solo_L2_RPW-LFR_surv/sbm12_CWF-B,E :

continuous WF of B and V12 & V23 at 16 Hz and 256Hz sometimes

solo_L2_RPW-LFR_surv-SWF-B,E :

snapshot WF of 2048 pts at : 256Hz, 4096Hz, 24576Hz



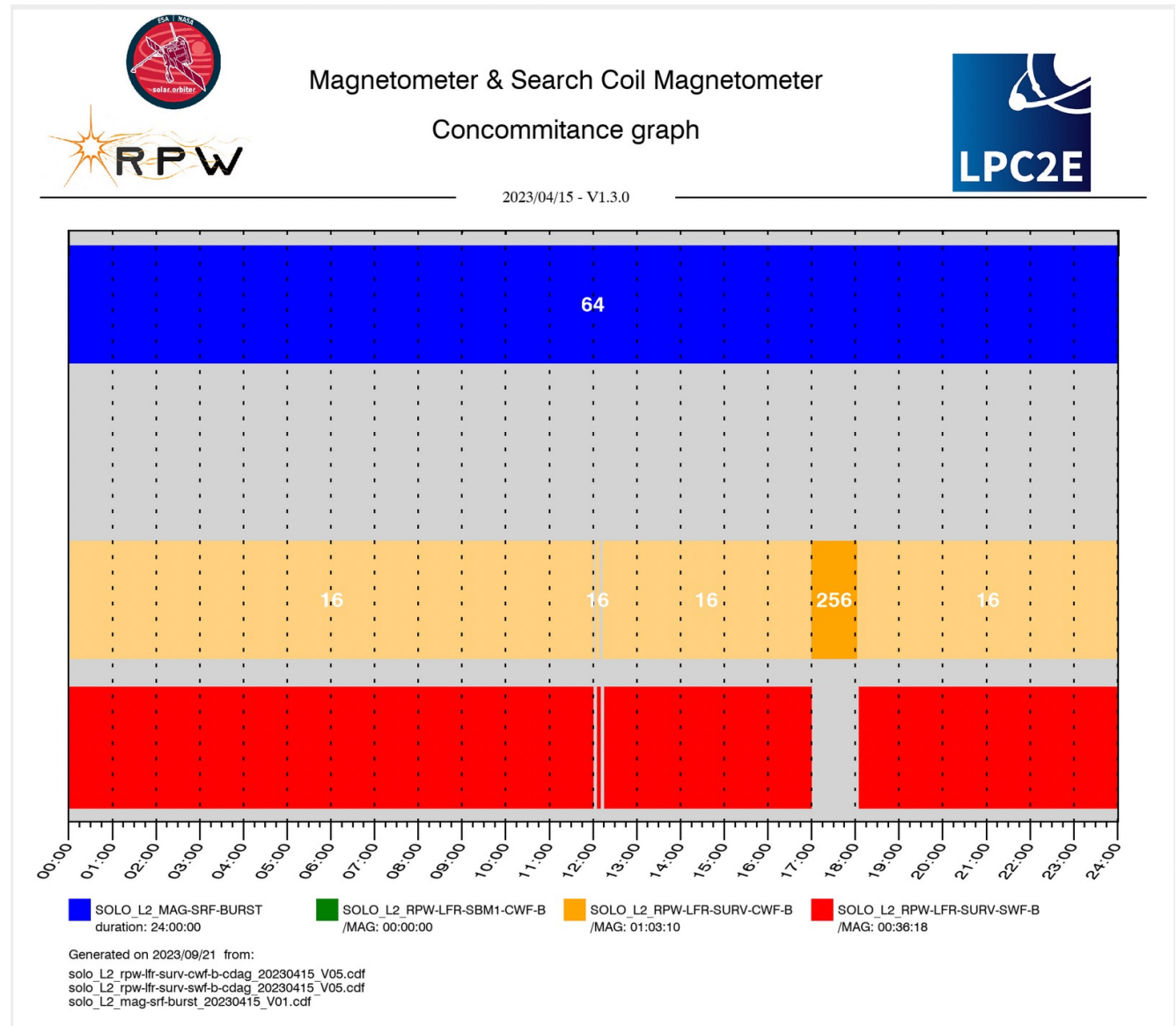
• SPECTRAL PRODUCTS

solo_L2_RPW-LFR_surv-BP1: Wave parameters at lower frequency resolution and better time coverage (every ~4s, df=8 Hz)

solo_L2_RPW-LFR_surv-ASM : time-averaged spectral matrices (every ~hour)

solo_L2_RPW-LFR_surv-BP2 : ASM at lower frequency resolution (every ~20s)

SCM & MAG Merging



- We are working on a merged data product
- Need some thoughts about which data product to merge

SCM & MAG merged file

- One file / day with only one sampling frequency 256 Hz,
 - made with CWF only
 - Made with both CWF and SWF
- All other sampling frequency are done over very short period of time
 - Exept sbm 1 at 4 KHz : typically 7 mn
- Changing f_{sampling} within a file ?