Solar Radio Spectrometer CALLISTO in Hurbanovo (Slovakia) – first results

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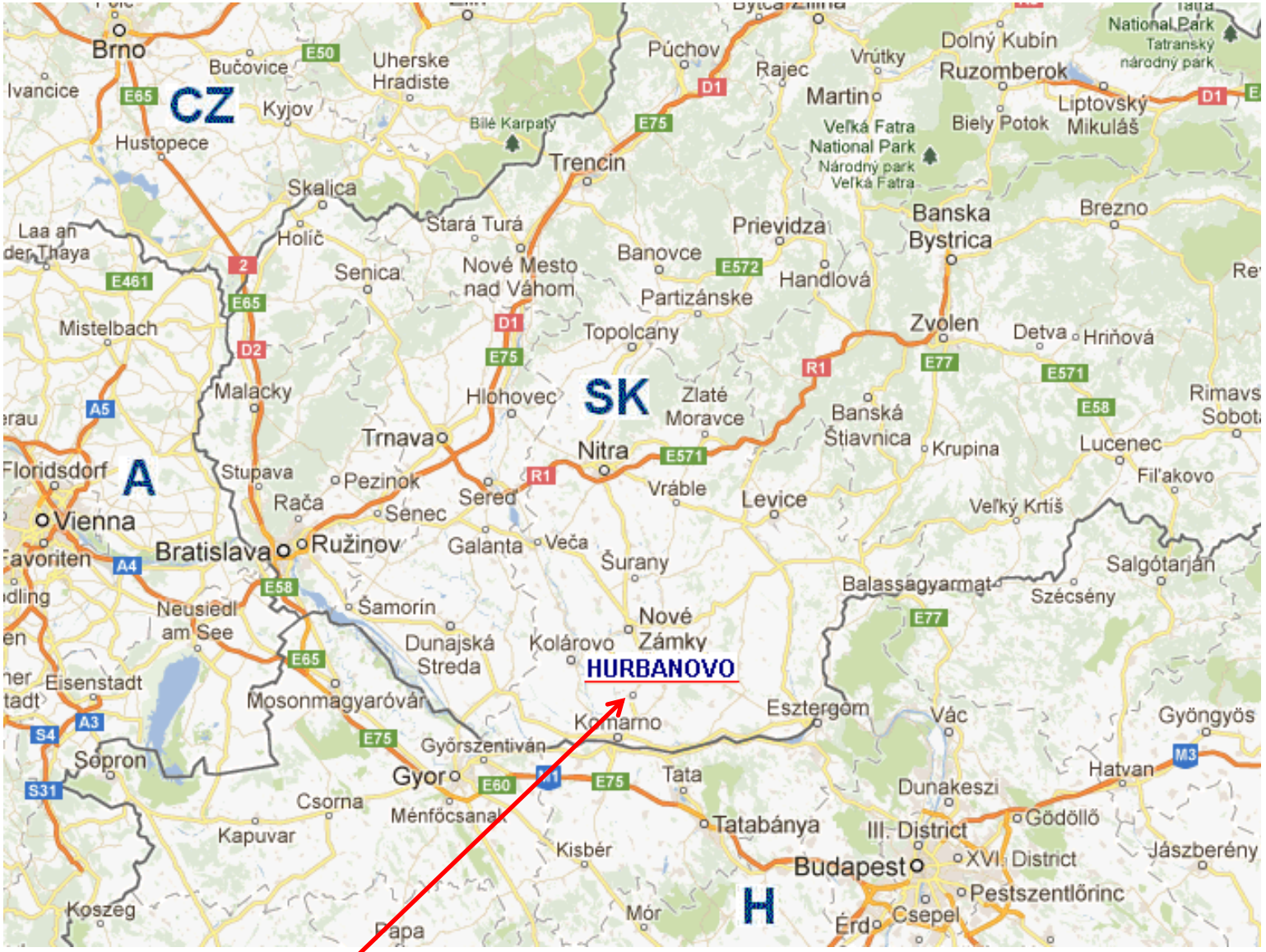
National ISWI Coordinator
T. Pintér, *Slovak Central Observatory Hurbanovo*

CLP-5130-2N Log Periodic Antenna

CALLISTO eC50 with amplifier

LOCATION:

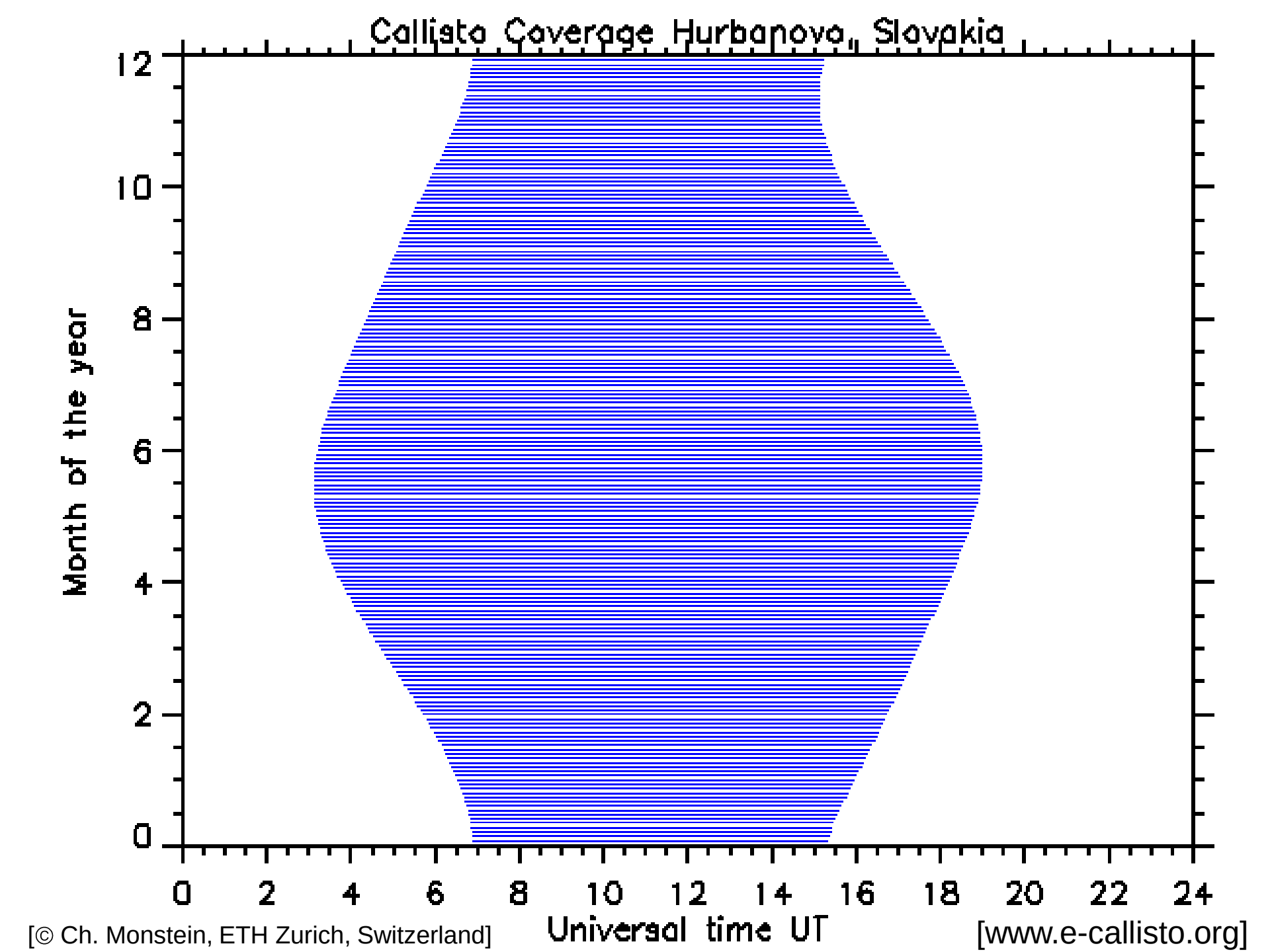


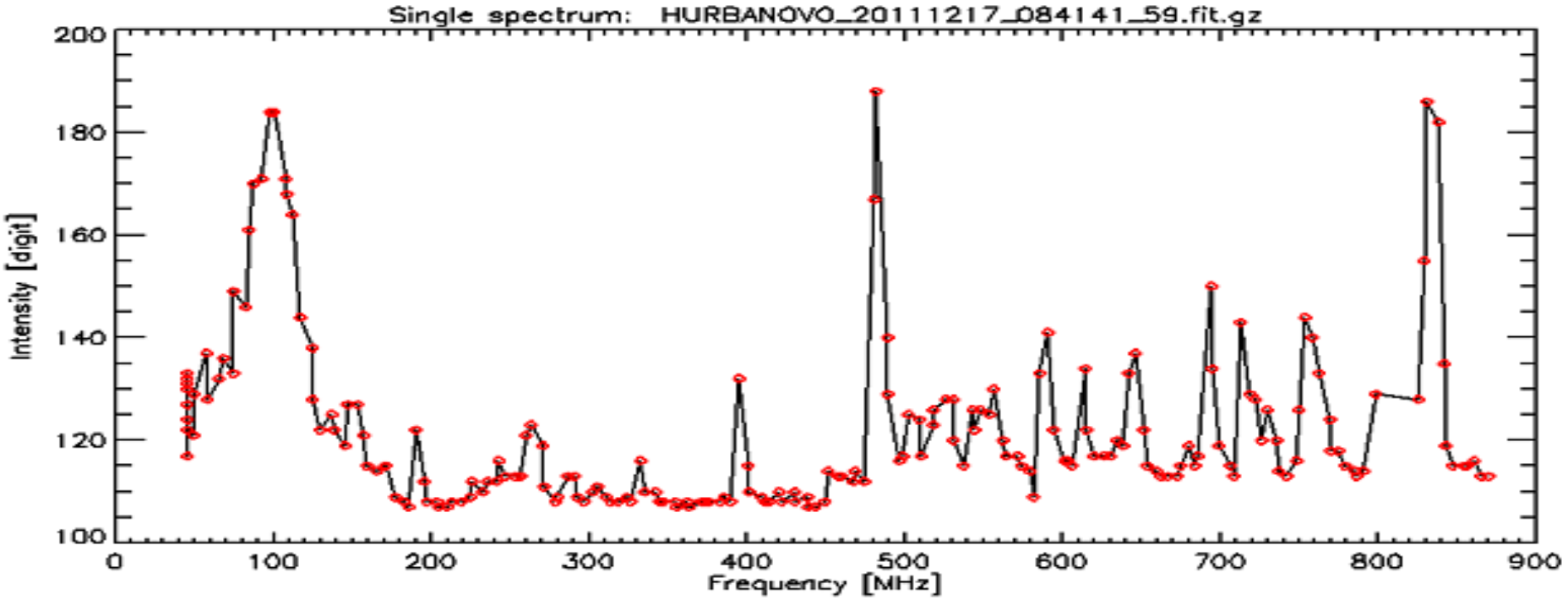
CALLISTO site is located in the Slovak Central Observatory (SCO) in Hurbanovo [N 47° 52′ 33.″28, E 18° 11′ 37.″93].

Antenna on a temporary stand

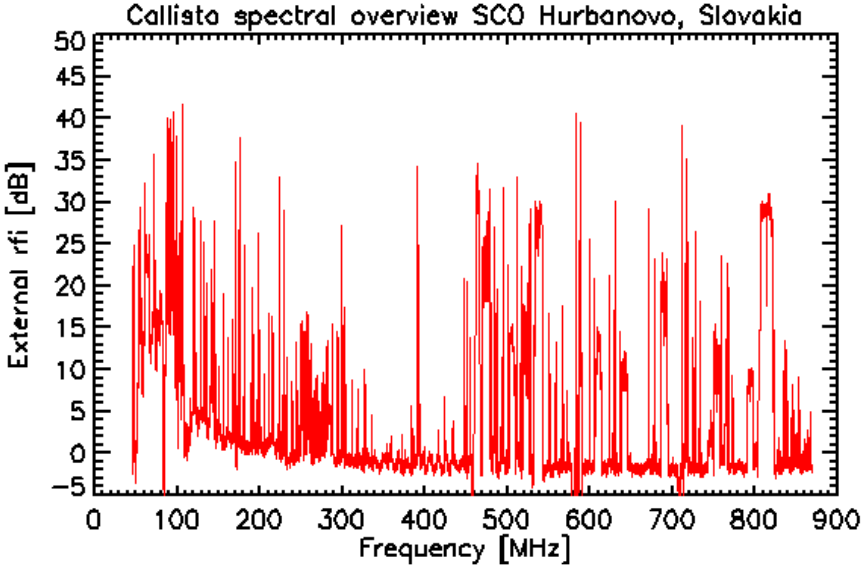
Software installation and first light observation

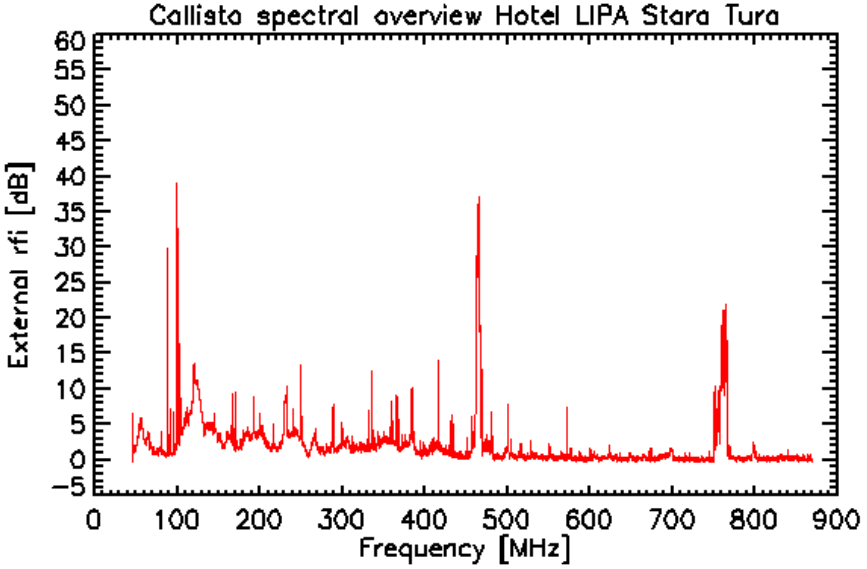
December 2011

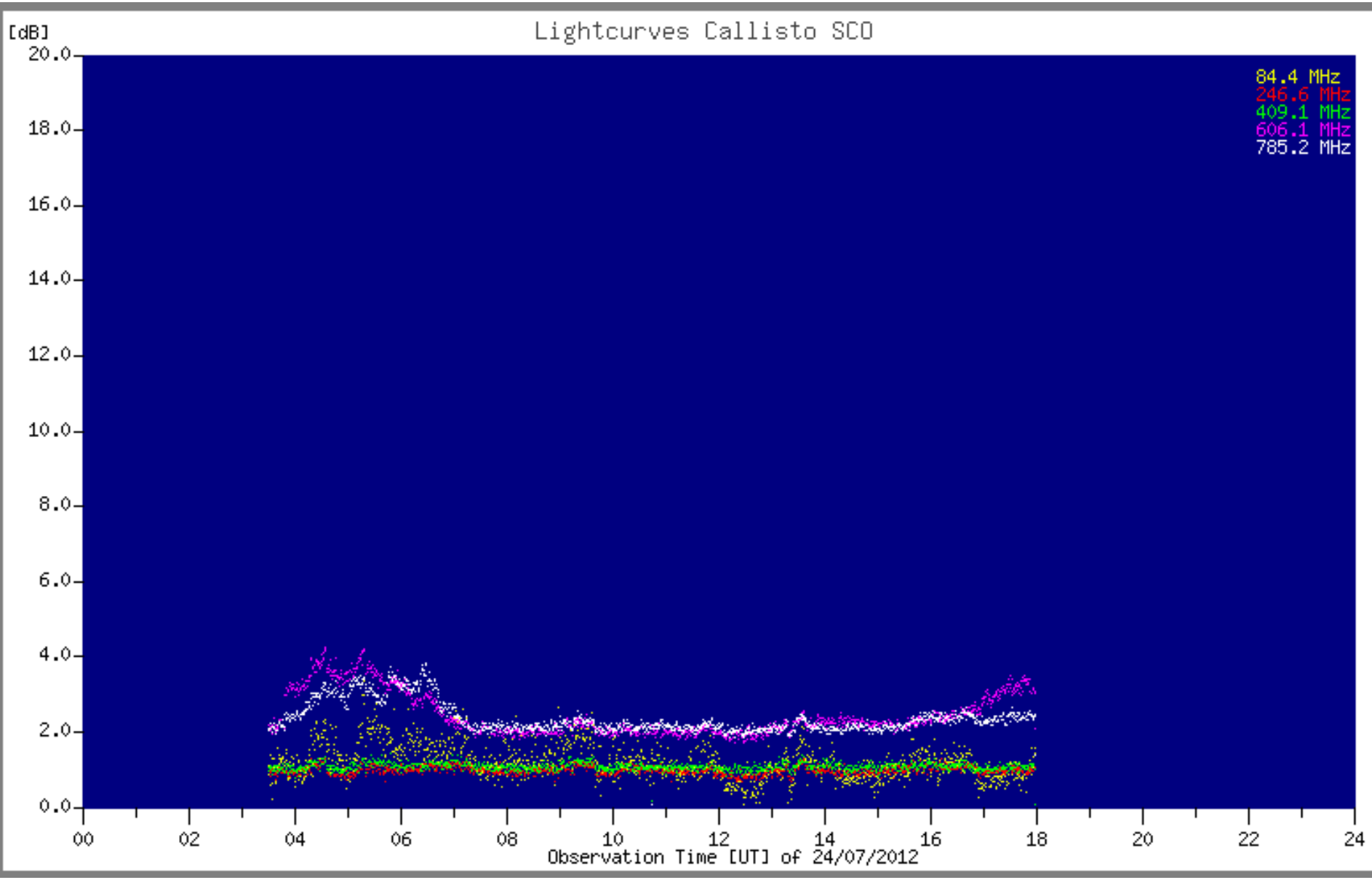

Callisto Coverage Hurbanovo, Slovakia
Month of the year
0
2
4
6
8
10
12
0
2
4
6
8
10
12
14
16
18
20
22
24
Universal time UT
[© Ch. Monstein, ETH Zurich, Switzerland]
[www.e-callisto.org]



Radio frequency interference (RFI)
in Hurbanovo [lowland plain area] and in Stará Turá [hilly area]



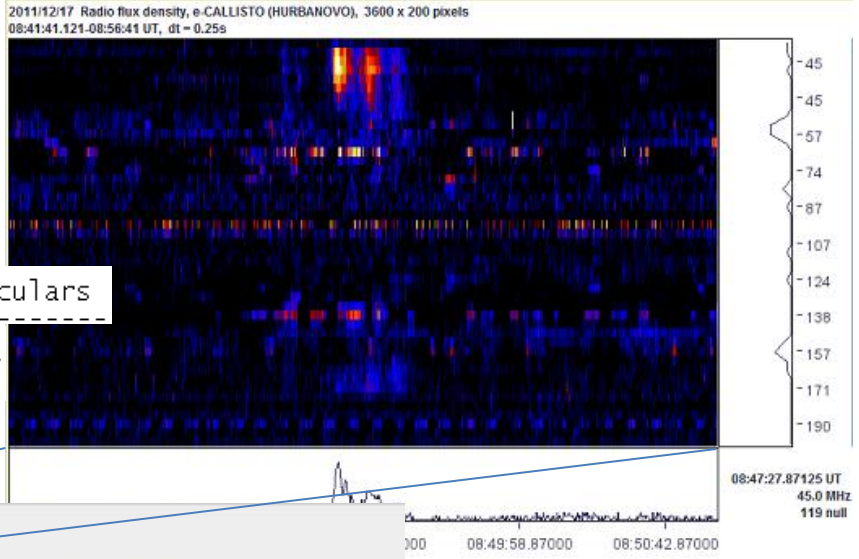


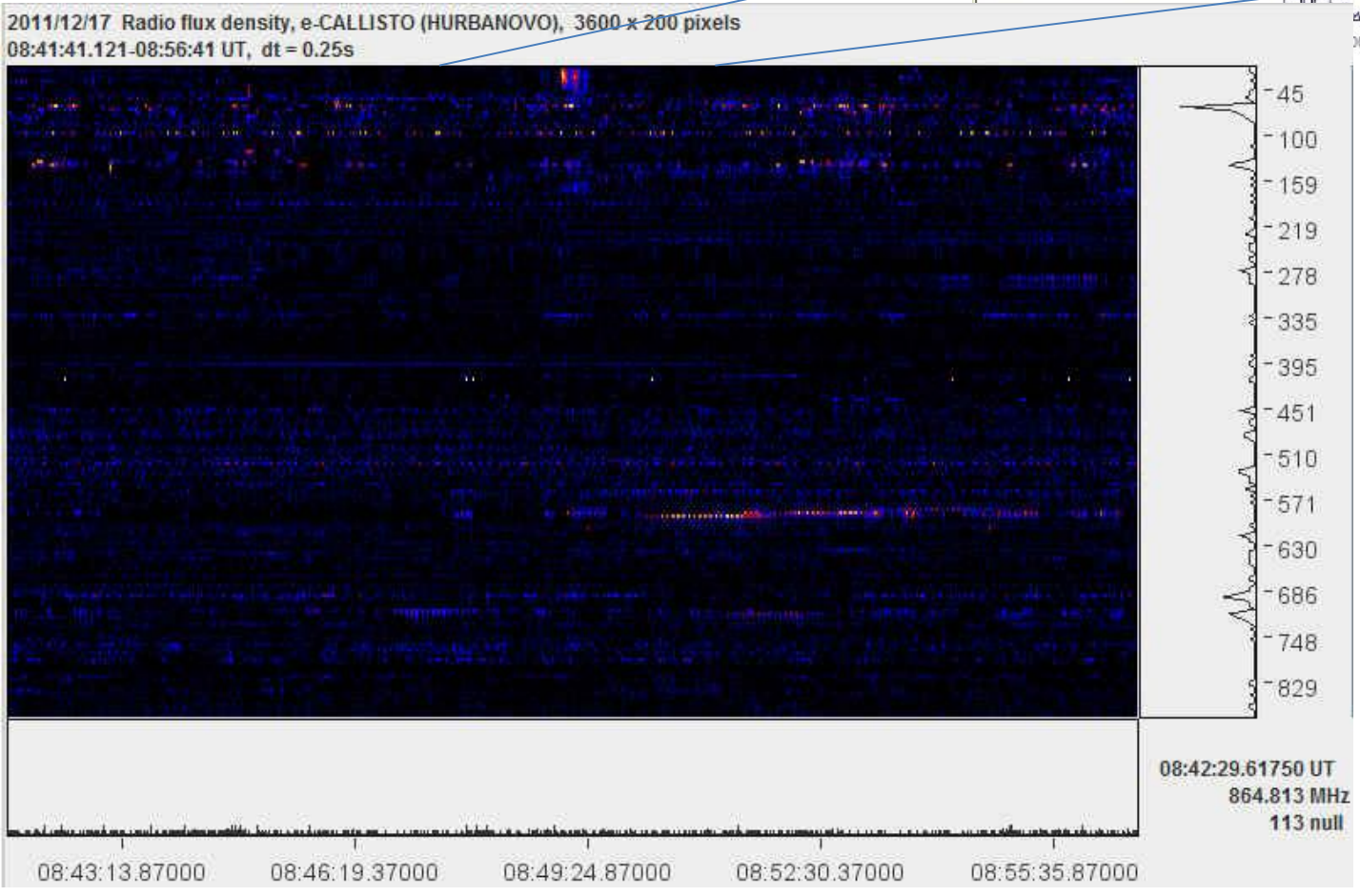


Lightcurves – Callisto SCO

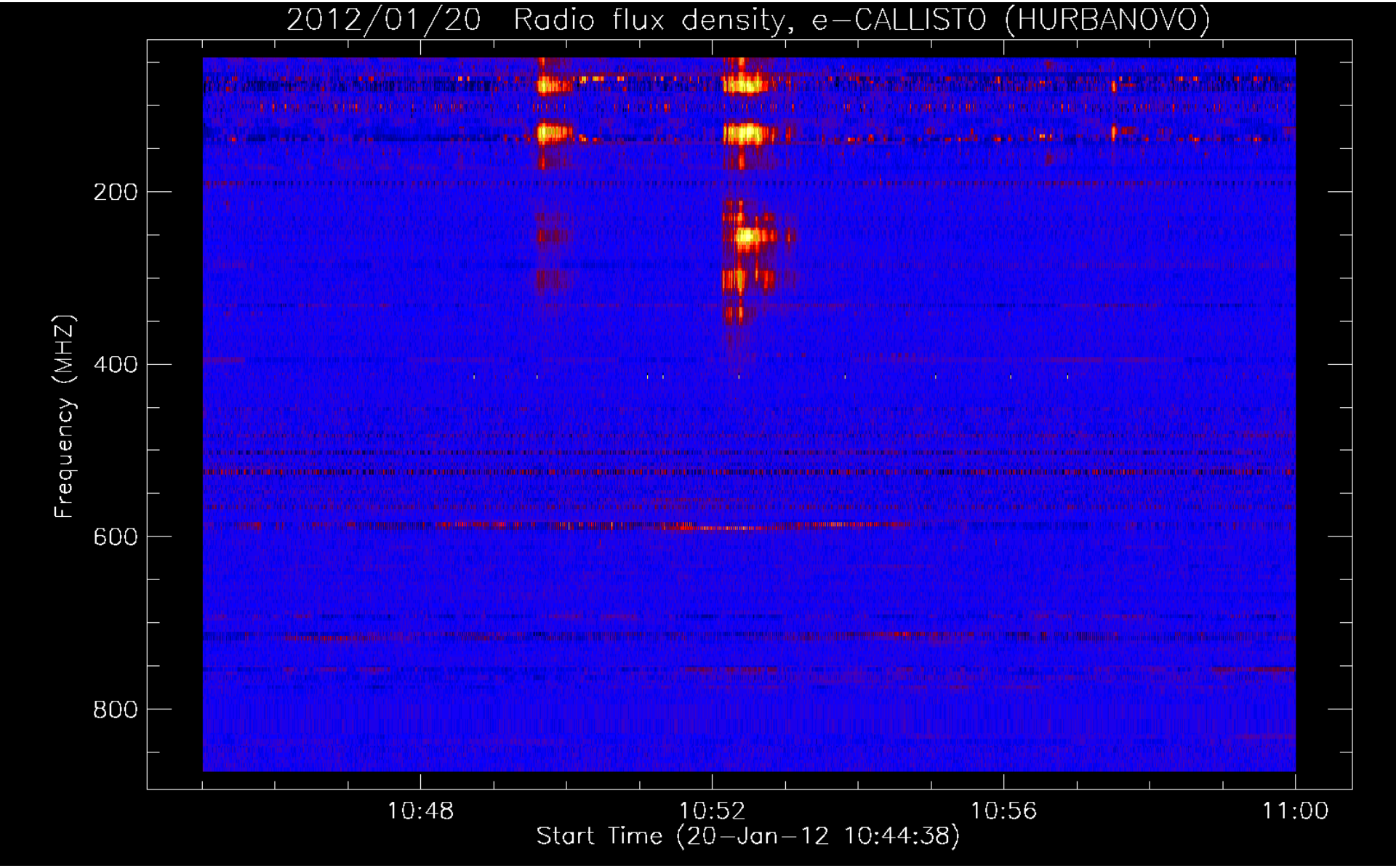
First light solar flare on 17 December 2011

#Event	Begin	Max	End	Obs	Q	Type	Loc/Frq	Particulars
670 +	0848	////	0849	SVI	C	RSP	074-180	III/1
670 +	0849	0849	0849	SVI	G	RBR	245	210



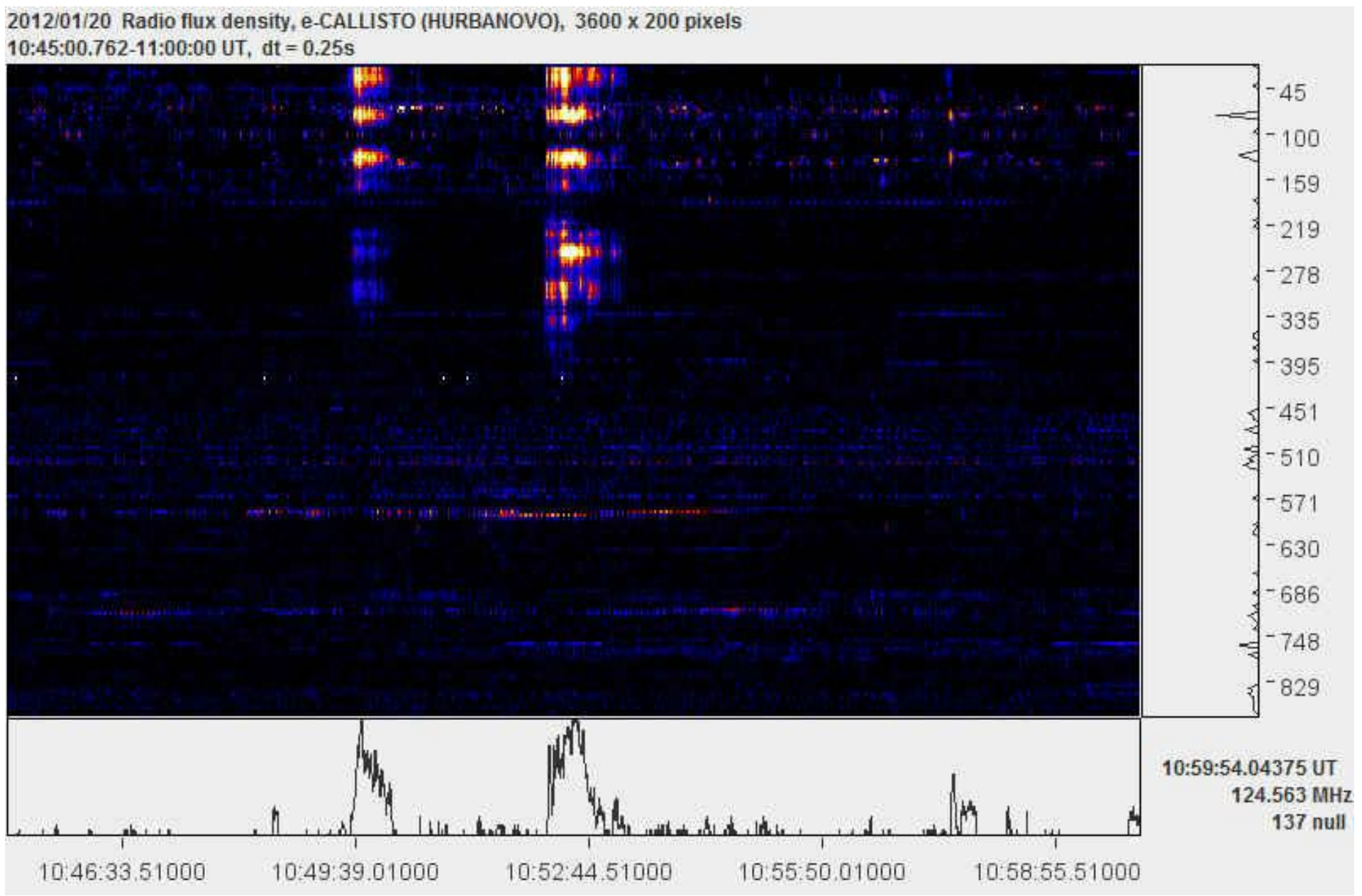


Gastronomy

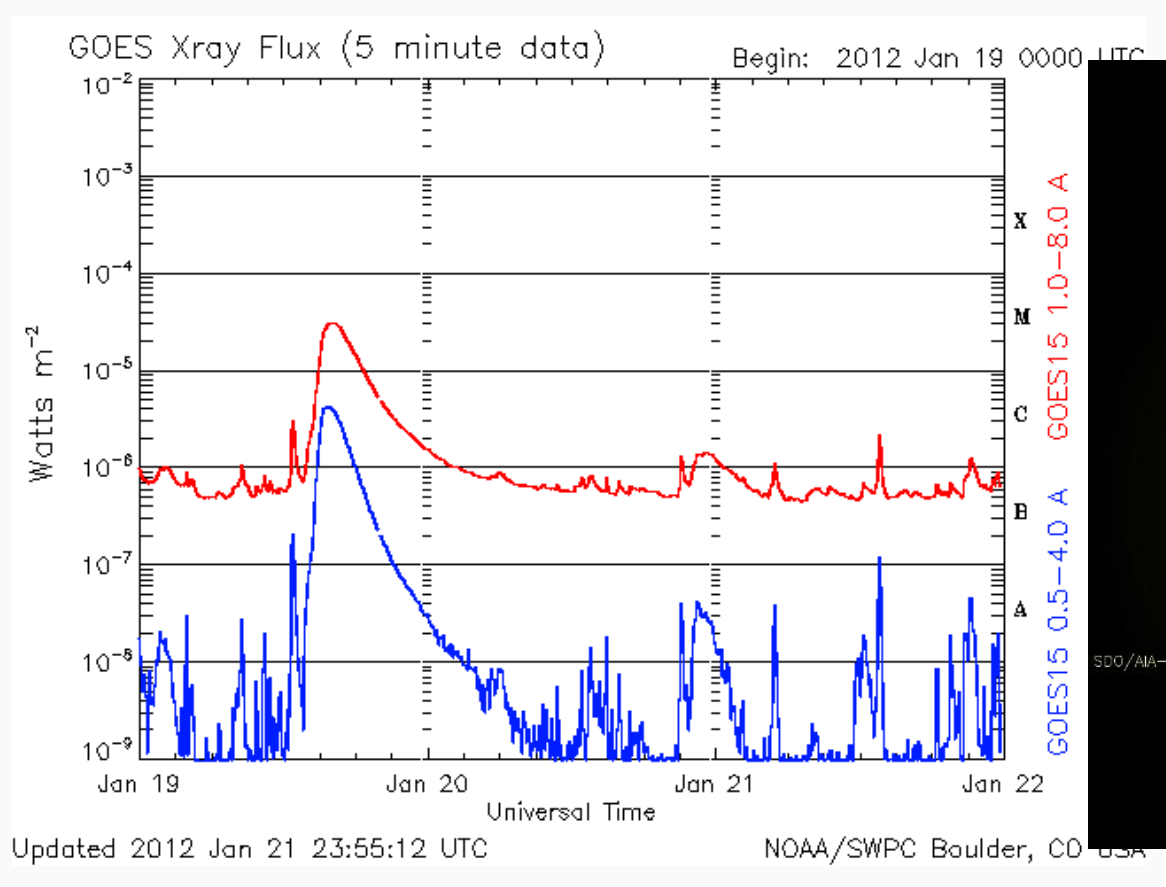


Radio bursts of type III (electrons) on 20 January 2012 between 10:49 and 10:53 UT.

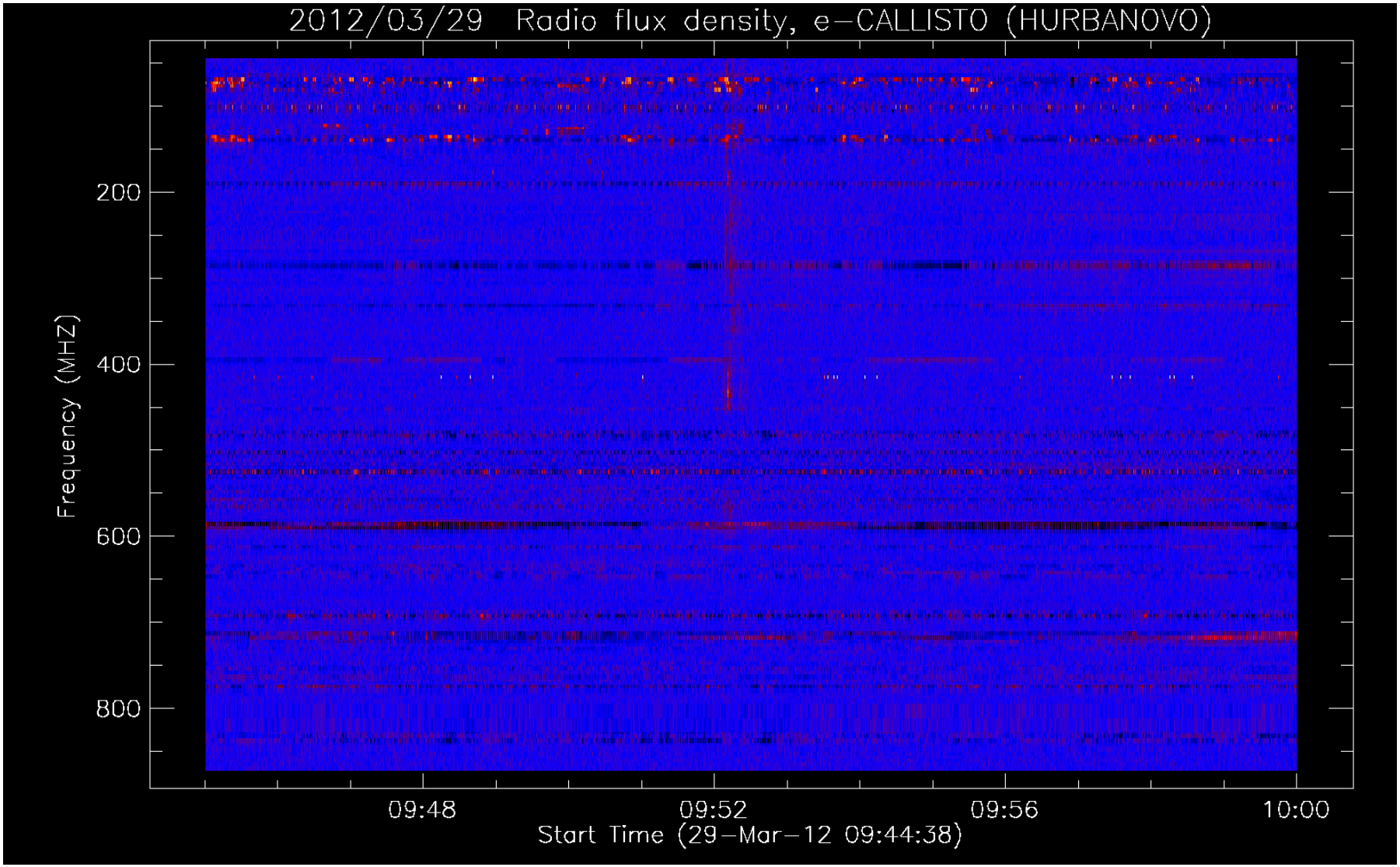
[http://soleil.i4ds.ch/solarradio/callistoQuicklooks/]



7480 +	1049	1052	1053	SVI	G	RBR	245	12000
7480 +	1049	////	1057	SVI	C	RSP	025-180	III/2
7480	1050	1050	1050	SVI	U	RBR	610	220
7480 +	1052	1052	1052	SVI	G	RBR	410	300

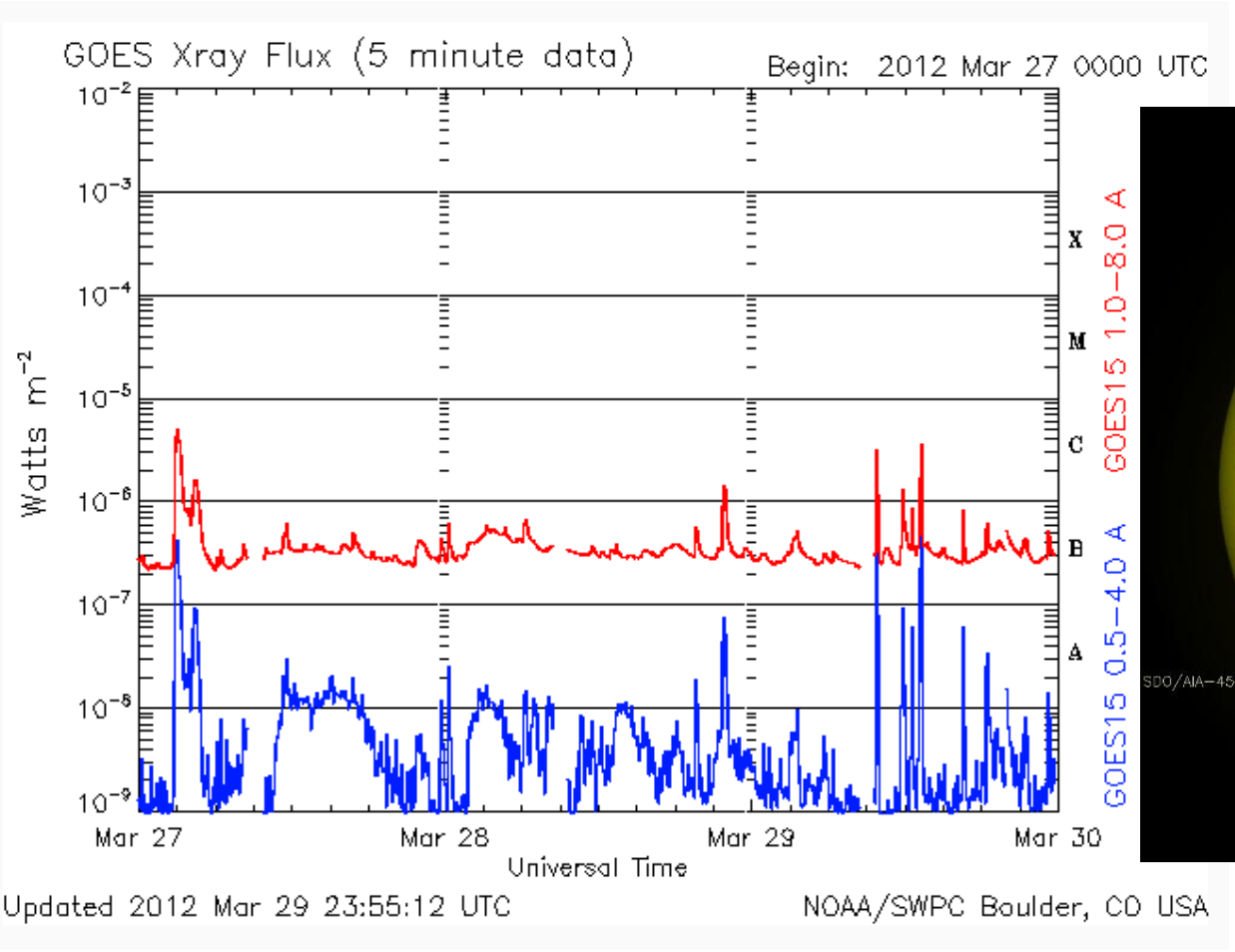


#Event	Begin	Max	End	Obs	Q	Type	Loc/Frq	Particulars		Reg#
7360	1344	1605	1750	G15	5	XRA	1-8A	M3.2	2.7E-01	1402

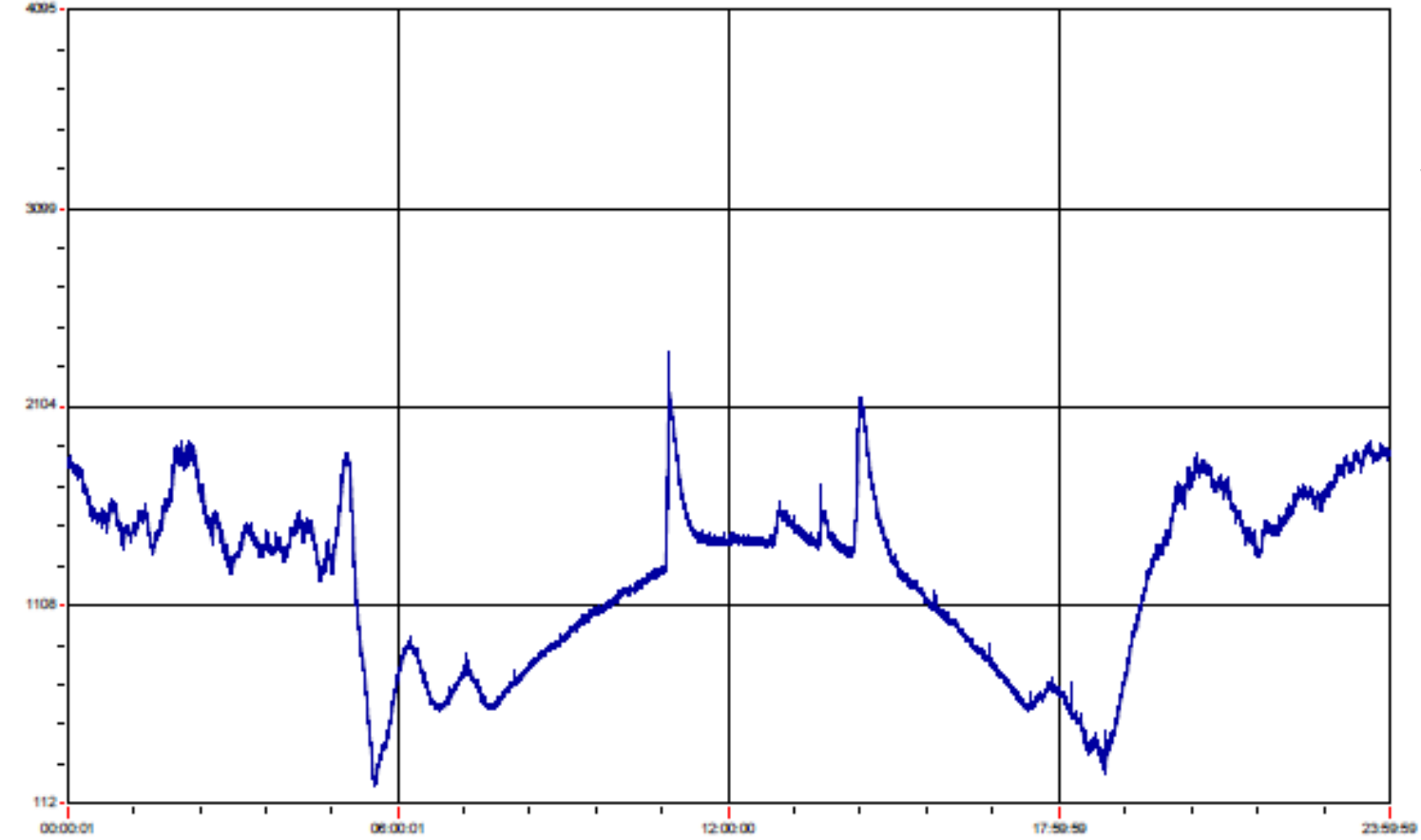


Radio bursts of type III (electrons) on 29 March 2012 at 9:52 UT.

#Event	Begin	Max	End	Obs	Q	Type	Loc/Frq	Particulars		Reg#
4640 +	0830	0953	0955	G15	5	XRA	1-8A	C7.7	1.3E-03	1451
4650 +	0952	////	0952	SVI	C	RSP	025-180	III/1		


GOES Xray Flux (5 minute data)
Begin: 2012 Mar 27 0000 UTC
Watts m-2
10-2
10-3
10-4
10-5
10-6
10-7
10-8
10-9
X
M
C
B
A
GOES15 1.0–8.0 A
GOES15 0.5–4.0 A
Mar 27
Mar 28
Mar 29
Mar 30
Universal Time
Updated 2012 Mar 29 23:55:12 UTC
NOAA/SWPC Boulder, CO USA

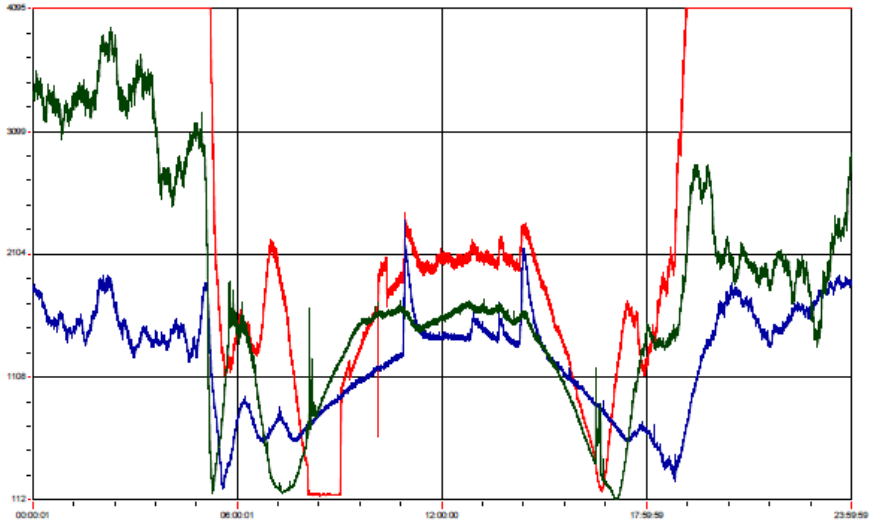

SDO/AIA-4500 20120329_230008
aia.lmsal.com

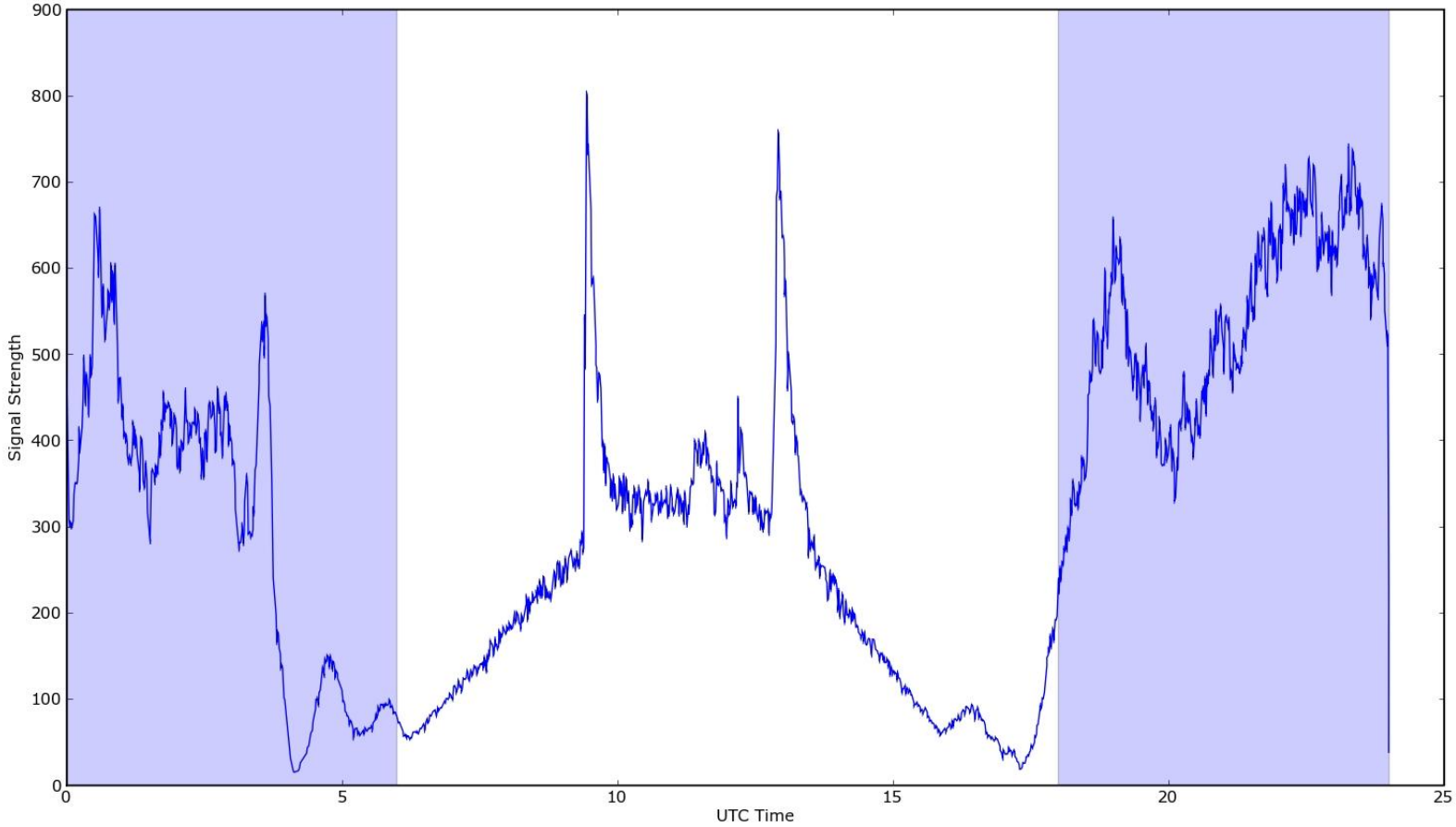


SID Monitor
-SCO Hurbanovo,
-HWU 20.9 kHz

UT

29 march 2012





29 March 2012

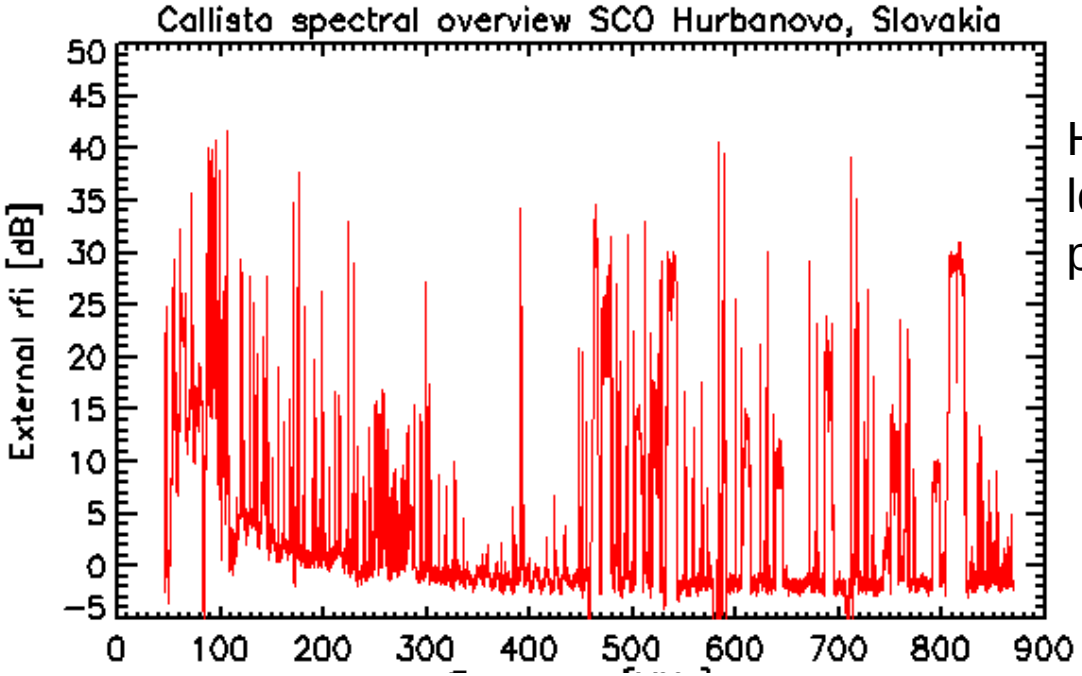
SuperSID – SCO Hurbanovo, HWU 20.9 kHz

Near future:

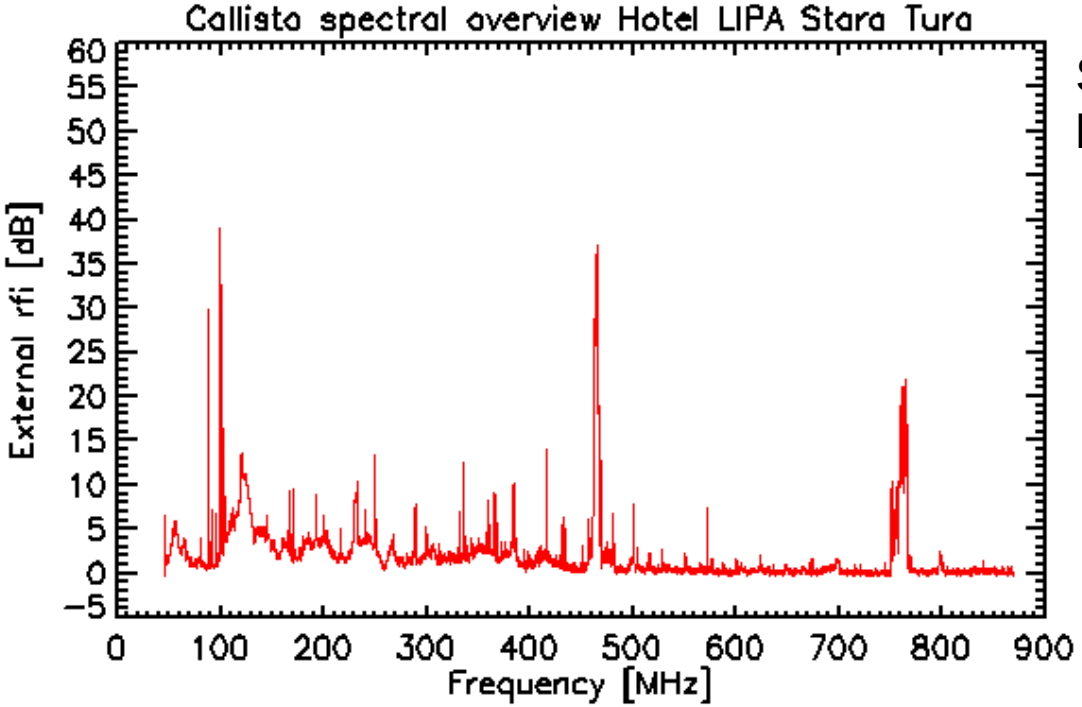
. stable stand
. rotator (for better sensitivity to observe morning and evening events
. tracking controller

Further future:

- **Other observing site in a hilly or montainous area → low RFI**
- **a dish antenna**
- **scientific analysis of solar radio spectrograms ...**



HURBANOVO
lowland
plain area



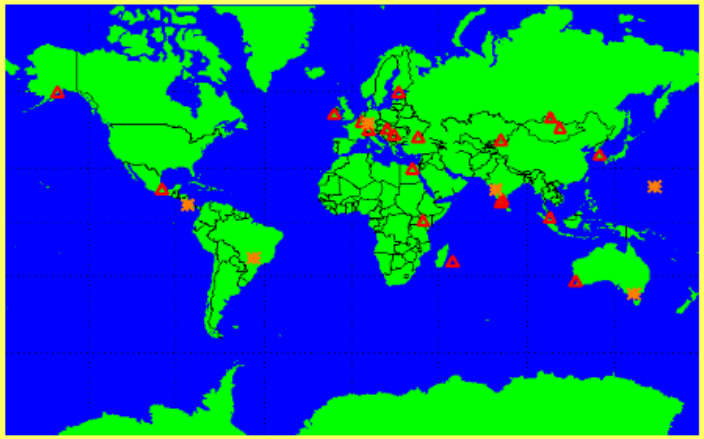
STARÁ TURÁ
hilly area

www.e-callisto.org :

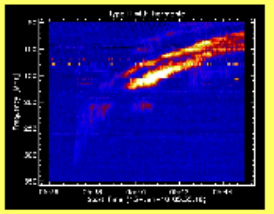
e-Callisto

International Network of Solar Radio Spectrometers

e-Callisto logo



IDL-map of current distribution of Callisto instruments in Sept. 2012.



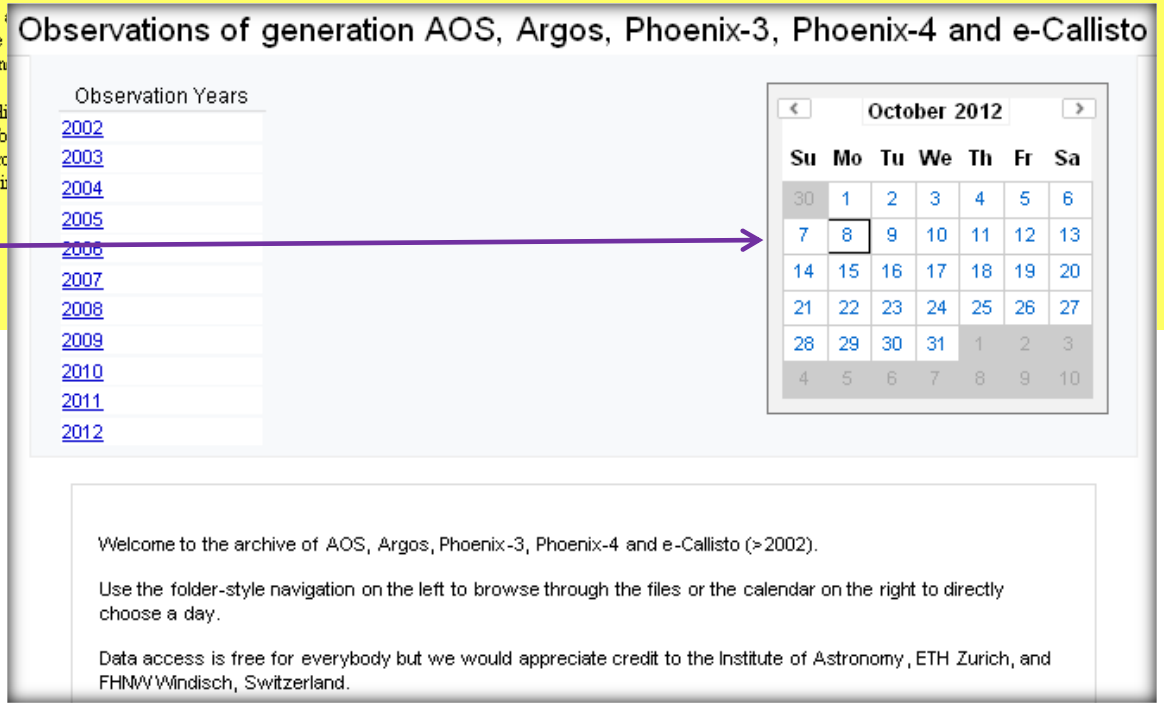
Type II burst (Ooty)

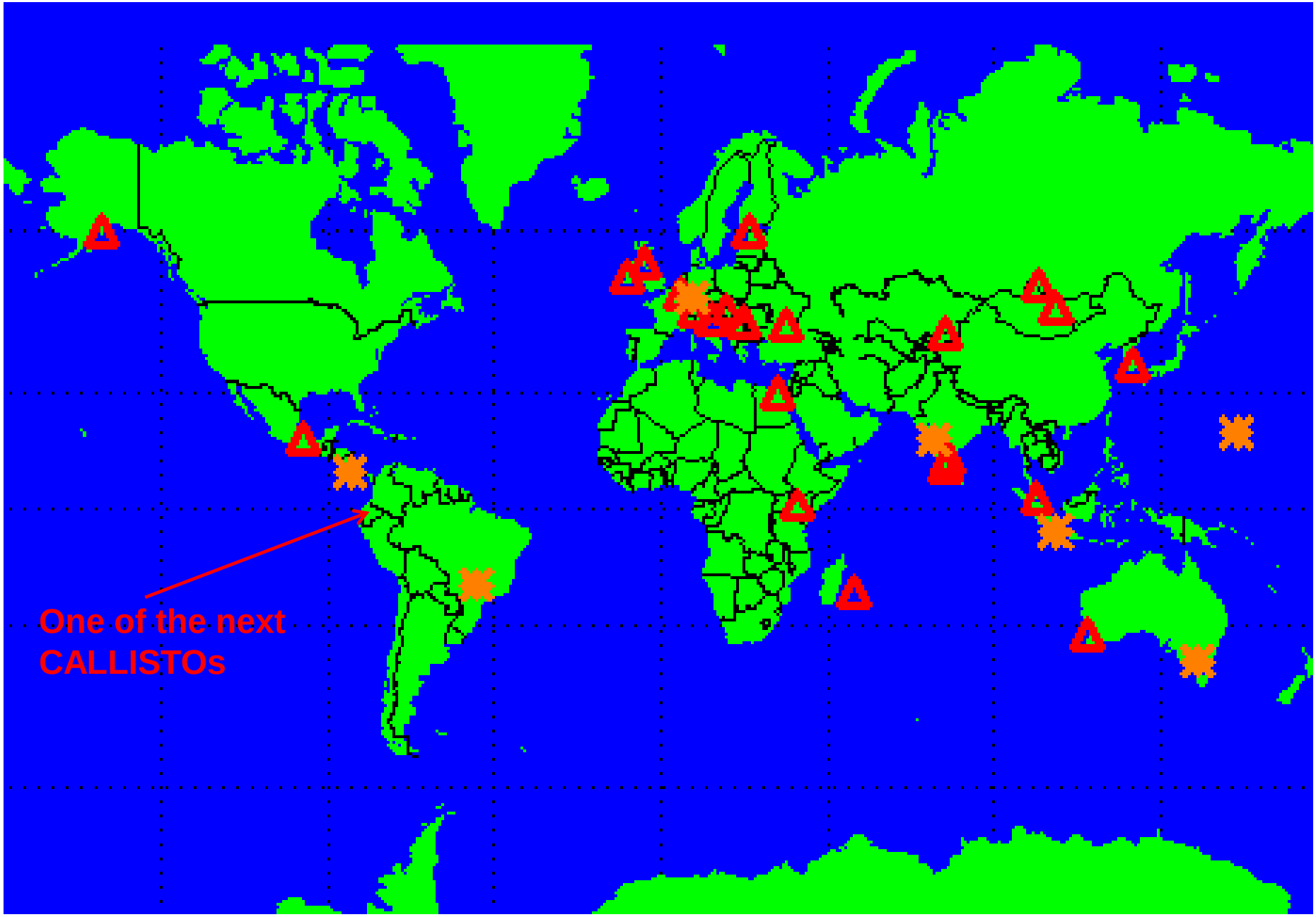
Page Revol

The CALLISTO spectrometer is a programmable heterodyne receiver build by ETH Zürich, Radio
tuner CD1316 having a frequency resolution of 62.5 KHz. The data obtained from CALLISTO are
is 0.25 sec at 200 channels per spectrum (800 pixels per second). The integration time is 1 msec an
routines were written.
Several of the CALLISTO instruments have already been deployed, including spectrometers in Indi
Melbourne), one in Hawaii, one in Mexico, one in Costa Rica, two in Brazil, three in Mauritius, fo
Pune, one in Sri Lanka one in Ahmedabad, one in Trieste one in Slovakia and two in Belgium. Thr
day through all the year. All Callisto spectrometers together form the e-Callisto network. Callisto i
any range by switching-in a heterodyne up- or a down-converter.

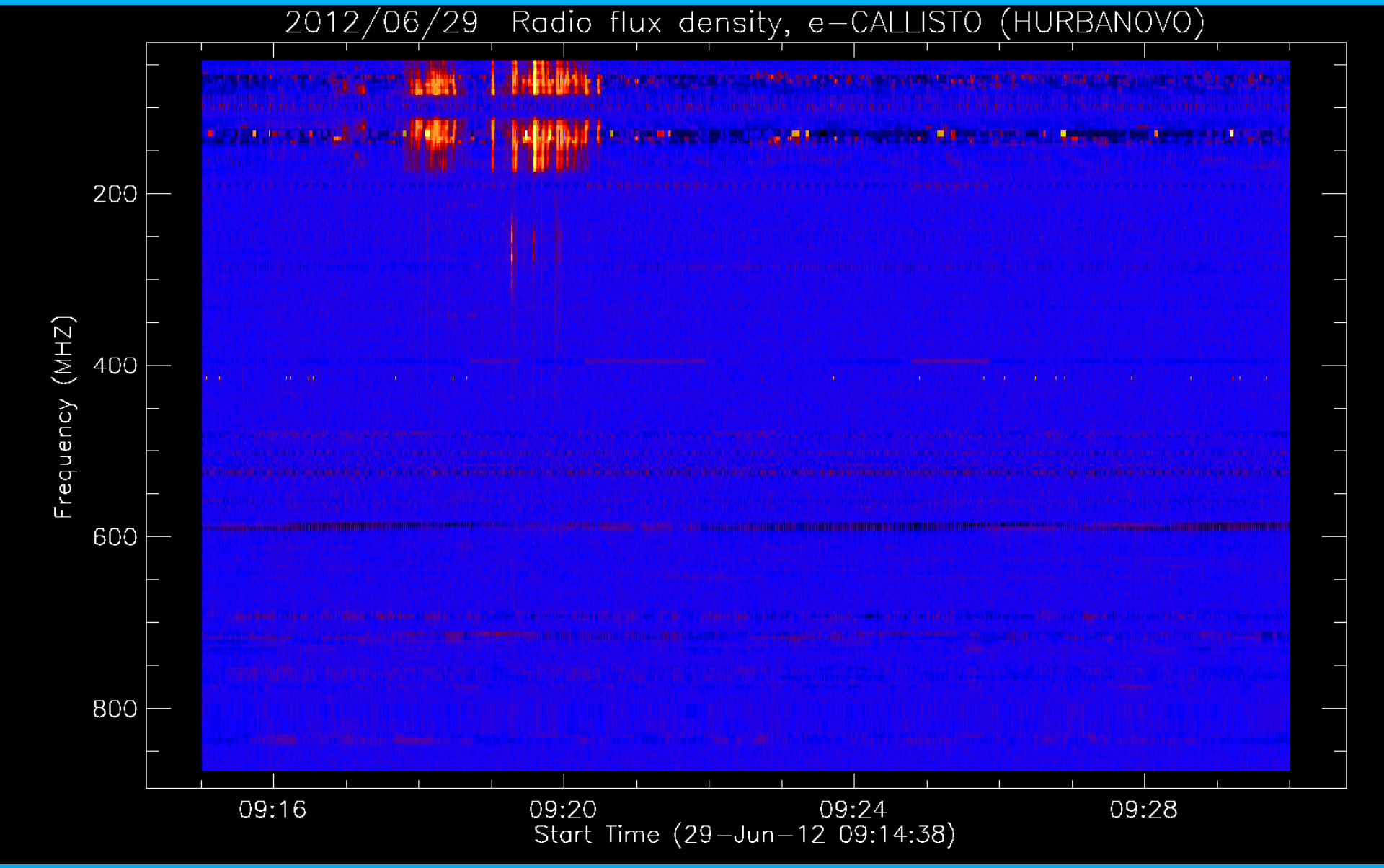
- Data and QuickLooks >2002
- Direct data access (without Quickviews)

- Current coverage maps of e-Callisto





The latest map (October 6, 2012) with distribution of CALLISTO spectrometers. Ch. Monstein just set up a CALLISTO in the University in Glasgow (UK).


2012/06/29 Radio flux density, e-CALLISTO (HURBANOVO)
Frequency (MHZ)
200
400
600
800
09:16
09:20
09:24
09:28
Start Time (29-Jun-12 09:14:38)

Sunspots and Coronal Bright Points Tracking using a Hybrid Algorithm of PSO and Active Contour Model

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[2] UNINOVA, Campus da FCT/UNL, 2829-516 Caparica, Portugal; Emails: {ehs, rar}@ca3-uninova.org, jmf@uninova.pt
3 Institute of Experimental Physics SAS, Košice, Slovak Republic, Email: rybansky.milan@gmail.com

ABSTRACT

[illegible]

1. INTRODUCTION

[illegible]

2. AUTOMATIC DETECTION AND TRACKING ALGORITHM

[illegible]

3. ILLUSTRATIVE RESULTS

3. 1. SUNSPOTS

SOHO/MDI:

Fig. 1. Initial snake on first image (2010/08/27)

Fig. 2. Detection and tracking process of the selected sunspot.

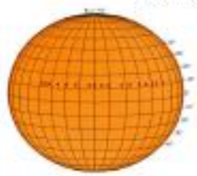


Fig. 3. Sunspot transition from 2010/8/27 till 2010/9/4 with overlaid grid.

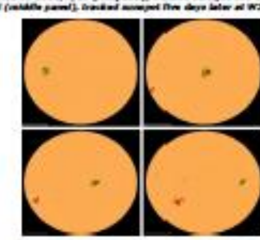


Fig. 4. Tracking a sunspot group in SOHO MDI images, 21 till 27 of October 2003.

SDO/HMI:

Fig. 5. Initial snake on first image (2011/06/18).

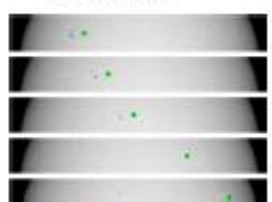


Fig. 6. Tracking of a sunspot in SDO HMI images from 18 to 24 of June 2011.

SMART (Hida Obs.):

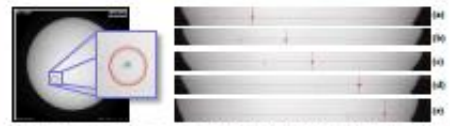


Fig. 7. Initial snake on first image (left panel, 15 September 2011) and detection and tracking process of the selected sunspot for 6 days (right panel).

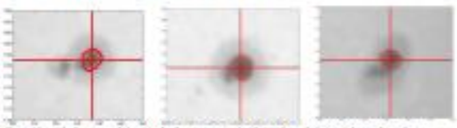


Fig. 8. Detailed views of the tracked sunspot in the fig.7, from left to right: a, b and e. The red contour delineates the snake and the center of cross represents the center of sunspot.

3. 2. CORONAL BRIGHT POINTS

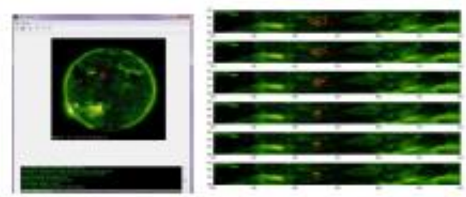


Fig. 9. Initial snake on first image (left panel, 16 June 2010) and detection process of the selected CBP (right panel).

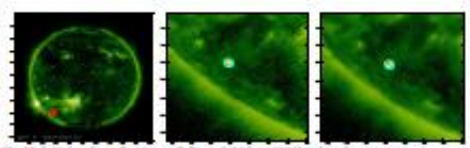


Fig. 10. Initial snake on first image (left panel, 16 June 2010) and tracking process of the selected CBP (middle and right panels).

5. DISCUSSION AND CONCLUSIONS

[illegible]

Acknowledgements

[illegible]

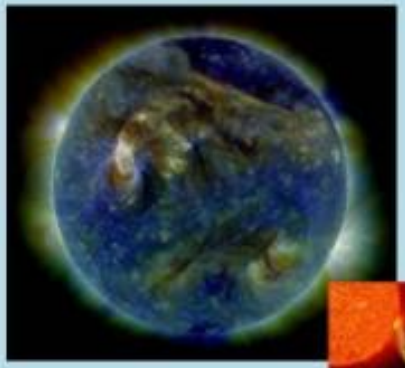
REFERENCES

[illegible]

2011 ISWI Summer School in Space Science

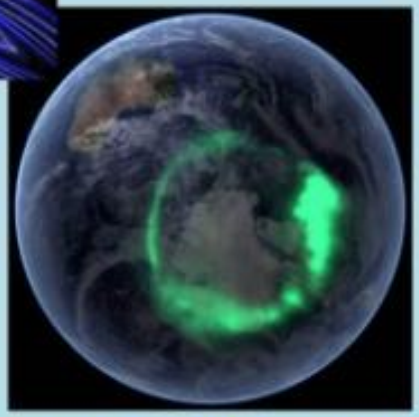
21 – 27 August 2011, Tatranská Lomnica, Slovakia

- **Organiser:** International Space Weather Initiative
- **Co-organisers:** Centre of Space Research: Space Weather Influences, Tatranská Lomnica
  Slovak Central Observatory, Hurbanovo



- **School directors:** N. Gopalswamy (Nat.Gopalswamy@nasa.gov) and I. Dorotovič (ivan.dorotovic@suh.sk)
- **Local Organising Committee:**

I. Dorotovič (chair of the LOC), E. Hodálová, SCO, Hurbanovo · J. Koza, A. Kučera, AI of SAS, Tatranská Lomnica · K. Kudela, R. Langer, IEP of SAS, Košice · M. Lorenc, T. Pintér, SCO, Hurbanovo · F. Valach – GPI of SAS, Geomagnetic Obs., Hurbanovo



- **Invited lecturers:**

Ch. Amory-Mazaudier, M. Bárta, M. Danielides, J. M. Davila, I. Dorotovič, J. Dudík, W. Dziembowski, R. Erdélyi, N. Gopalswamy, A. Hanslmeier, P. Heinzel, R. Huth, F. Jansen, F. Kamalabadi, J. Koza, A. Kučera, K. Kudela, J. Laštovička, E. D. Lopez, D. Maia, D. Odstrčil, D. Pérez-Suárez, R. A. Ribeiro, M. Sobotka, F. Valach

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