

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: 1 March 2018

Object: Jupiter – Io-B

Observer: Unattended

Start – Time UT:	0958	Planetary K-index:	1
Jupiter Altitude (deg):	31.9	Jupiter Azimuth (deg):	177.3
Jupiter CML:	147.32	Jupiter Io Phase:	068.22
Jupiter RA (hr/min):	15:23	Jupiter Dec (hr/min):	-17:20
Hour Angle (hr/min):	-00:10	Polarization	RCP
Sun Altitude (deg):	-22.1	Sun Azimuth (deg):	081.7
Sun RA (hr/min):	22:42	Sun Dec (hr/min):	-08:15

End – Time UT:	1041		
Jupiter Altitude (deg):	31.5	Jupiter Azimuth (deg):	189.3
Jupiter CML:	173.02	Jupiter Io Phase	074.02
Hour Angle (hr/min):	00:33		
Sun Altitude (deg):	-14.1	Sun Azimuth (deg):	088.8

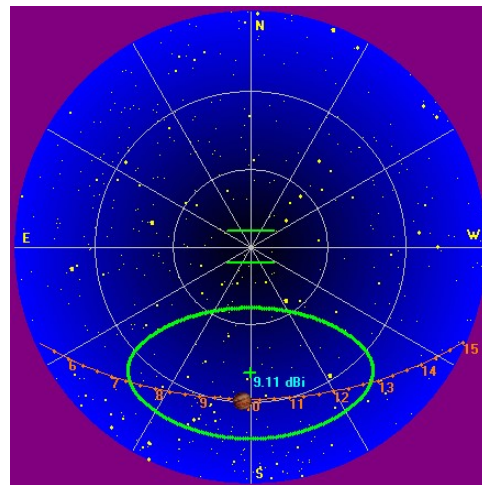
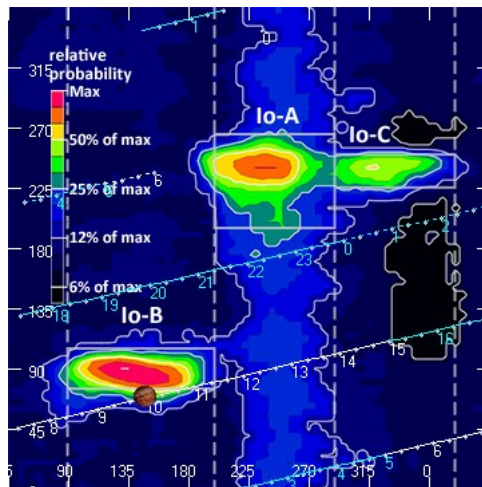
Observatory Configuration

Spectrograph Receiver	Antenna	Polarization	System Loss	Multicoupler	Multicoupler port	Calibrated
FSX-8S	TFD	RCP/LCP	7.7 dB	#1 LCP #2 RCP	Port 2 +3dB Port 2 +3dB	Twice daily
FSX-2	LWA	RCP/LCP manual select		N/A	N/A	N/A
SDRPlay RSP2	TFD	RCP	-7.70 dB	#1 LCP	Port 3 +3dB	Twice daily
SDRPlay RSP2	TFD	LCP	-7.70 dB	#2 RCP	Port 3 +3dB	Twice daily
SDRPlay RSP1	Jove dipoles	Linear	-3.19 dB	N/A	N/A	N/A
JOVE II	Jove dipoles	Linear	-3.19 dB	N/A	N/A	02/20/2018
JOVE 1	TFD	RCP	-7.70 dB	N/A	N/A	
JOVE 1	TFD	LCP	-7.70 dB	N/A	N/A	

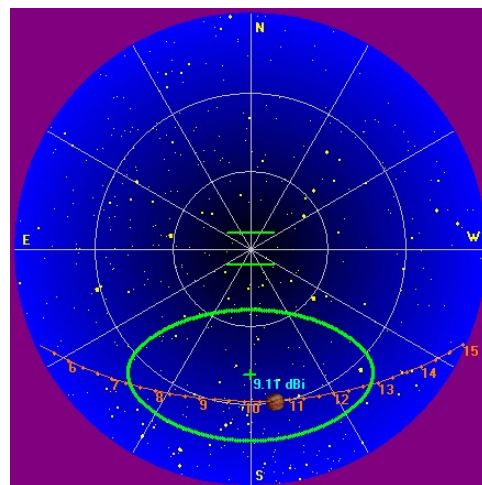
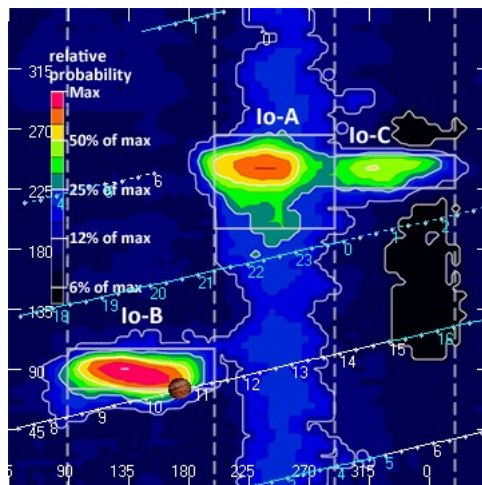
JOVE dipoles phased for 2017-2018 season

LWA antenna orientation for observation: 67.5 degrees

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Beginning of Pass



End of Pass

HNRAO Observing Log

40.673181 N – 80.437885 W
EN90sq

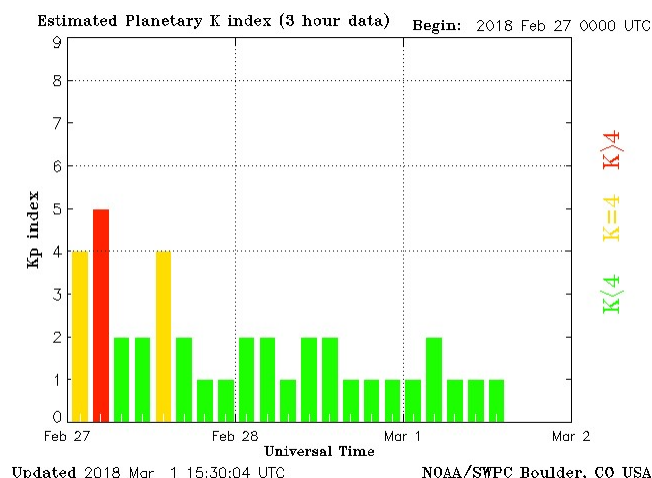


MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360	38	RH	Late	
Io-C	(300-20)	(225-260)	36	RH&LH	Late	Also called "third source"
non-Io-C	300-360	0-360	32	RH&LH	Late	Voyager info

<https://www.radiosky.com/jupmodes.html>

Modulation Lanes Designations*	
L - Burst	S-Burst
L1 – No lanes	S1 – No lanes
L2 - Positive slope	S2 – Positive slope
L3 - Cross hatched	S3 – Cross hatched
L4 – Negative slope	S4 – Negative slope

*Modulation Lanes in the Dynamic Spectra of Jovian L-bursts, J.J. Riihimaa, Astron. & Astrophys. 4, 1970



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



This was an unattended observation of an RCP Io-B storm lasting about 40 minutes, starting at about 17 MHz and ending near 23 MHz.

Emissions were not consistent through the duration of the event with the strongest S-bursts in a grouping at the beginning and another at the end. In between were groupings of weaker bursts. This storm consisted of virtually all S-bursts. The N-event at 1023 UT appears to be a combination of both S-bursts and L-bursts.

There were S-burst modulation lanes, of type S2, present. The measurements appear in a table at the end of this report.

S-bursts recorded with SkyPipe and the Radio JOVE receiver and the linear polarization JOVE dual dipole combination peaking at 578 kK. SkyPipe chart at the end of the report.

SDRPLay RSP1/JOVE Dipoles also recorded this event. Linear polarized, Faraday lanes were very apparent.

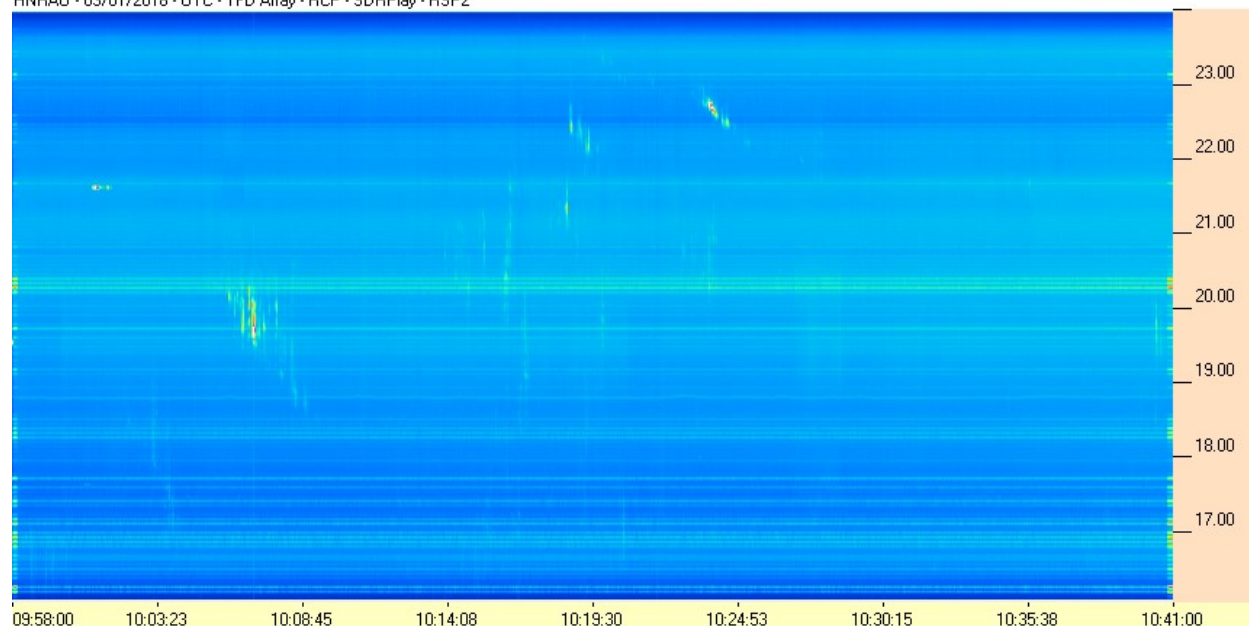
At the end of the report, there is a comparison of the SkyPipe record and the Spectrograph record of a single S-burst at 1006:51 UT. The calibrated SkyPipe record shows the burst to have an equivalent antenna temperature of 564 kK. The corresponding time and S-burst grouping is shown in the Spectrograph record.

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

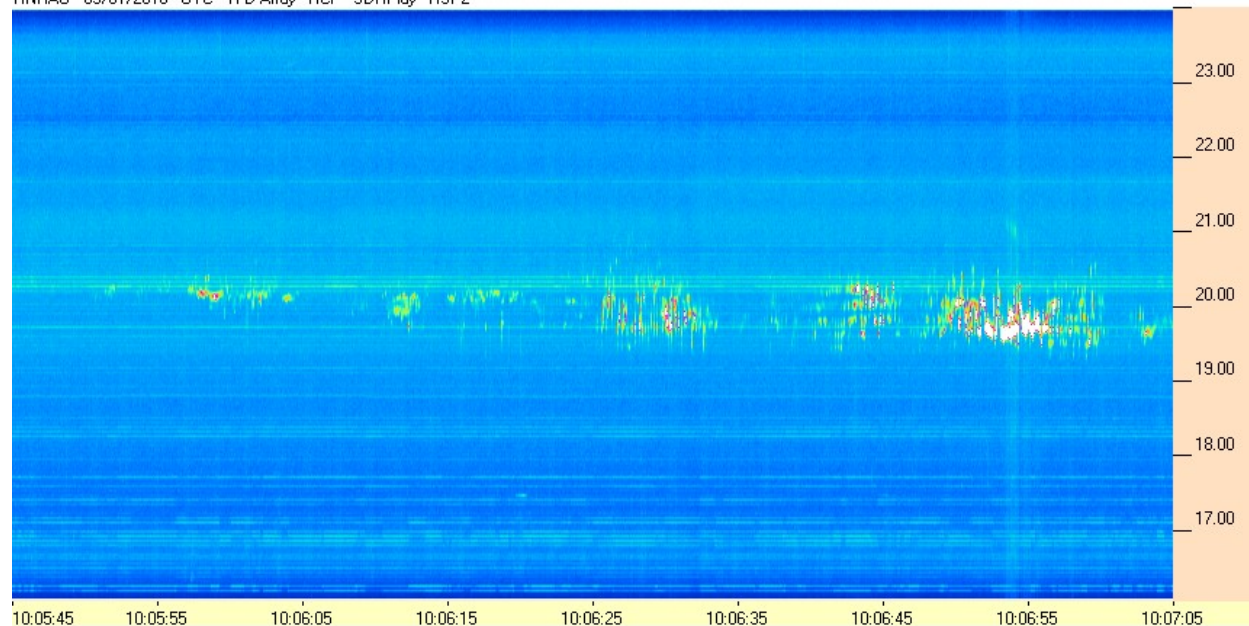


SDRPlay RSP2/TFD Array (RCP)

HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



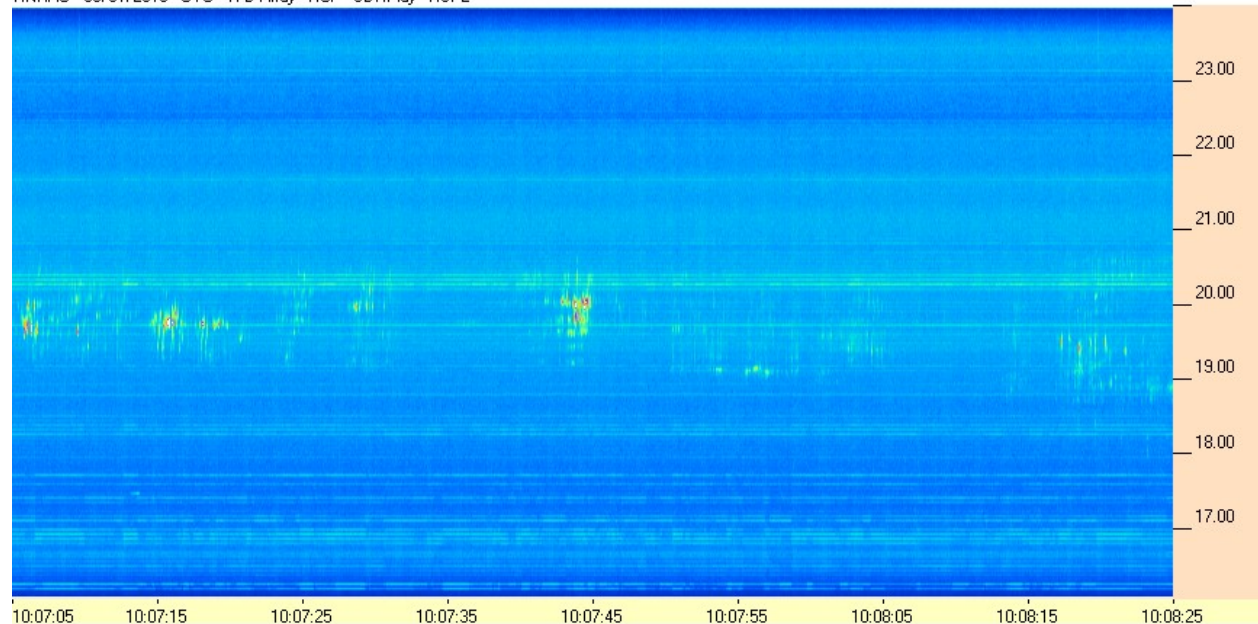
HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



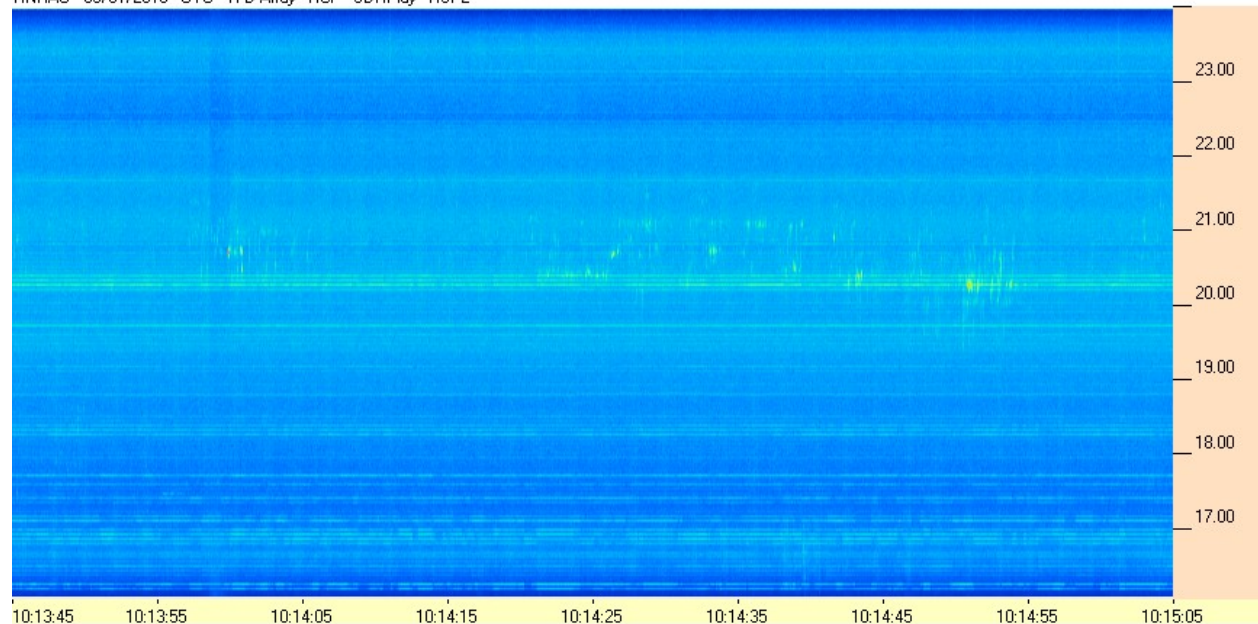
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



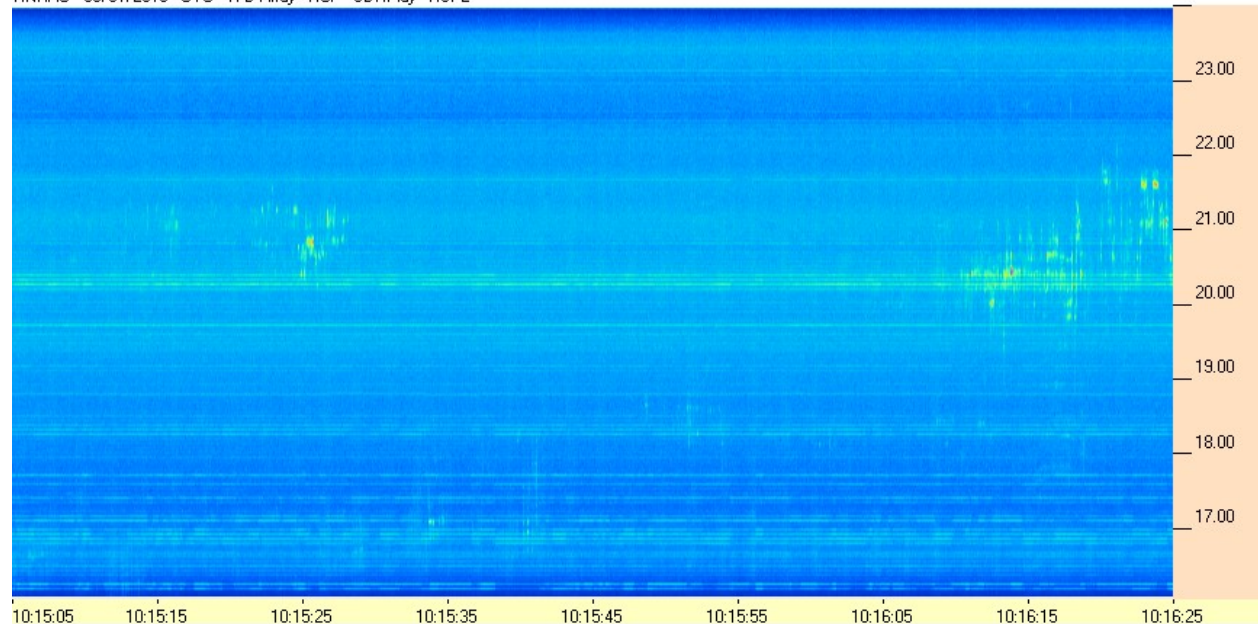
HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



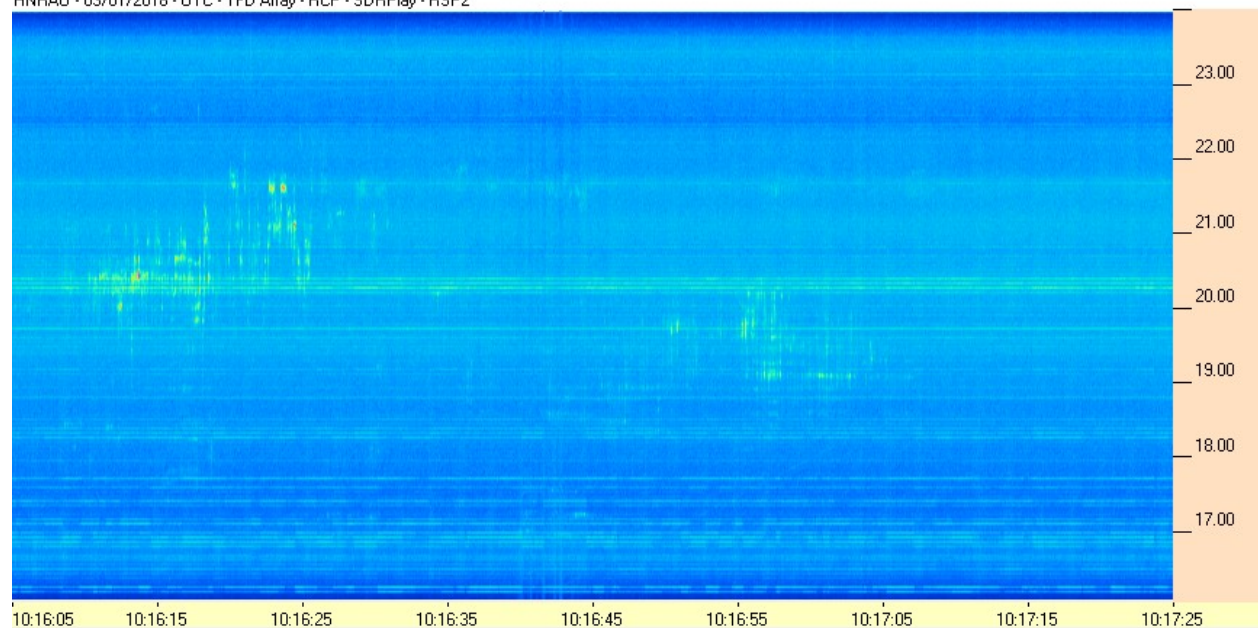
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



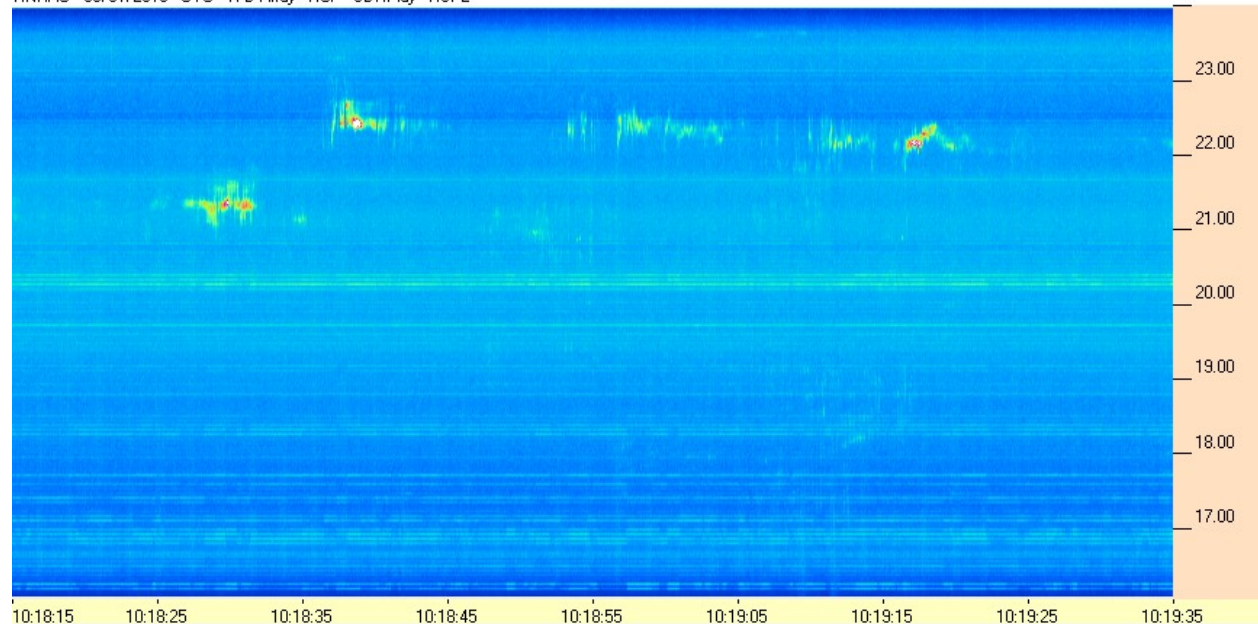
HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



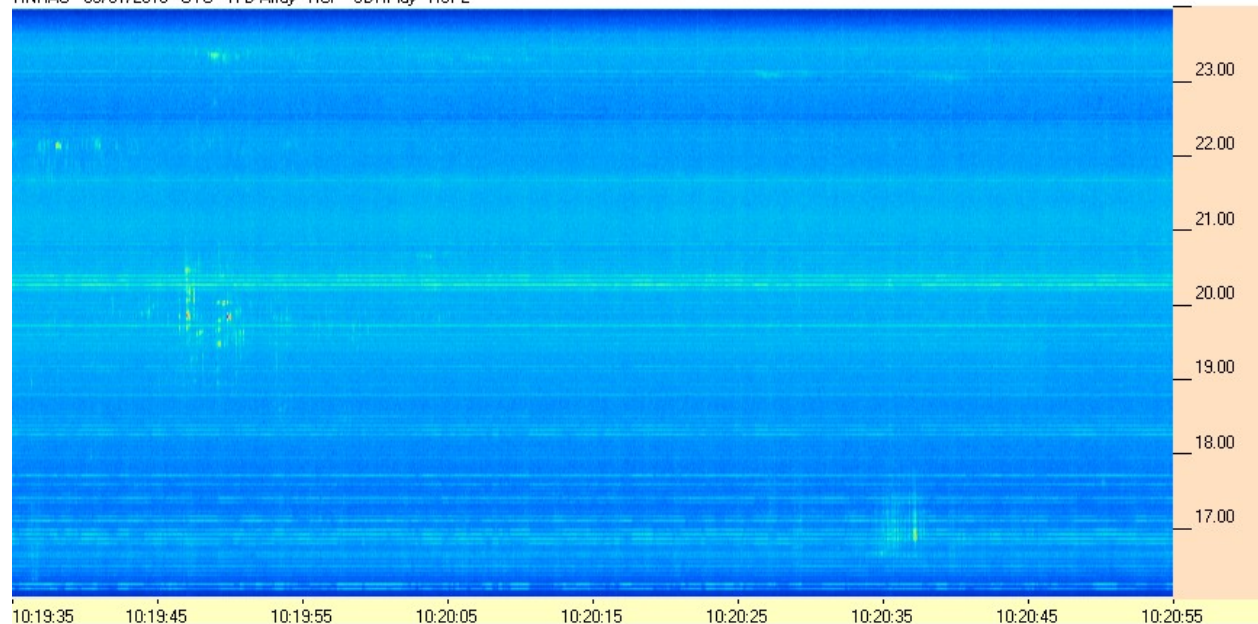
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



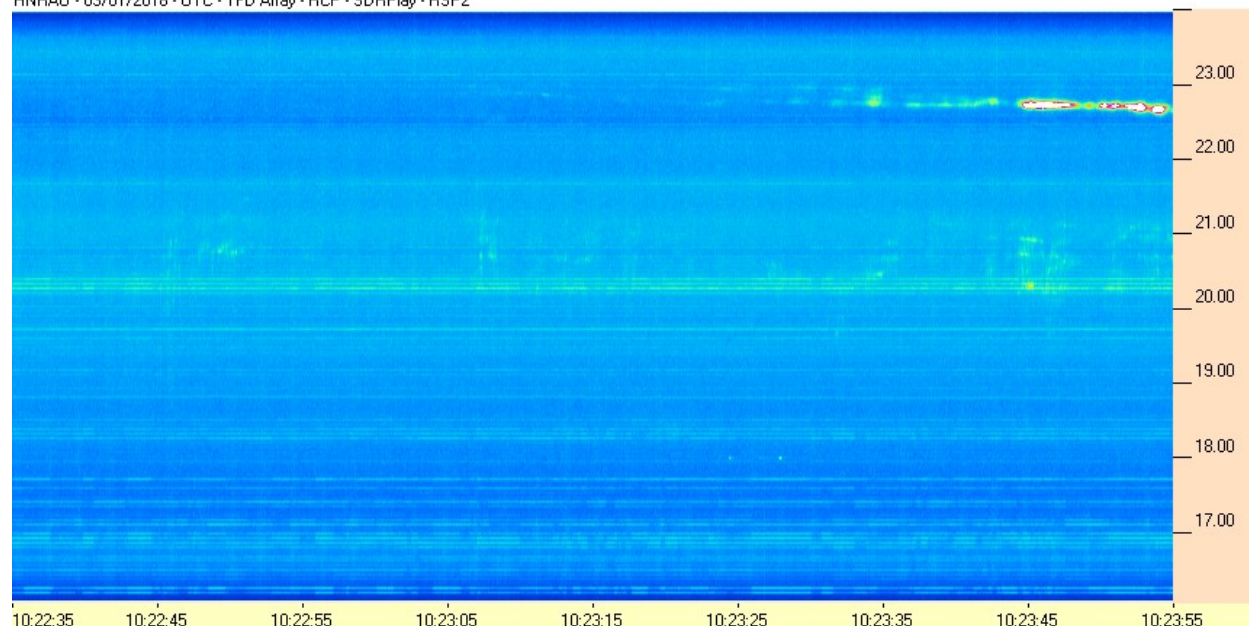
HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



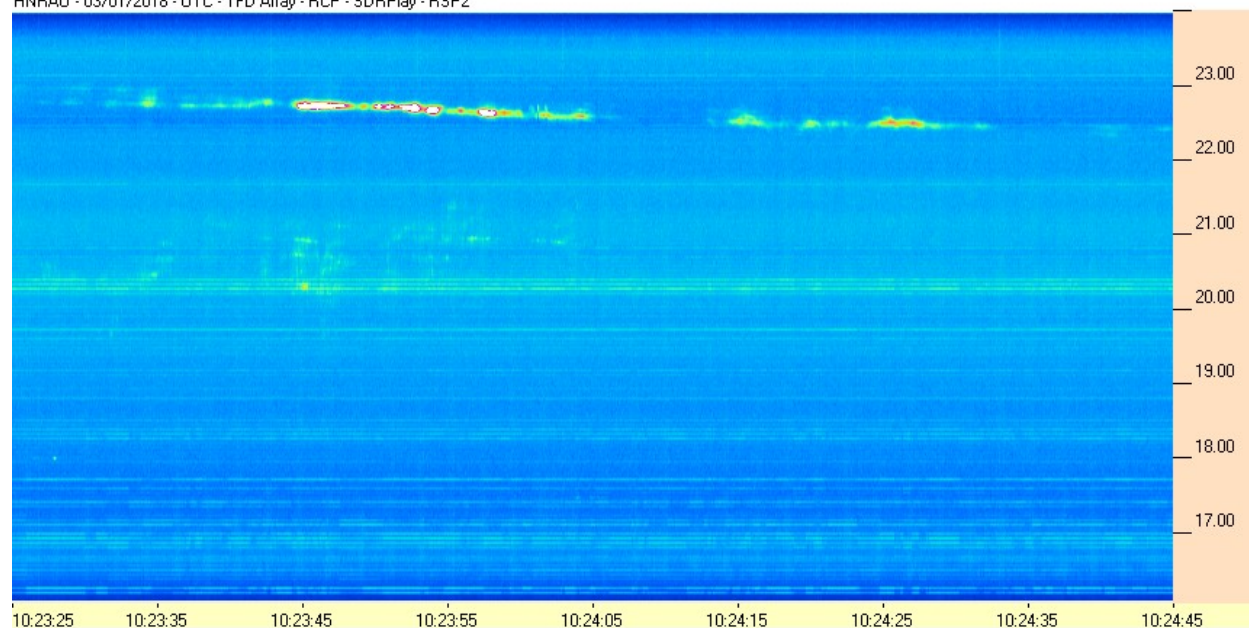
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



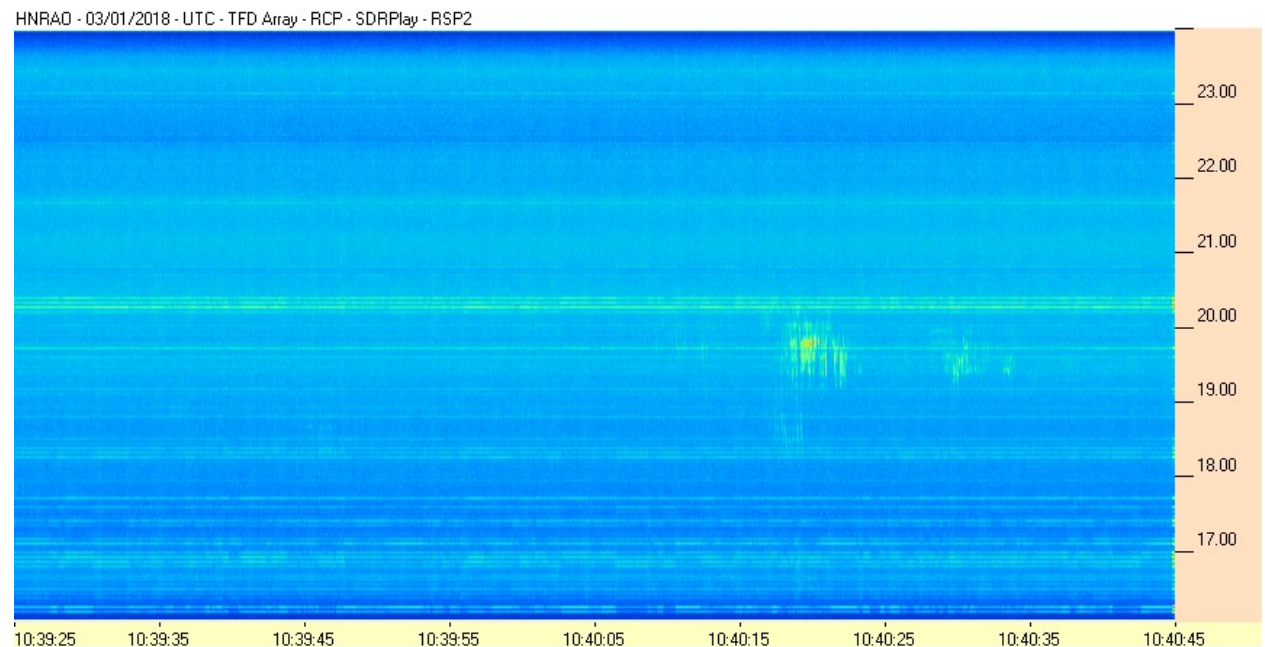
HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

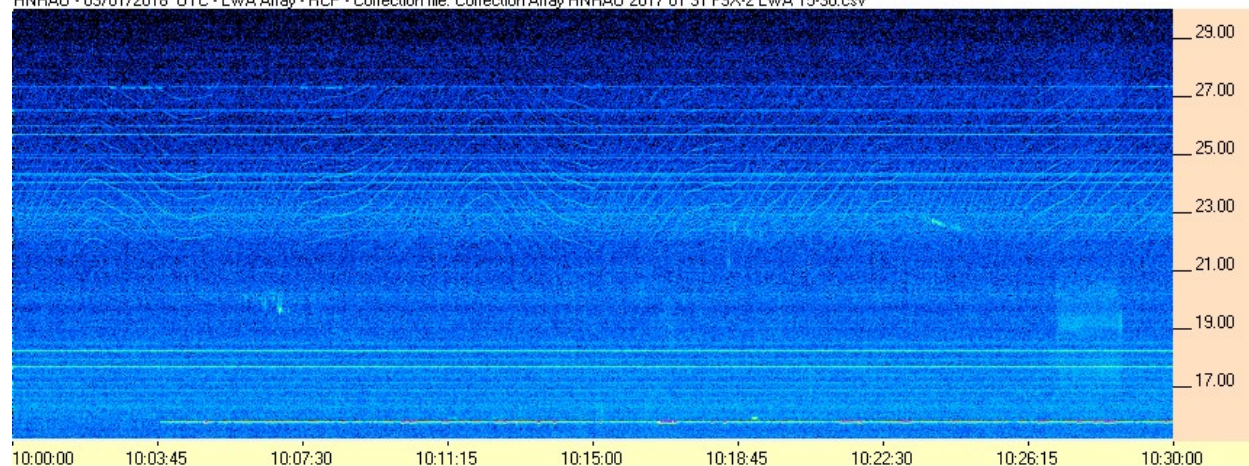


HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

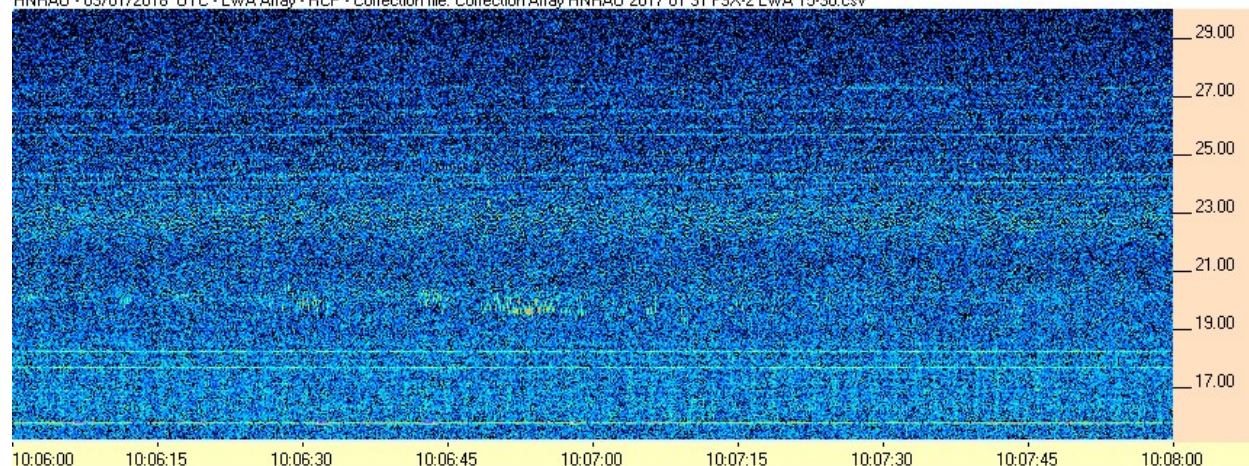


FSX-2/LWA Array (RCP)

HNRAO - 03/01/2018 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



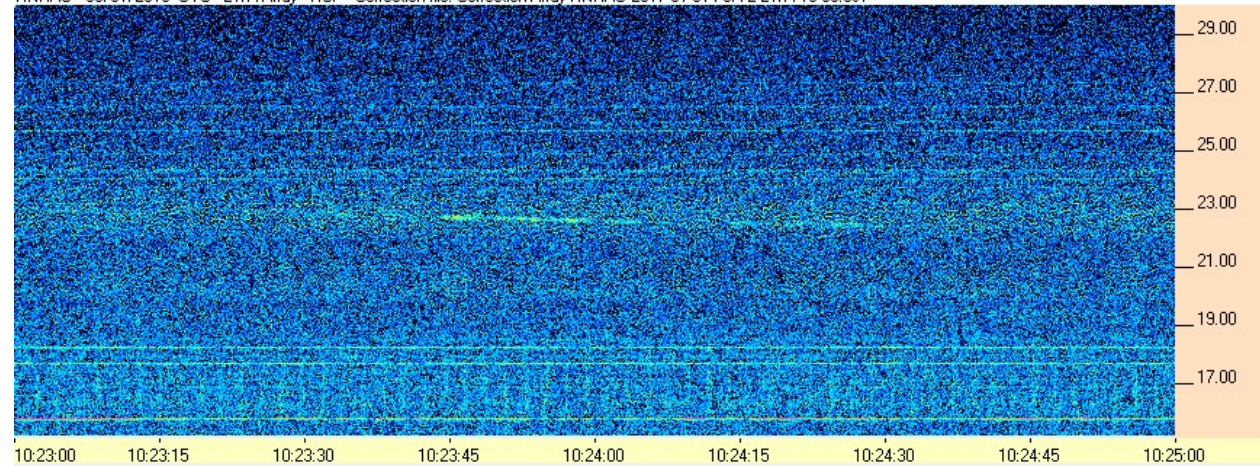
HNRAO - 03/01/2018 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 03/01/2018 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv

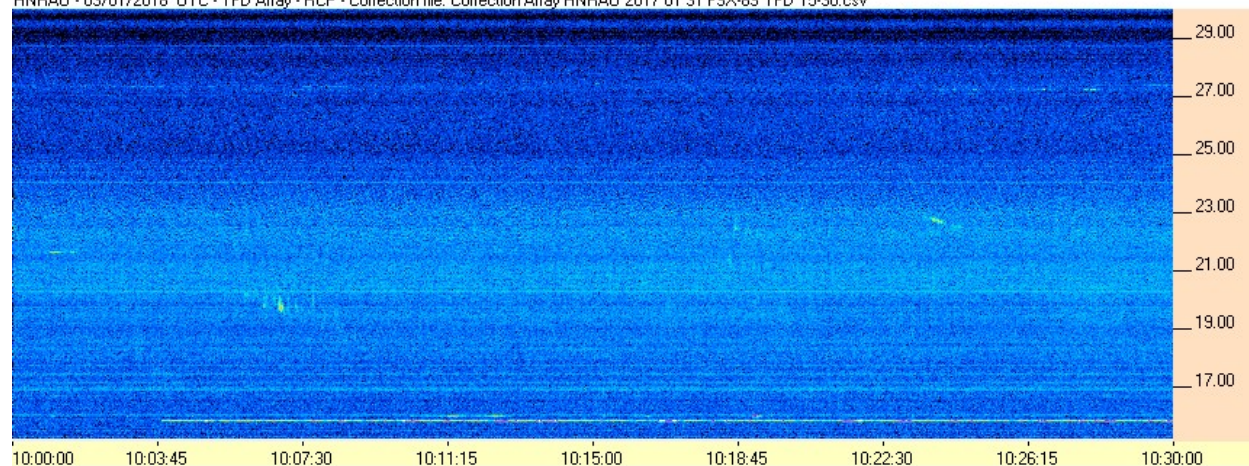


HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

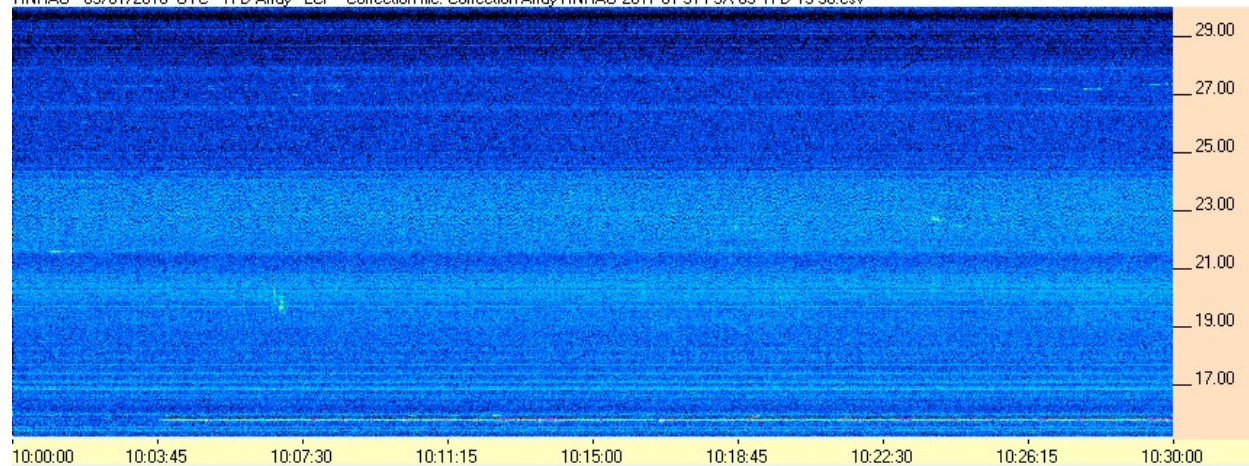


FSX-8S/TFD Array (RCP/LCP)

HNRAO - 03/01/2018 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



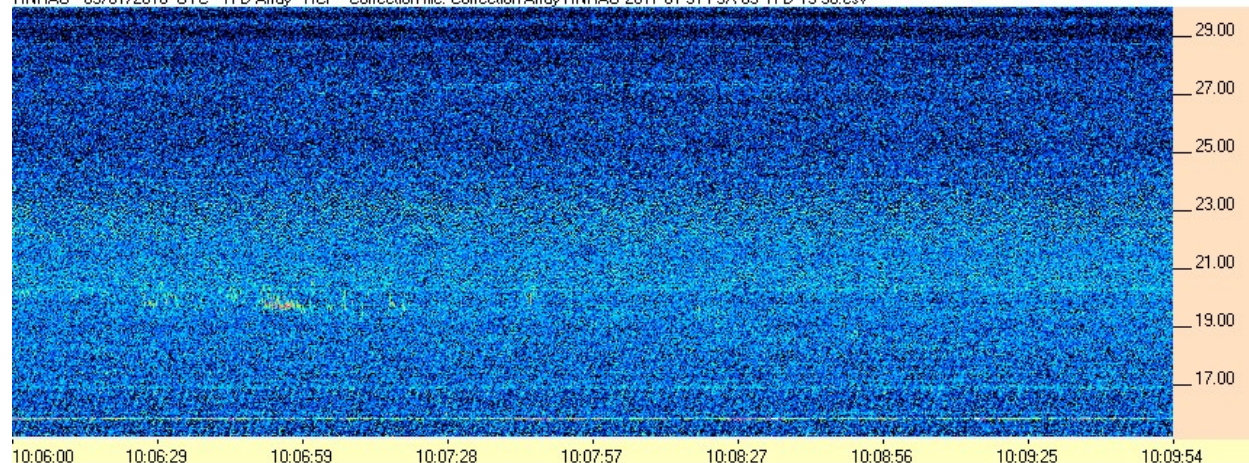
HNRAO - 03/01/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



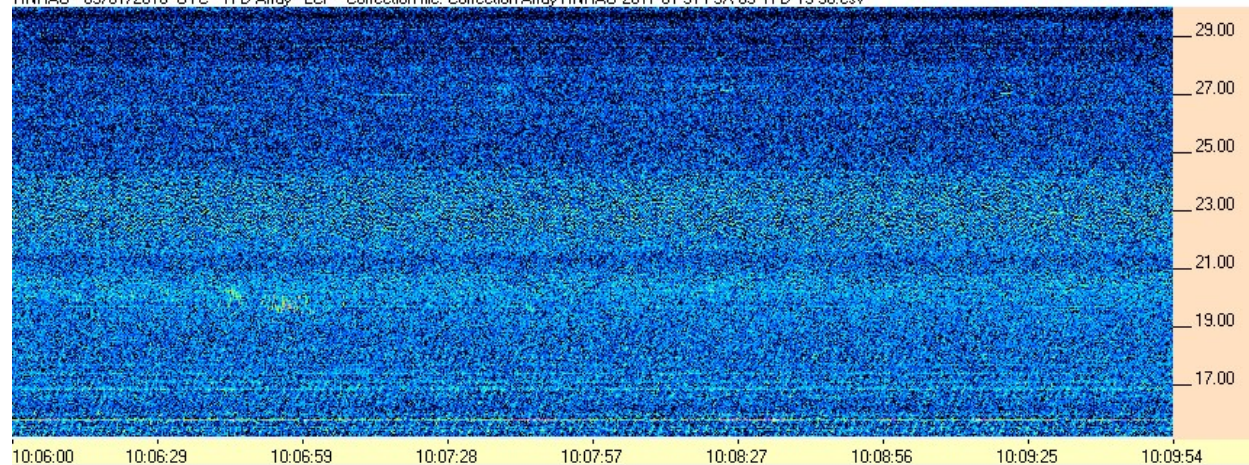
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 03/01/2018 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



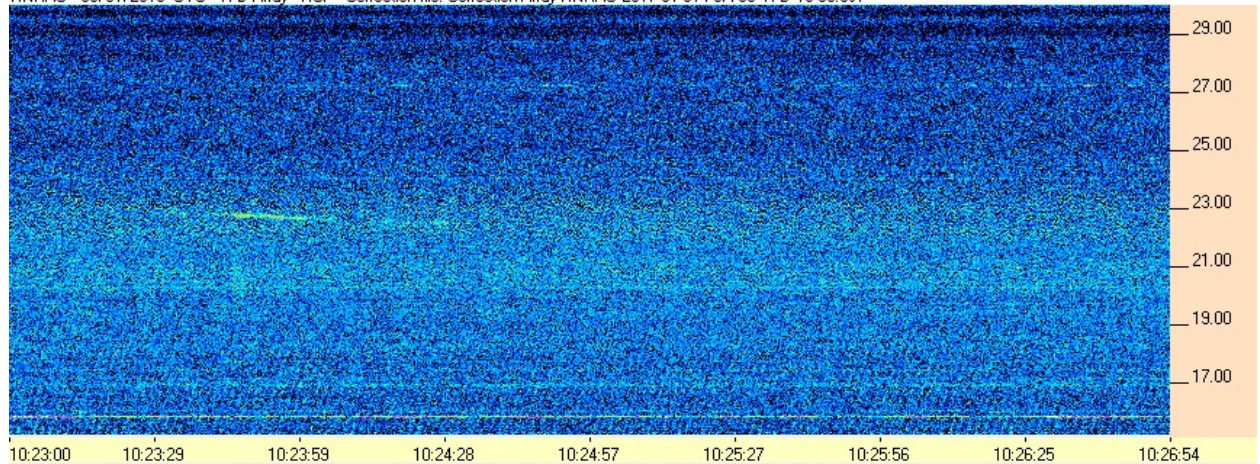
HNRAO - 03/01/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



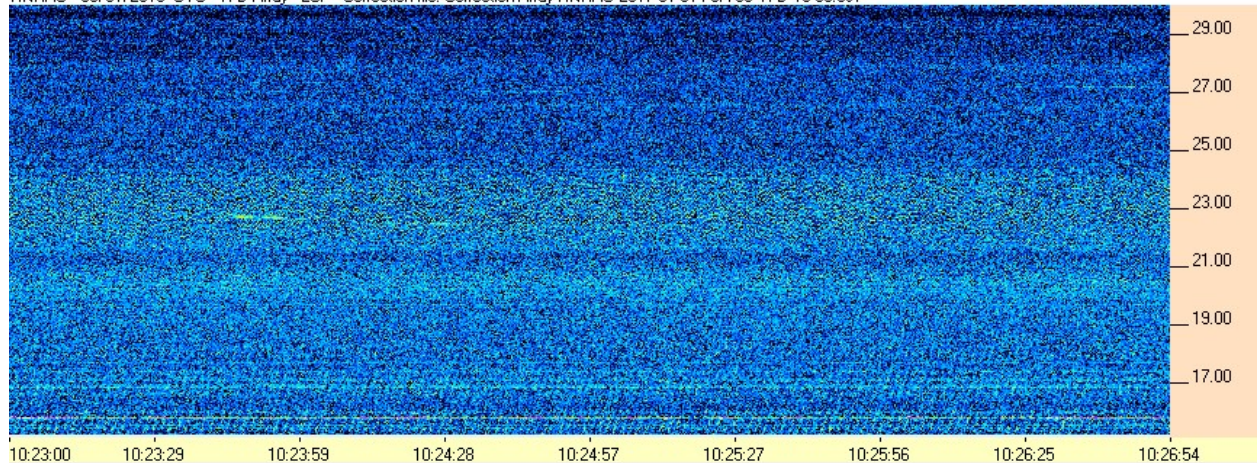
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 03/01/2018 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 03/01/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

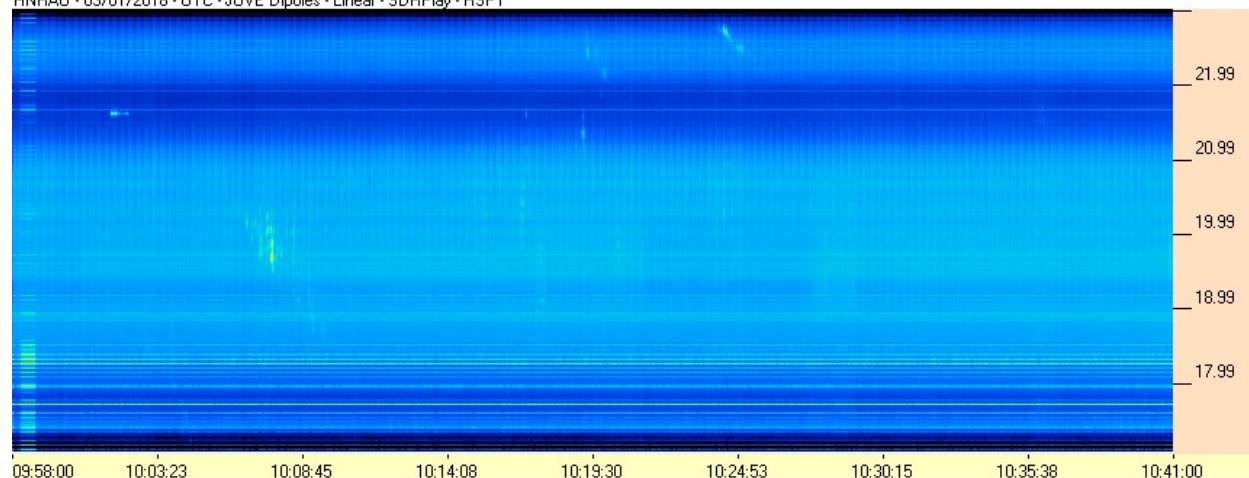


HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

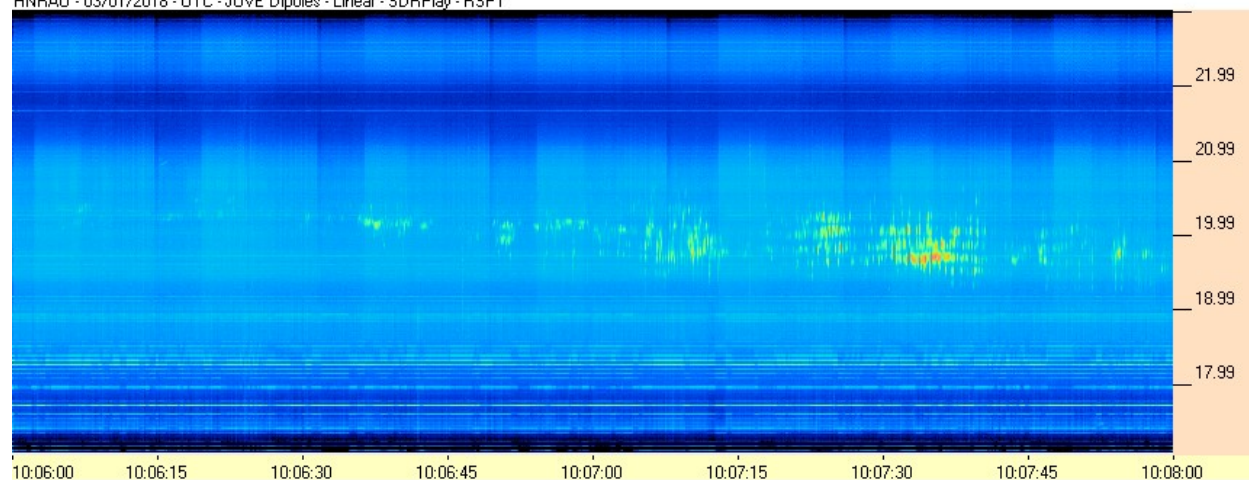


SDRPlayRSP1/Radio JOVE Dipole Array (Linear)

HNRAO - 03/01/2018 - UTC - JOVE Dipoles - Linear - SDRPlay - RSP1



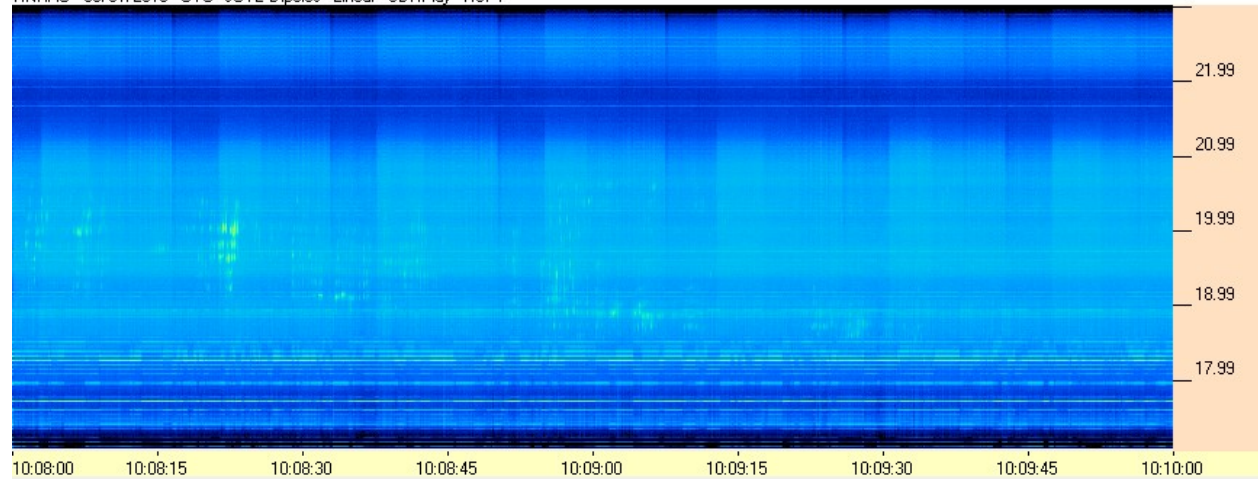
HNRAO - 03/01/2018 - UTC - JOVE Dipoles - Linear - SDRPlay - RSP1



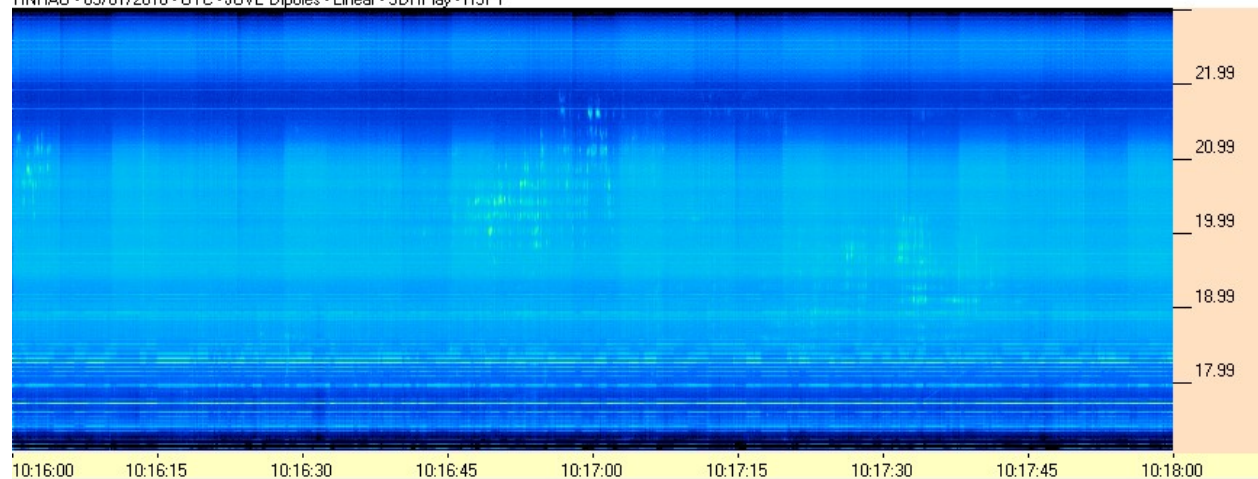
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 03/01/2018 - UTC - JOVE Dipoles - Linear - SDRPlay - RSP1



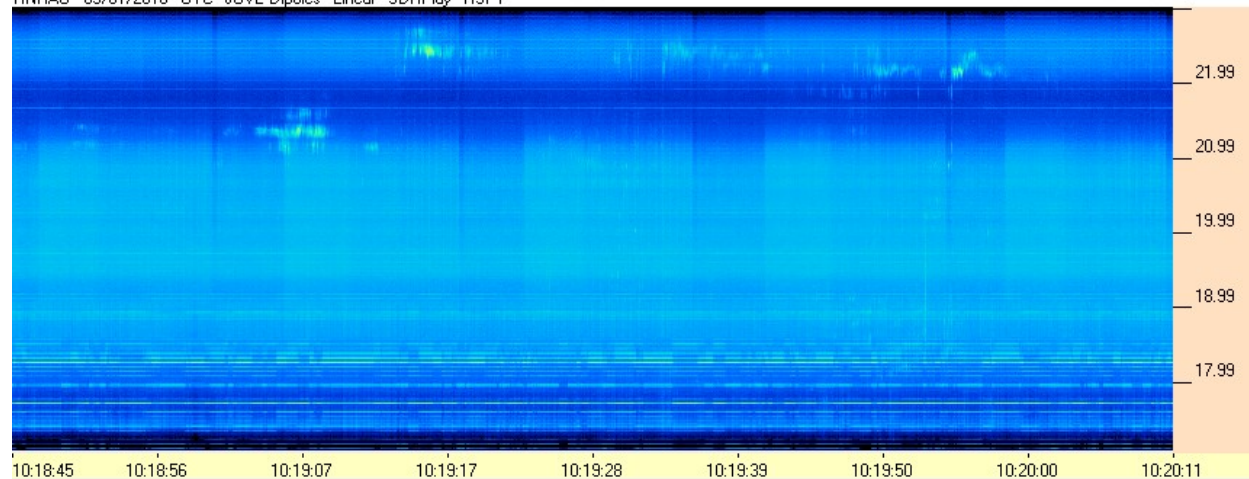
HNRAO - 03/01/2018 - UTC - JOVE Dipoles - Linear - SDRPlay - RSP1



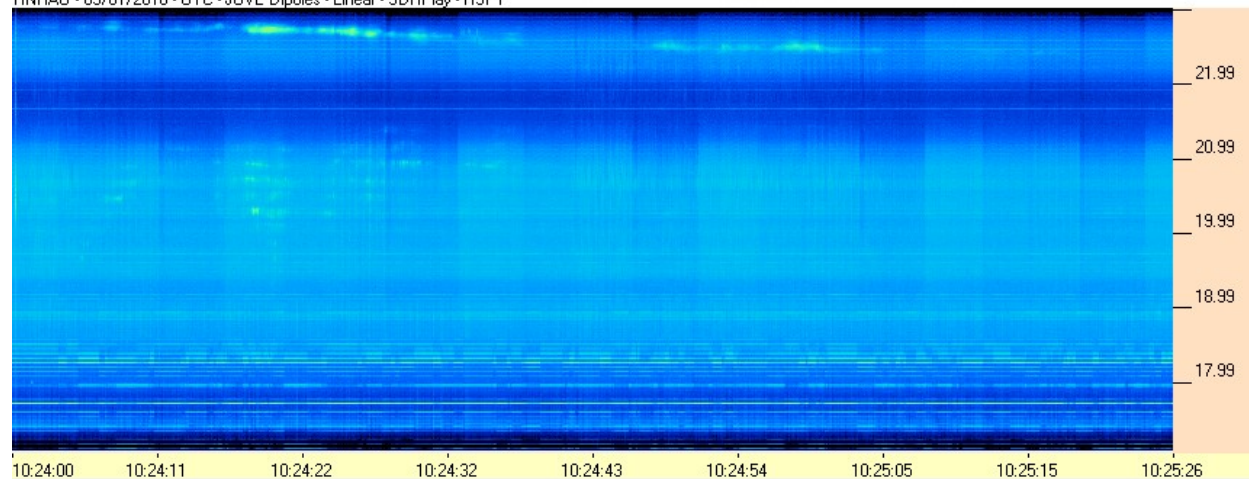
HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



HNRAO - 03/01/2018 - UTC - JOVE Dipoles - Linear - SDRPlay - RSP1



HNRAO - 03/01/2018 - UTC - JOVE Dipoles - Linear - SDRPlay - RSP1

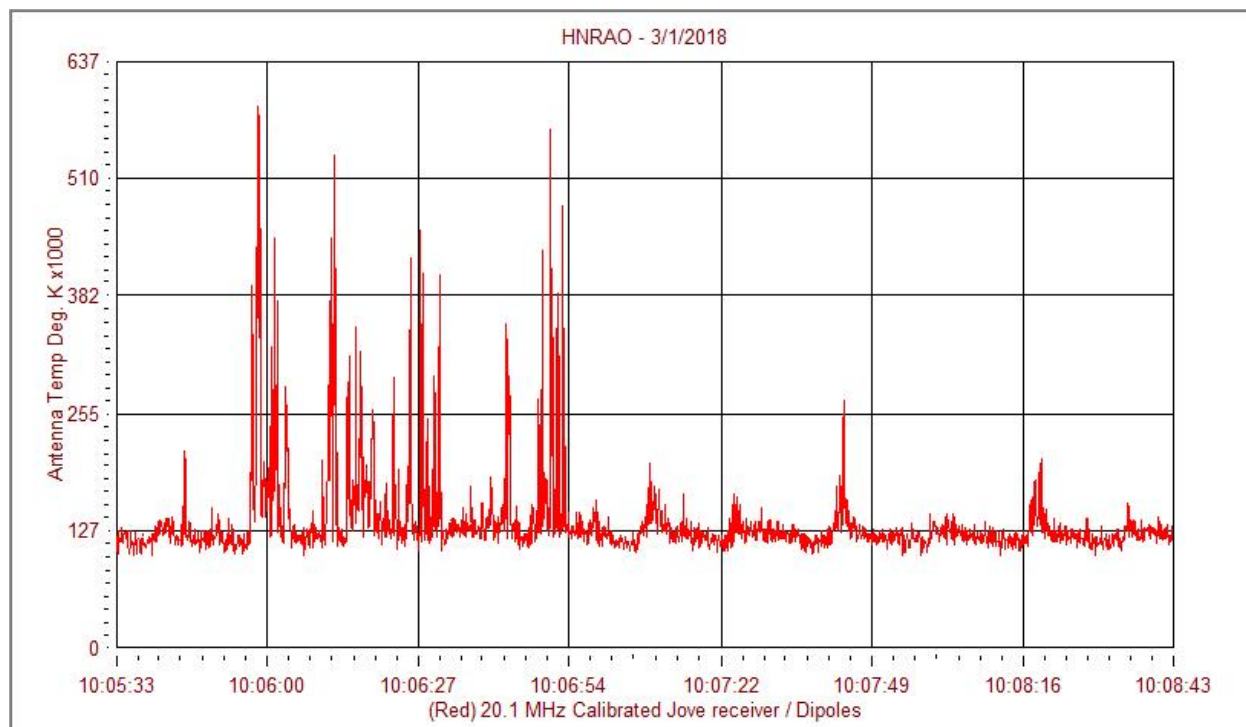


HNRAO Observing Log

40.673181 N – 80.437885 W
EN90sq



Radio JOVE Receiver/Radio JOVE Dipole Array (Linear)



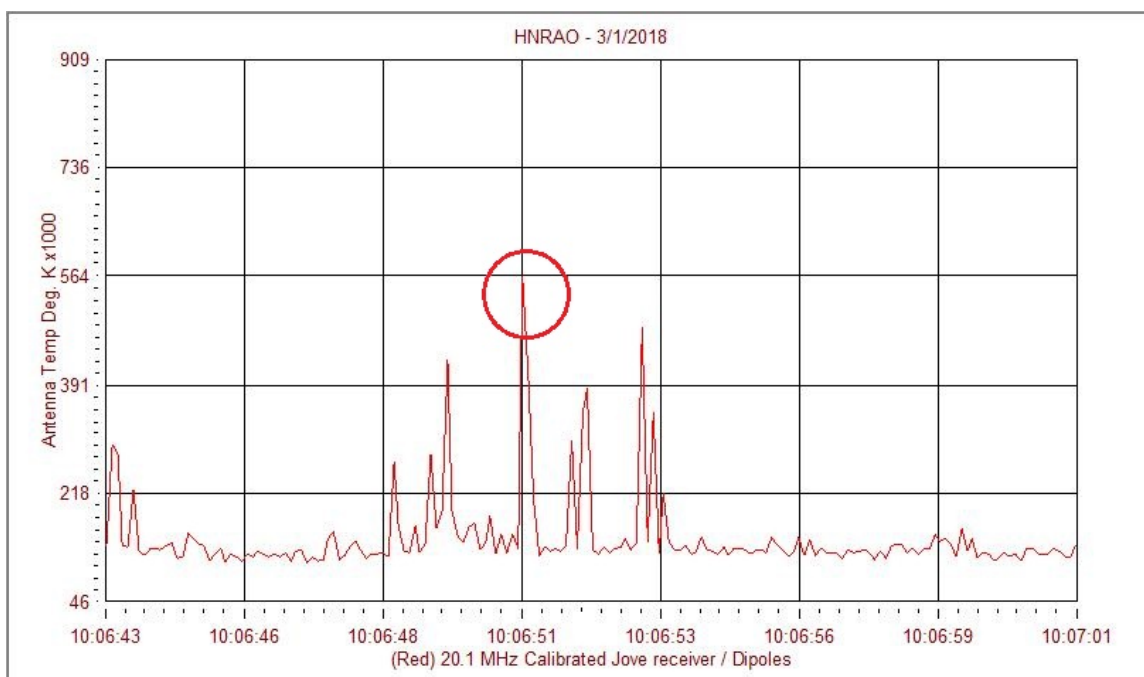
S-Burst measurements

Antenna	Start	Stop	Mid	Freq 1	Freq 2	Slope	CML	Io Phase	Equipment	Type
RHC	3/1/2018 09:59	3/1/2018 09:59	3/1/2018 09:59	16330	16645	104.9	147.7	68.3	SDRPlay	S2
RHC	3/1/2018 10:03	3/1/2018 10:03	3/1/2018 10:03	17826	18219	112.4	150.5	69	SDRPlay	S2
RHC	3/1/2018 10:08	3/1/2018 10:08	3/1/2018 10:08	18987	19420	123.7	153.3	69.6	SDRPlay	S2
RHC	3/1/2018 10:08	3/1/2018 10:08	3/1/2018 10:08	18751	19144	145.8	153.5	69.7	SDRPlay	S2
RHC	3/1/2018 10:19	3/1/2018 10:19	3/1/2018 10:19	18101	18396	118.1	159.8	71.1	SDRPlay	S2
RHC	3/1/2018 10:19	3/1/2018 10:19	3/1/2018 10:19	19538	19990	122.3	160.2	71.2	SDRPlay	S2
RHC	3/1/2018 10:19	3/1/2018 10:19	3/1/2018 10:19	19380	19715	123.9	160.2	71.2	SDRPlay	S2
RHC	3/1/2018 10:22	3/1/2018 10:22	3/1/2018 10:22	20580	20895	131.2	162	71.6	SDRPlay	S2
RHC	3/1/2018 10:23	3/1/2018 10:23	3/1/2018 10:23	20679	21053	178	162.2	71.7	SDRPlay	S2

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Burst comparison at 1006:51 UT 564 kK



HNRAO - 03/01/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2

