HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: 6 June 2017

Object: Jupiter – Io-C

Observer: JB

Start of pass:	**0245 UT**	**Planetary K-index:**	**2**
Jupiter Altitude (deg):	**40.8**	**Jupiter Azimuth (deg):**	**211.0**
Jupiter CML:	**262.16**	**Jupiter Io Phase:**	**231.16**
Jupiter RA (hr/min):	**12:50**	**Jupiter Dec (hr/min):**	**-03:48**
Hour Angle (hr/min):	**01:32**	**Polarization**	**LCP**
Sun Altitude (deg):	**-18.2**	**Sun Azimuth (deg):**	**324.3**
Sun RA (hr/min):	**04:50**	**Sun Dec (hr/min):**	**22.27**

End of pass:	**0516 UT**		
Jupiter Altitude (deg):	**19.0**	**Jupiter Azimuth (deg):**	**247.2**
Jupiter CML:	**353.44**	**Jupiter Io Phase**	**253.44**
Hour Angle (hr/min):	**04:04**		
Sun Altitude (deg):	**-26.8**	**Sun Azimuth (deg):**	**000.9**

Observations made using:

1. FSX-8S fed by the TFD array
    a. 7.7 dB loss between TFD and Multicouplers.
    b. Connect to array through HNRAO Multicoupler #1 and #2, port 2
        i. HNRAO Multicoupler #1 – TFD/LCP
        ii. HNRAO Multicoupler #2 – TFD/RCP
            1. Port 1 having 10 dB of gain, all other ports have 3 dB gain.
2. FSX-2 fed by the LWA array directly
    a. LWA element configuration – 90 degrees
3. JOVE 2 receiver fed by phased JOVE dipoles @ 13’
    a. 12’ 6” phase cable - phased for 2016-17 season
    b. Calibrated 1 June 2017
    c. Connected to dipoles through HNRAO Multicoupler #3, port 1.
        i. 3.165 dB loss between Multicoupler and dipoles.
4. Icom R75 receiver fed by experimental DDRR antenna directly.
    a. Calibrated 19 April 2017
5. SDRPlay
    a. RSP1 (2) and RSP2 (1)

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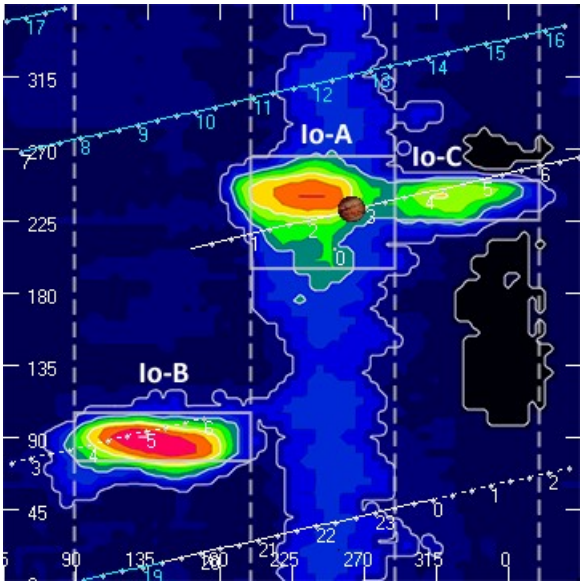
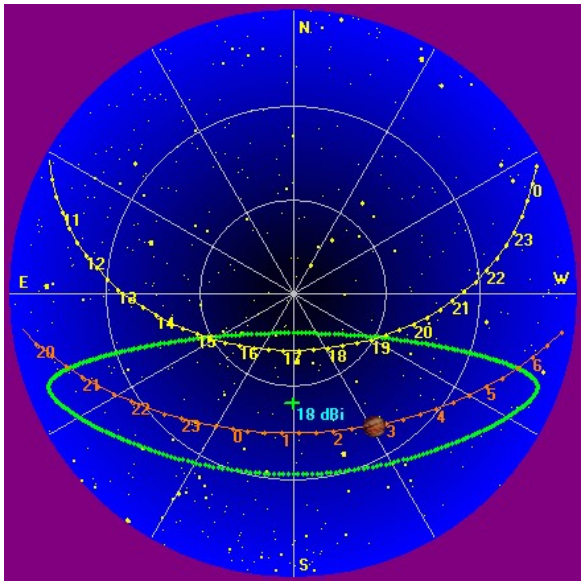
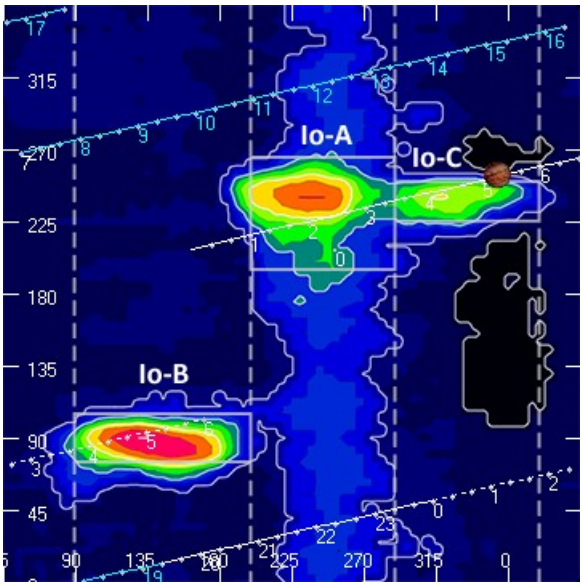
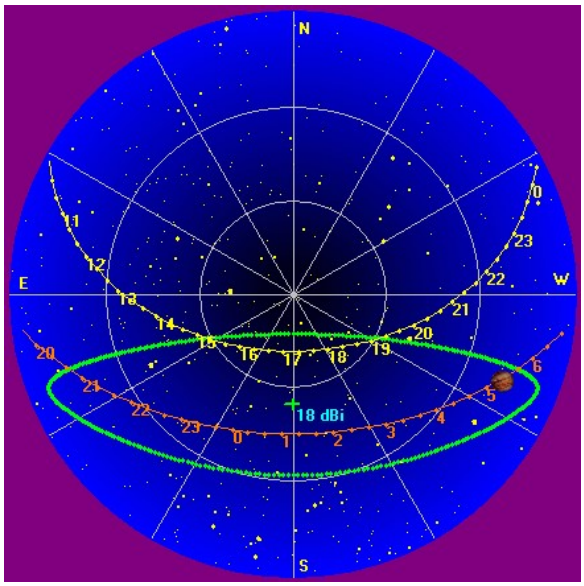




Beginning of Pass





End of Pass

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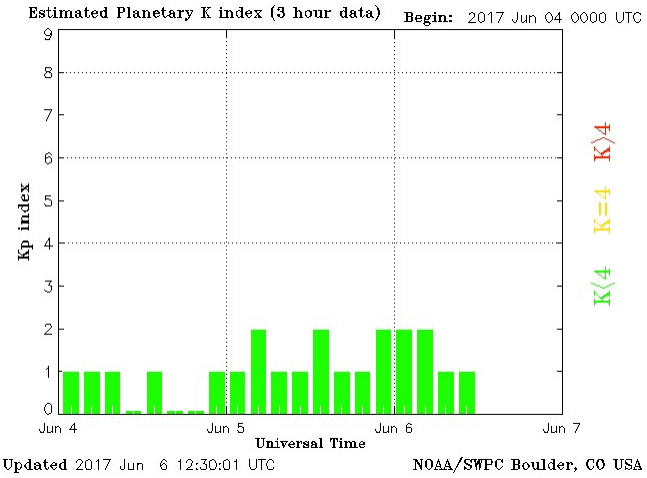

MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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

An LCP Io-C storm with double nested arcs spanning 16 MHz to 24 MHz and lasting 2.5 hours. Both L-bursts and S-bursts were observed. The highest frequency was reached at about 0400 UT for the upper arc, and about 15 minutes earlier for the lower arc.

The first 30 minutes of the storm contained distant lighting in the lower frequencies but settled down to relatively quiet for the remainder of the storm.

Several instances of strong S-burst clusters, 0332 UT, 0352 UT, 0423 UT and the strongest at 0450 UT.

What appear to be Faraday lanes about mid-storm could be the result of Jupiter being over 3 hours past transit.

Modulation lanes are present and some have been measured, all with a negative drift.

The storm was also observed with the FSX-8S/TFD pair, and the double nested arcs are present, but not with the intensity and clarity of the RSP1 spectrograph.

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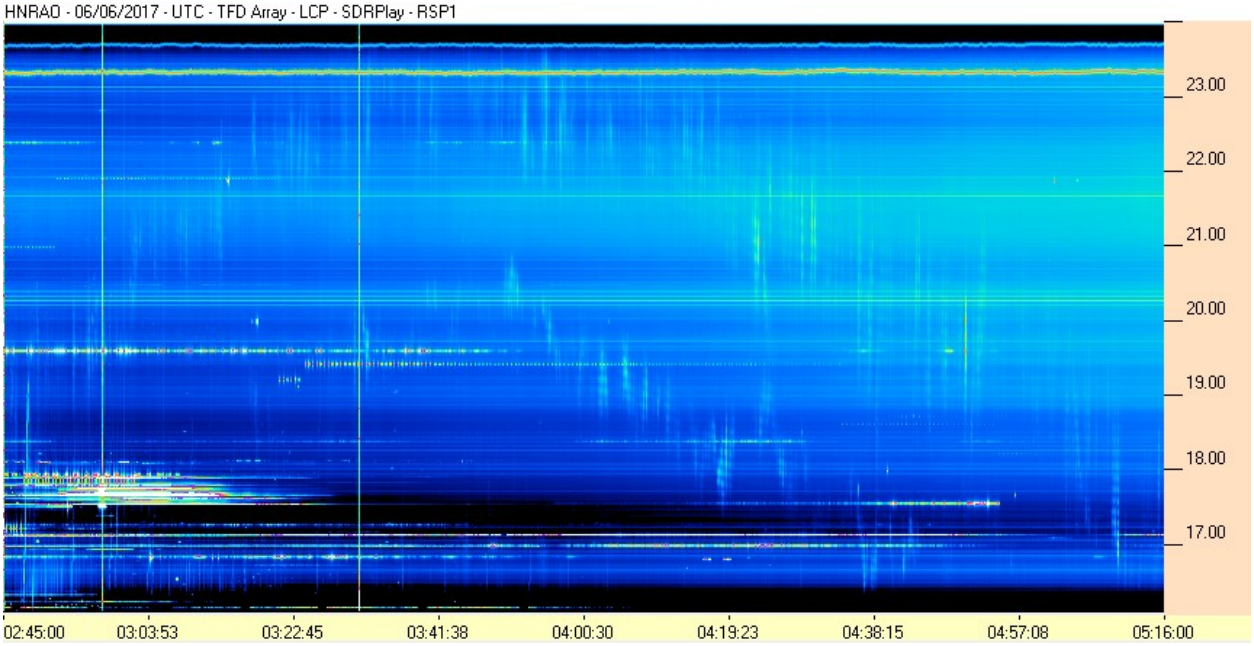
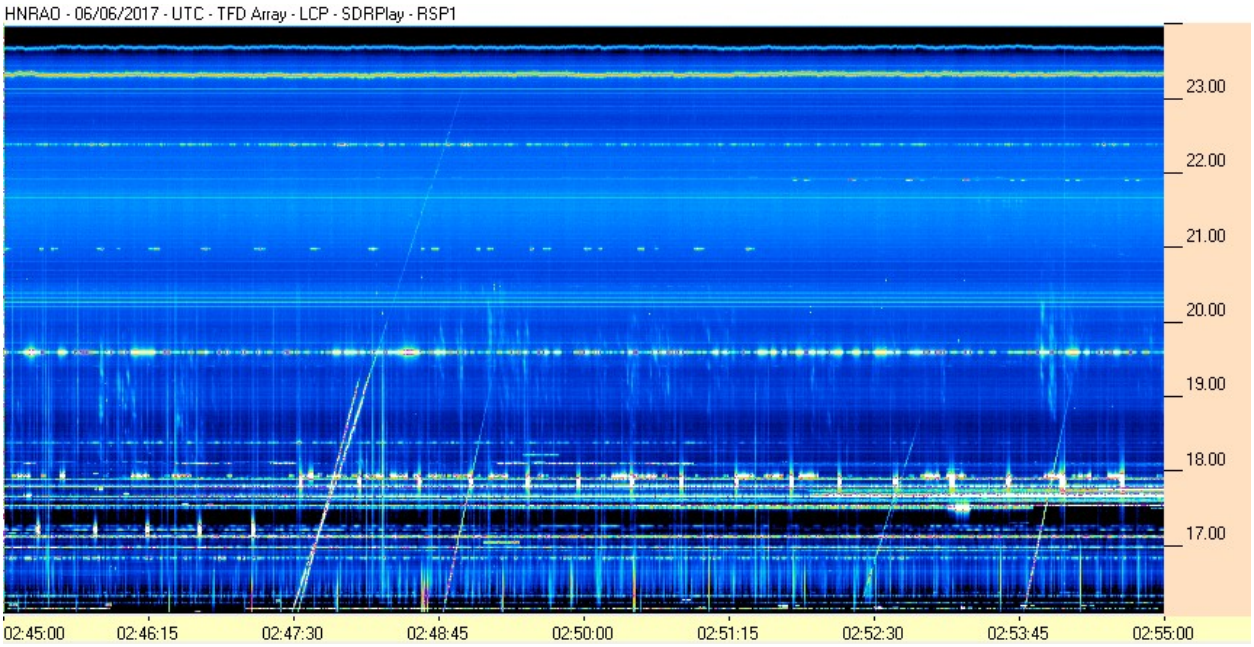
SDRPlay RSP1/TFD Pair





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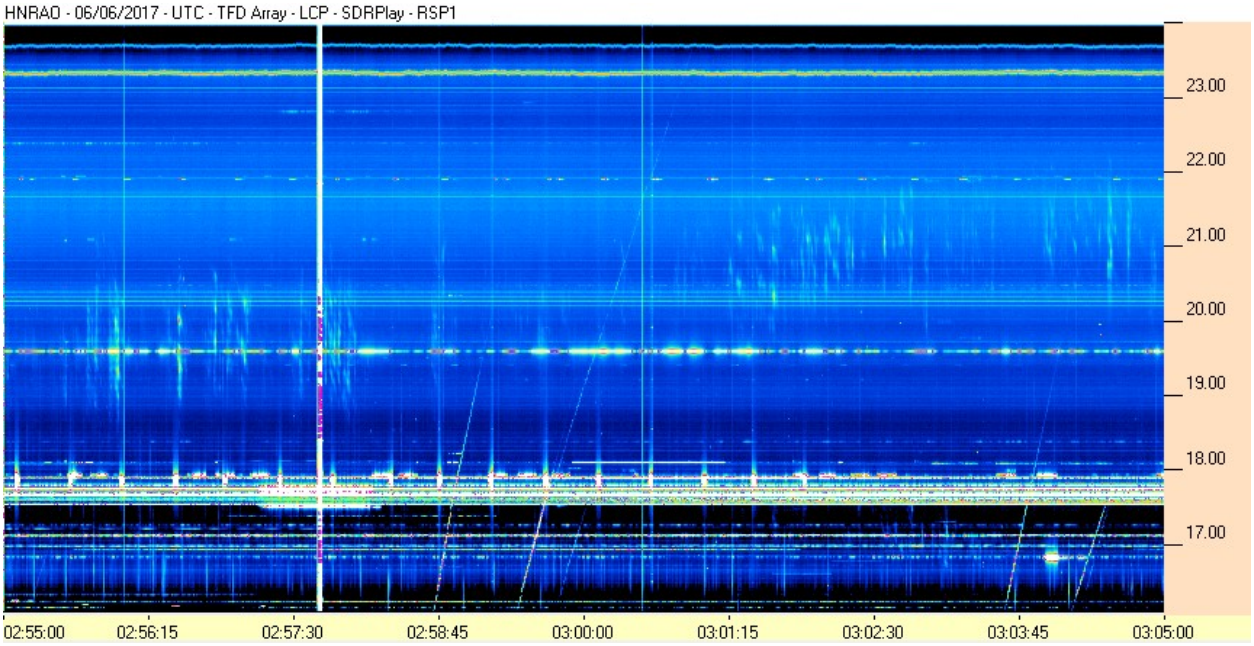

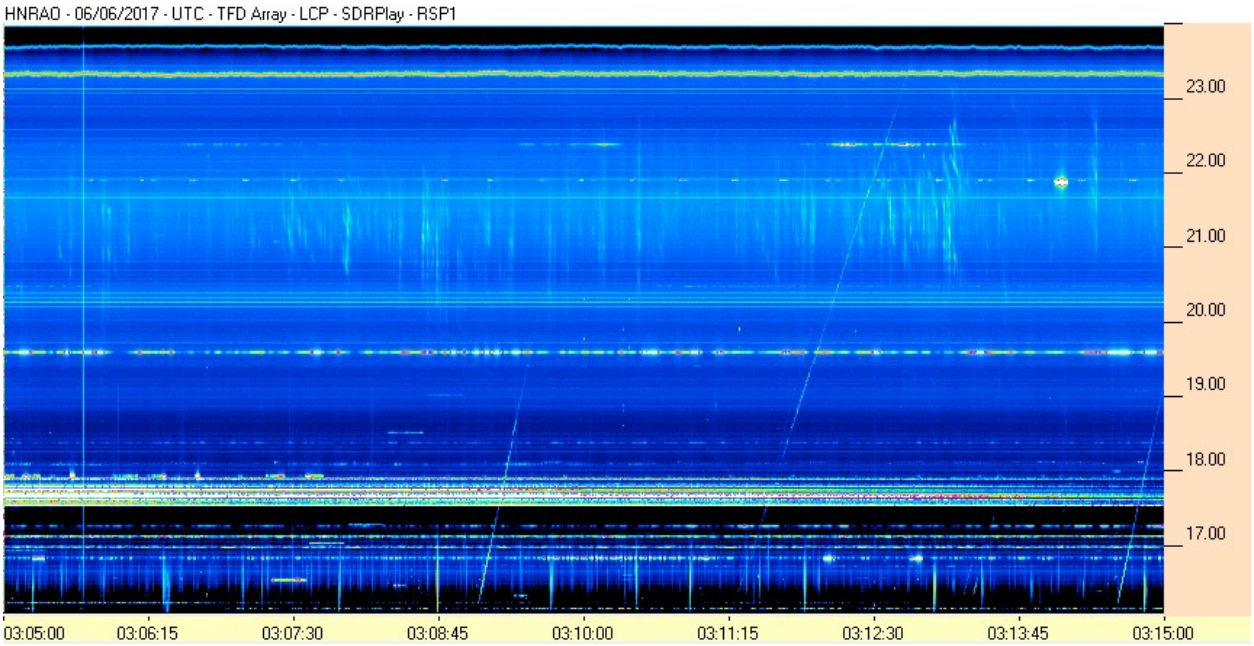

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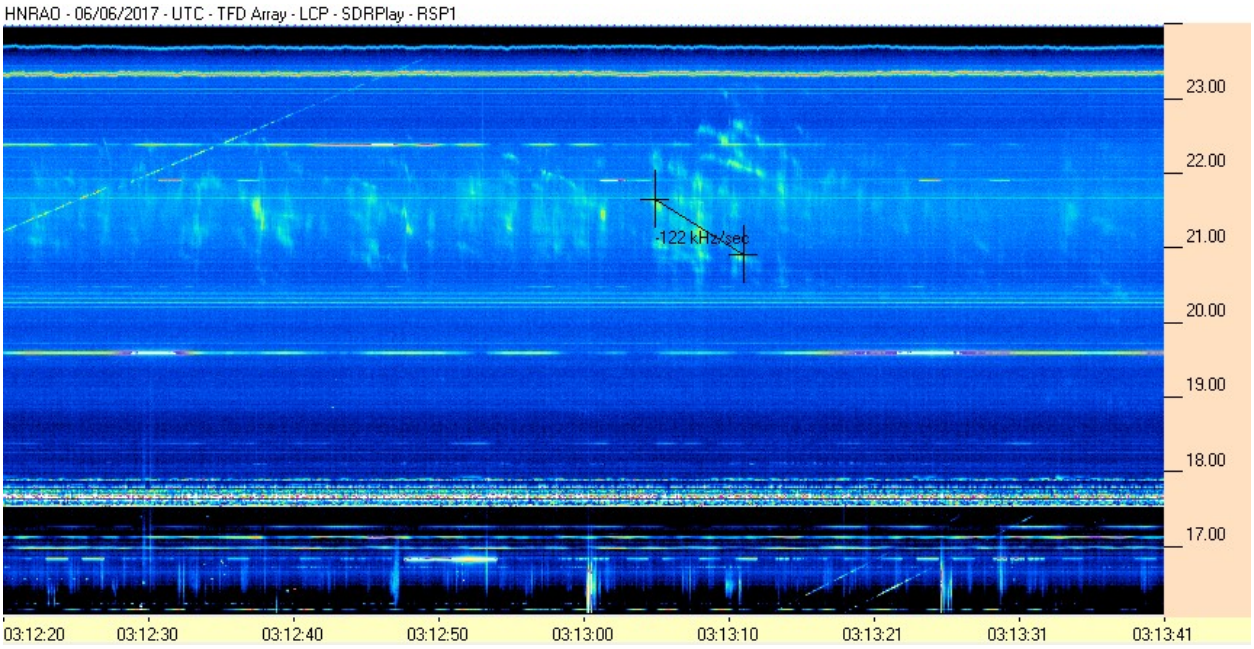

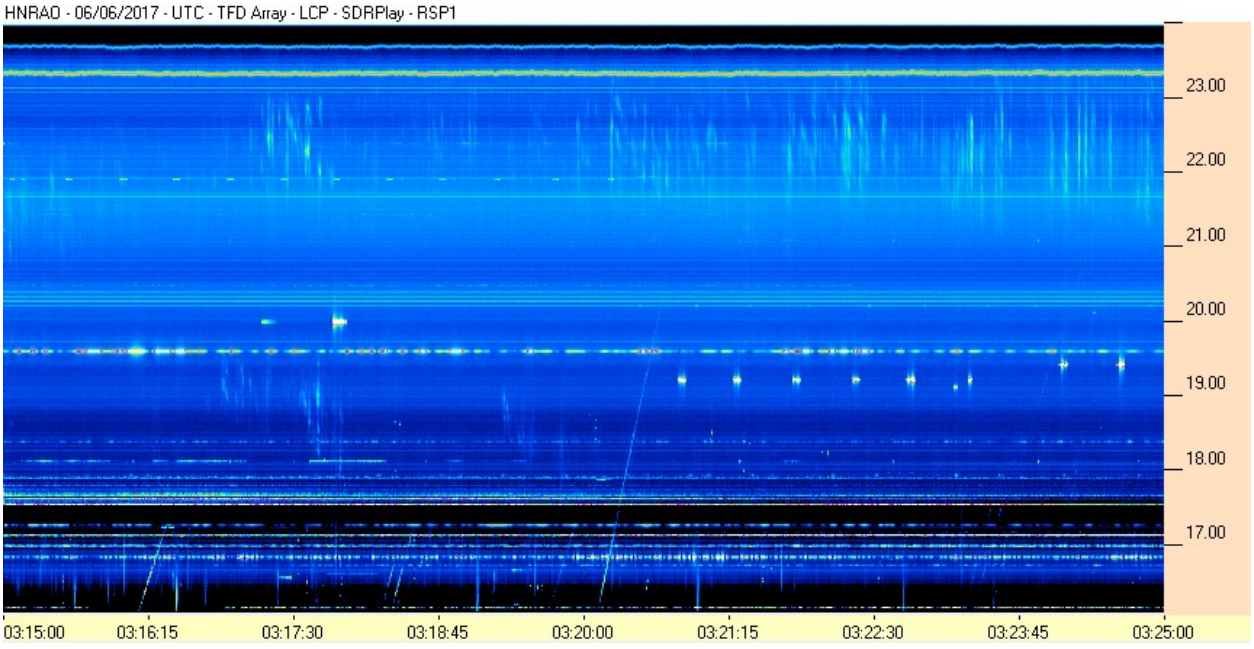

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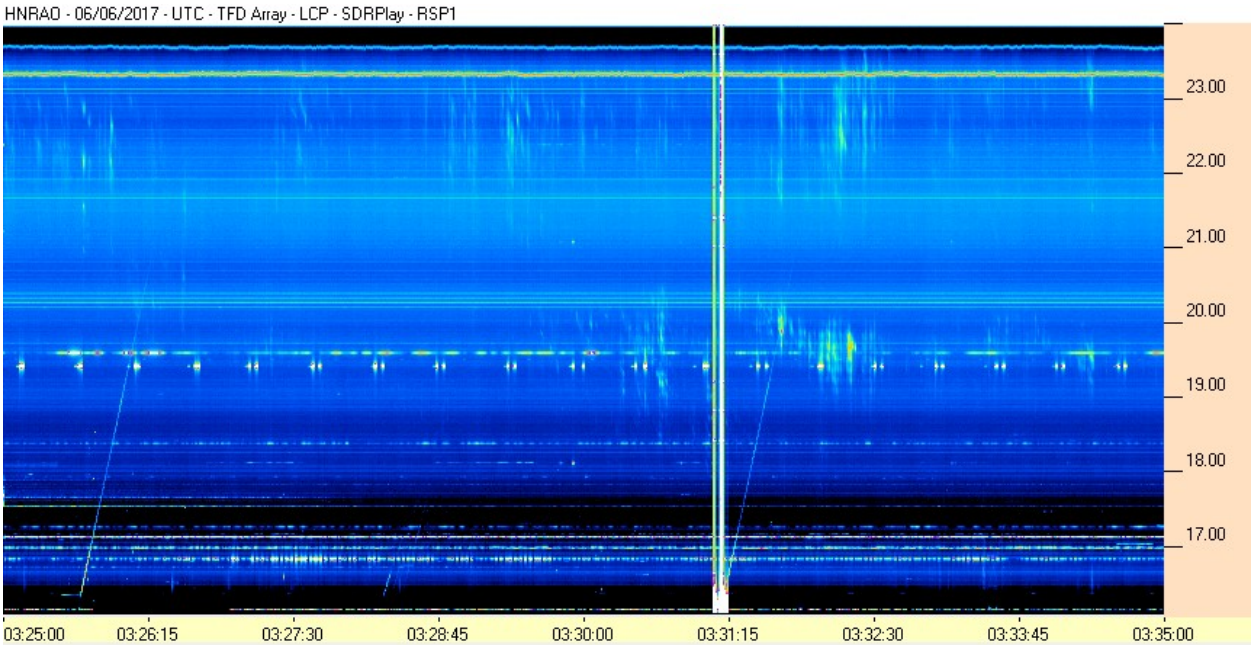

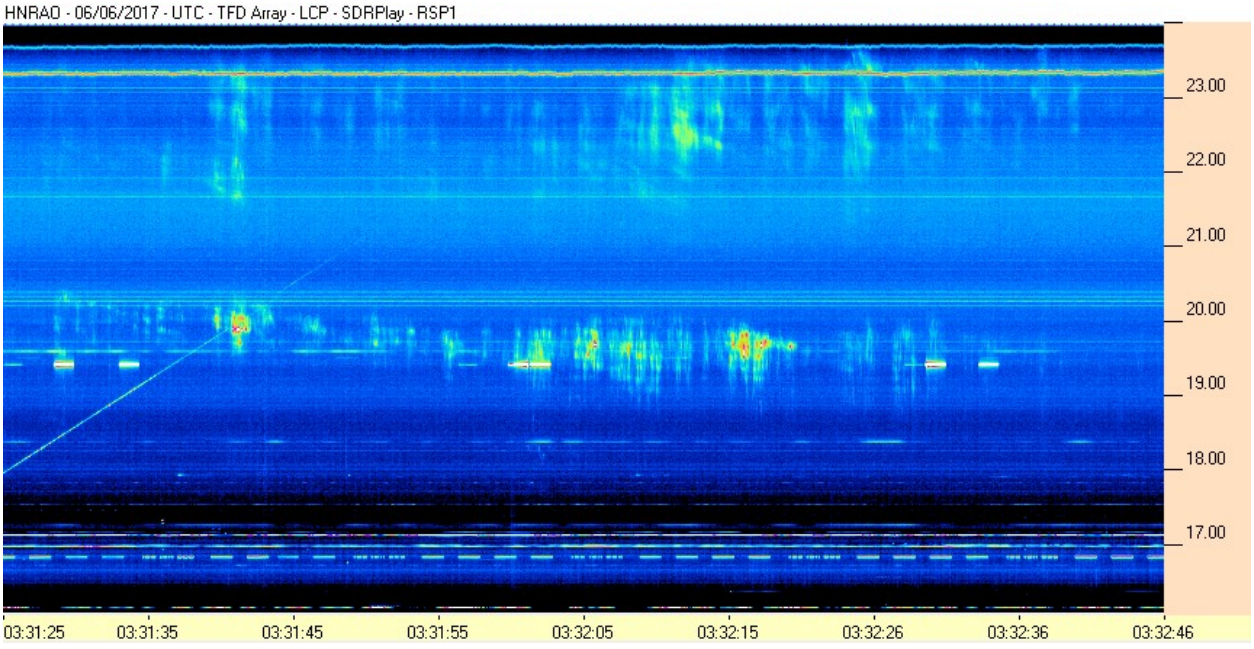

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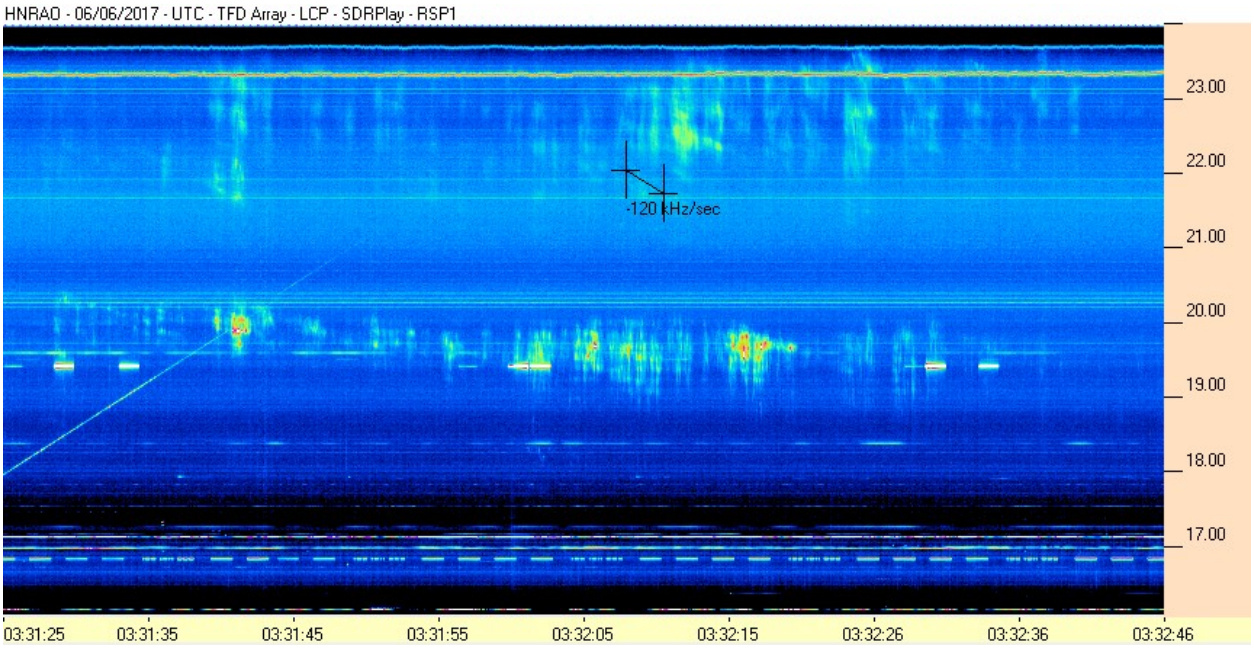
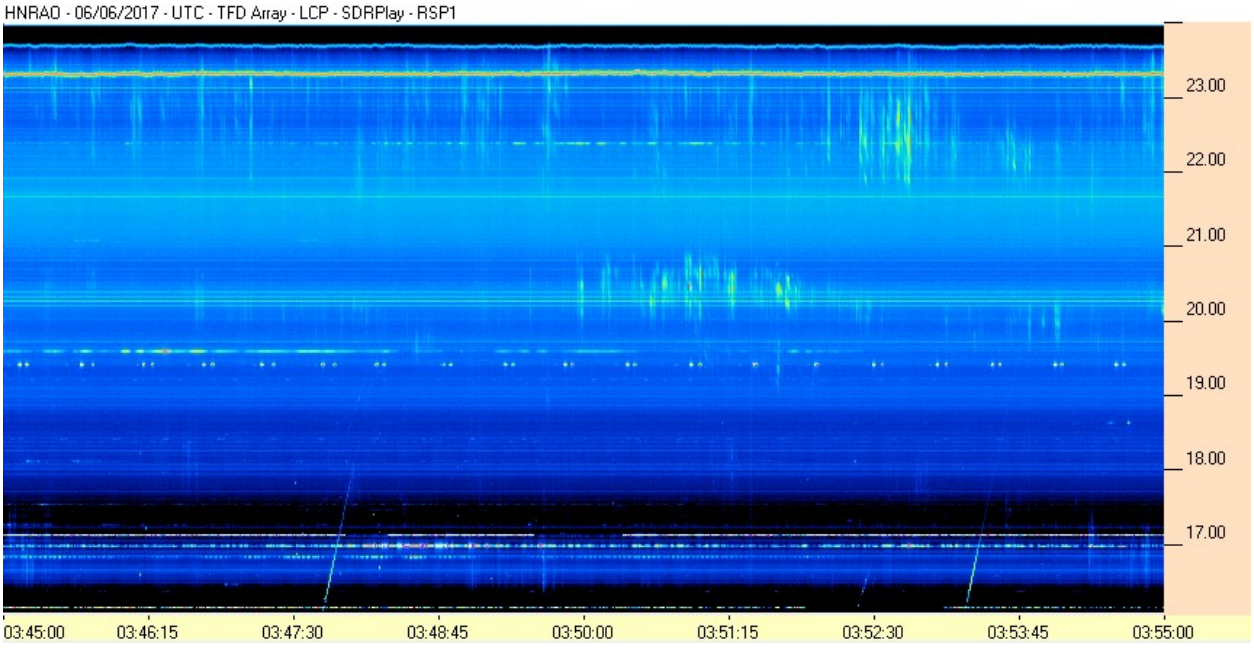
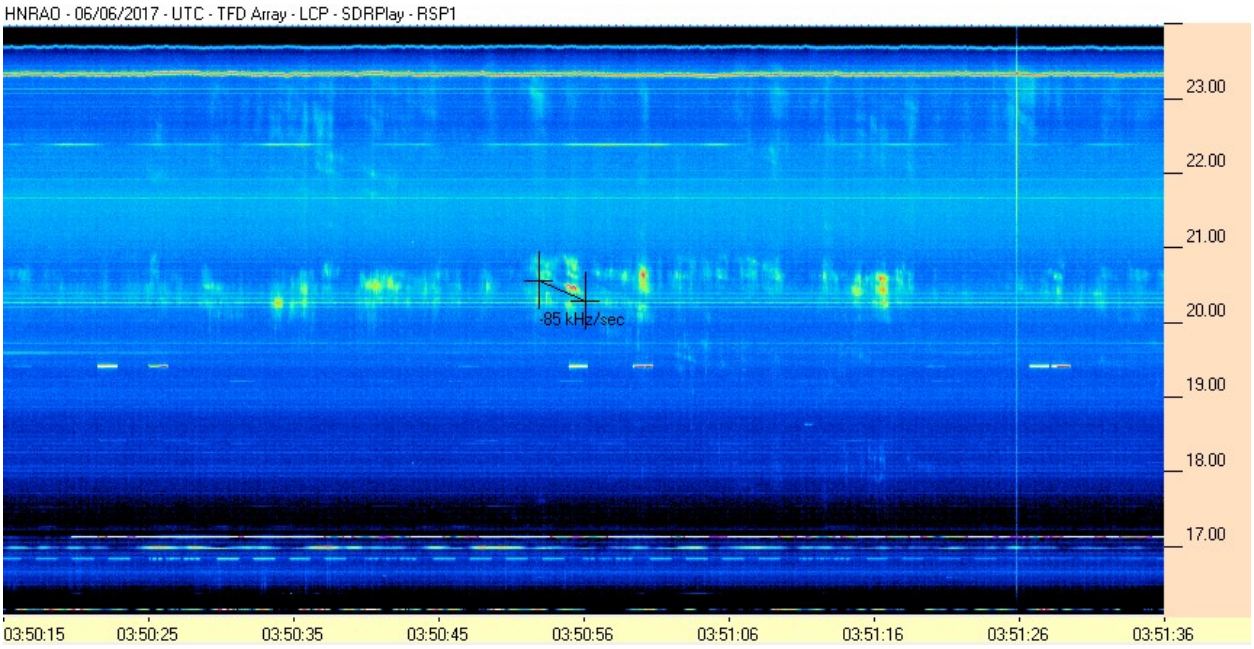
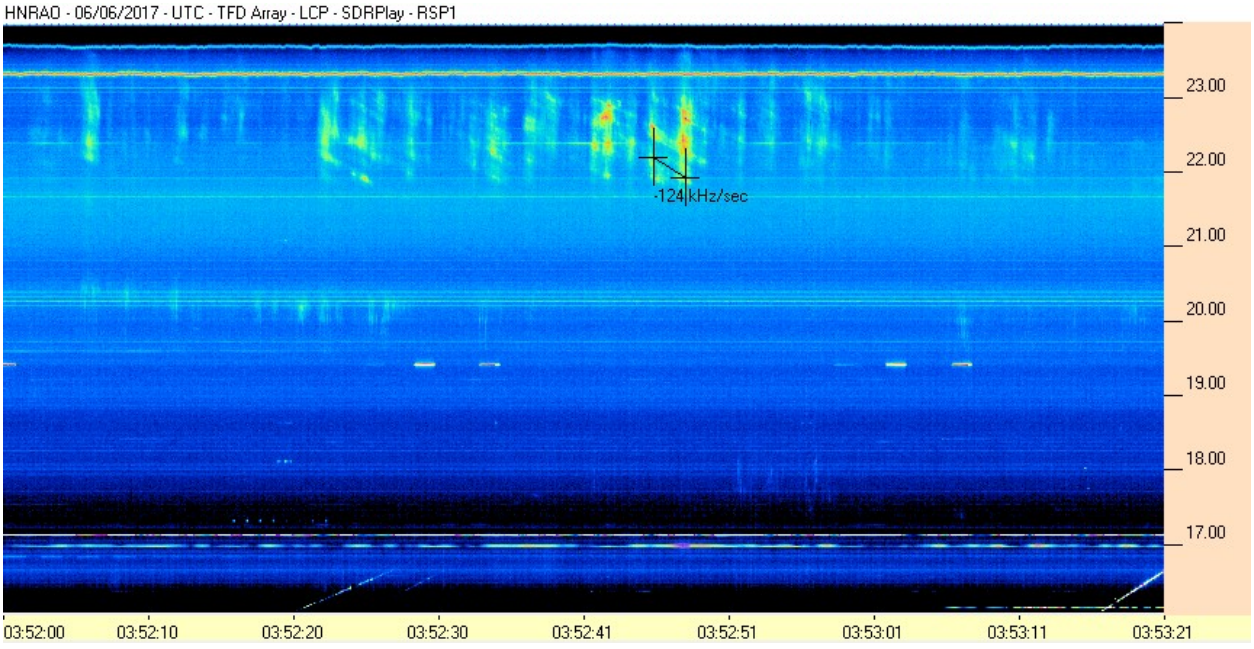





HNRAO - 06/06/2017 - UTC - TFD Array - LCP - SDRPlay - RSP1
-85 kHz/sec
23.00
22.00
21.00
20.00
19.00
18.00
17.00
03:50:15
03:50:25
03:50:35
03:50:45
03:50:56
03:51:06
03:51:16
03:51:26
03:51:36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-124 kHz/sec
23.00
22.00
21.00
20.00
19.00
18.00
17.00
03:52:00
03:52:10
03:52:20
03:52:30
03:52:41
03:52:51
03:53:01
03:53:11
03:53:21

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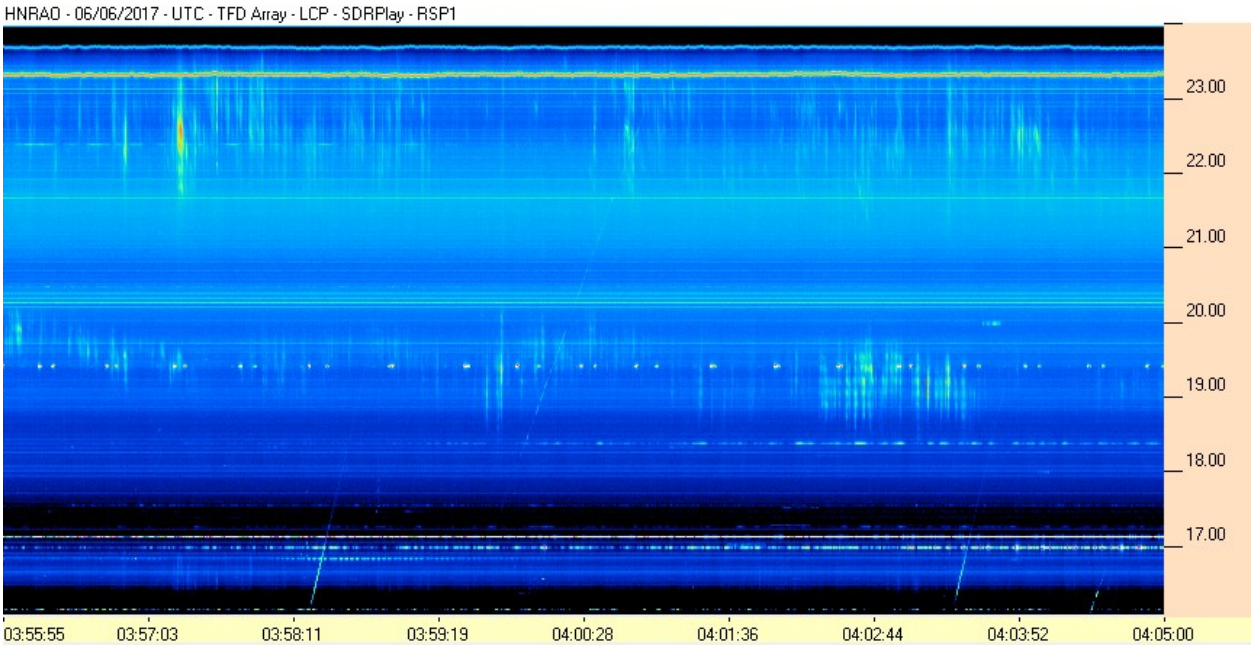
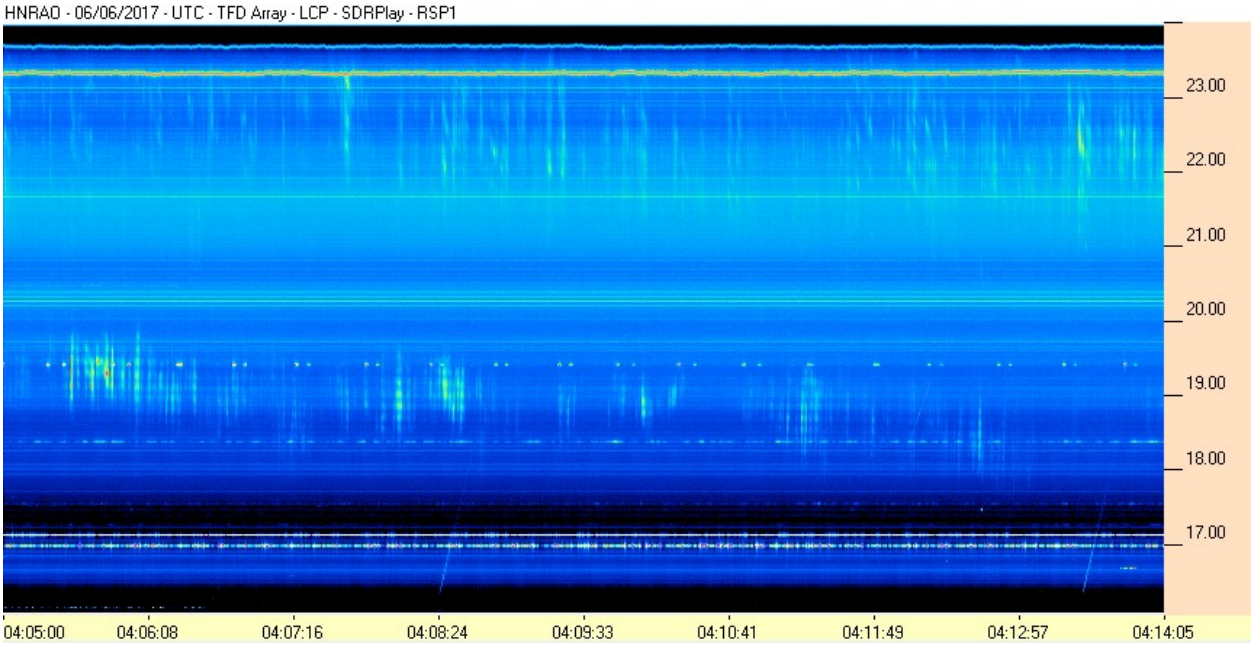
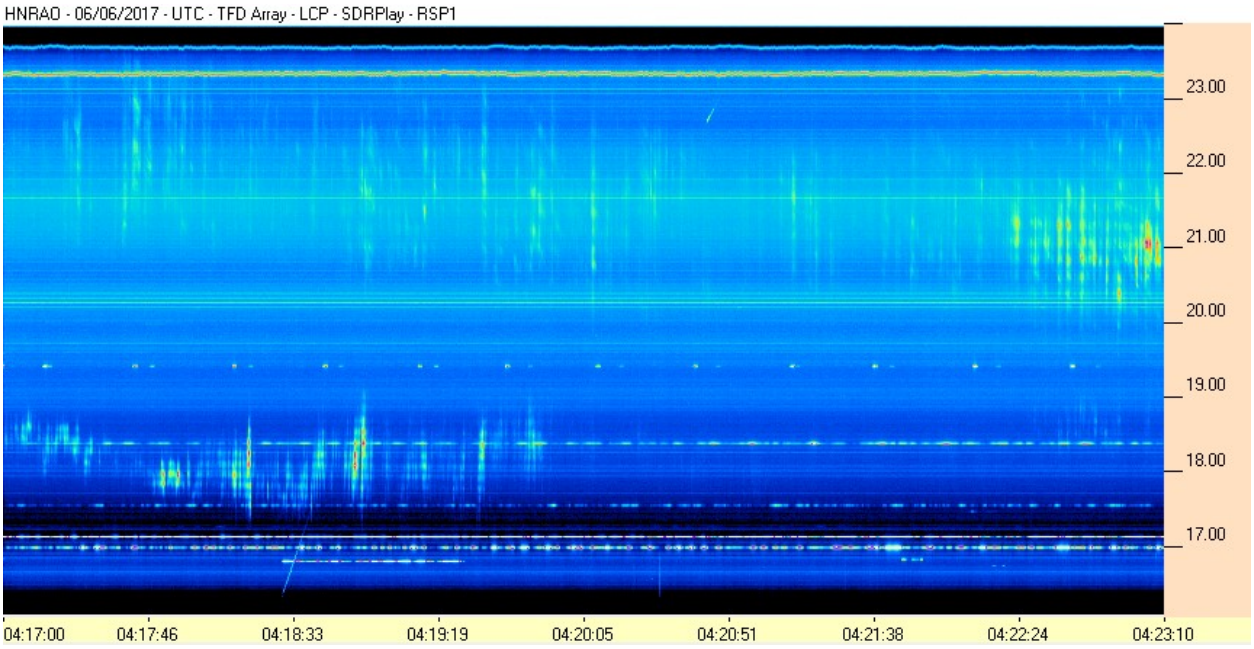
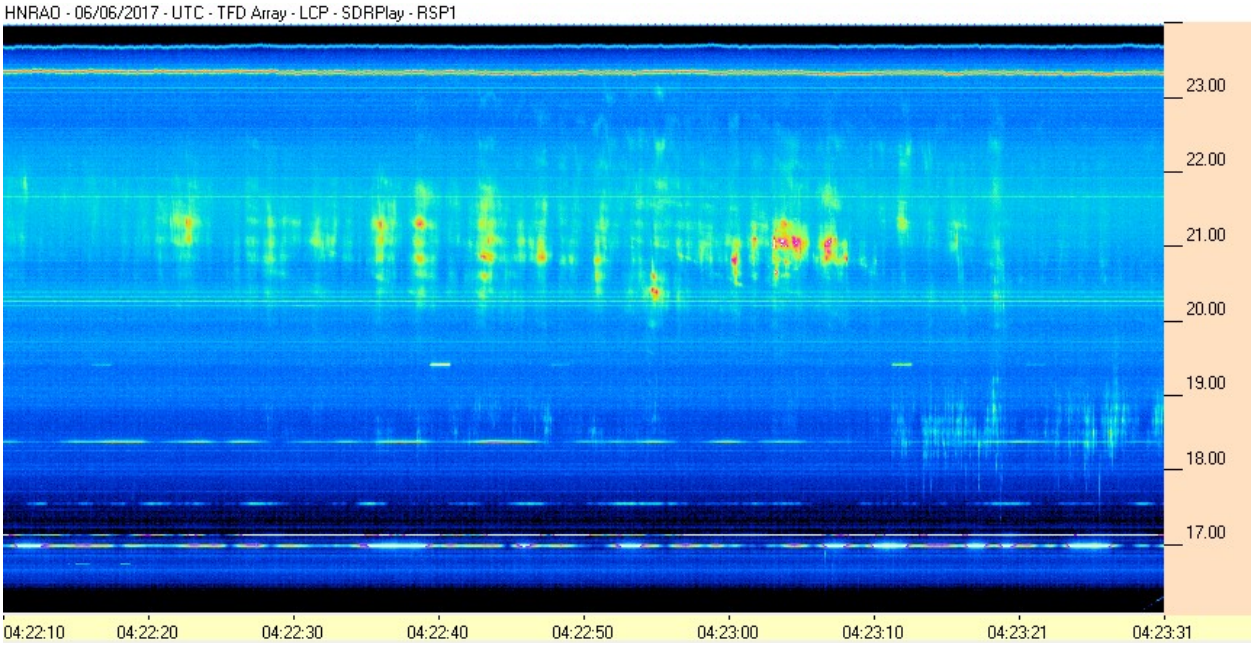
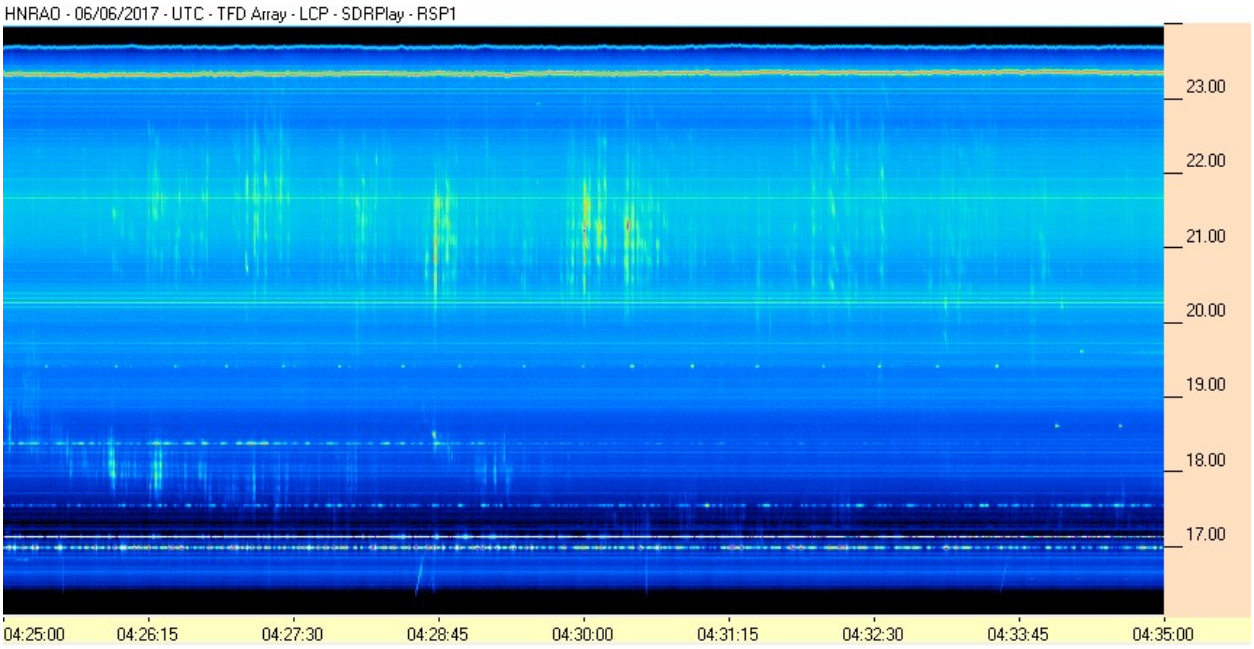
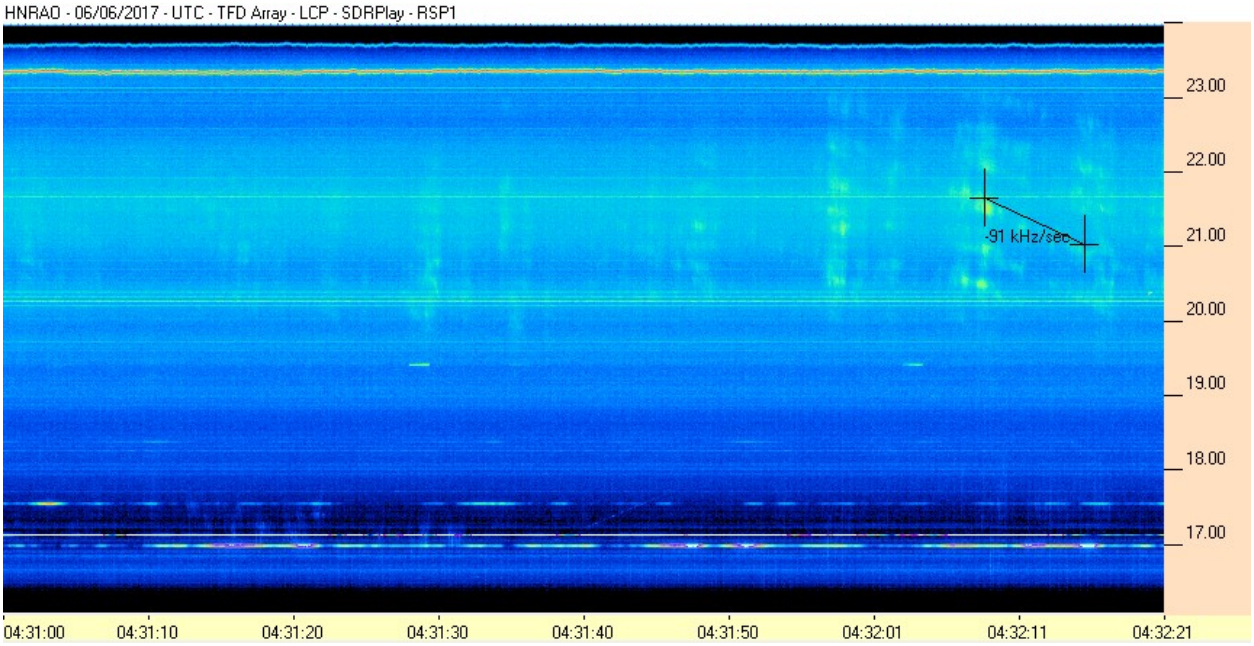





HNRAO - 06/06/2017 - UTC - TFD Array - LCP - SDRPlay - RSP1
23.00
22.00
21.00
20.00
19.00
18.00
17.00
04:17:00
04:17:46
04:18:33
04:19:19
04:20:05
04:20:51
04:21:38
04:22:24
04:23:10


HNRAO - 06/06/2017 - UTC - TFD Array - LCP - SDRPlay - RSP1
23.00
22.00
21.00
20.00
19.00
18.00
17.00
04:22:10
04:22:20
04:22:30
04:22:40
04:22:50
04:23:00
04:23:10
04:23:21
04:23:31


HNRAO - 06/06/2017 - UTC - TFD Array - LCP - SDRPlay - RSP1
23.00
22.00
21.00
20.00
19.00
18.00
17.00
04:25:00
04:26:15
04:27:30
04:28:45
04:30:00
04:31:15
04:32:30
04:33:45
04:35:00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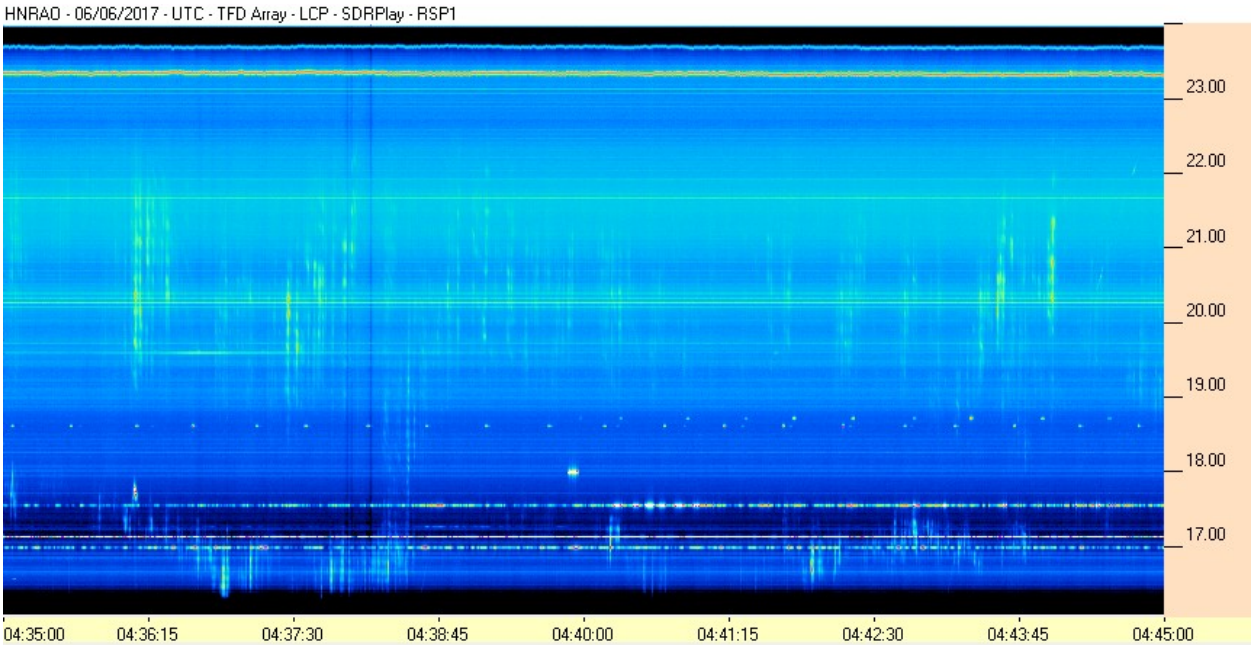
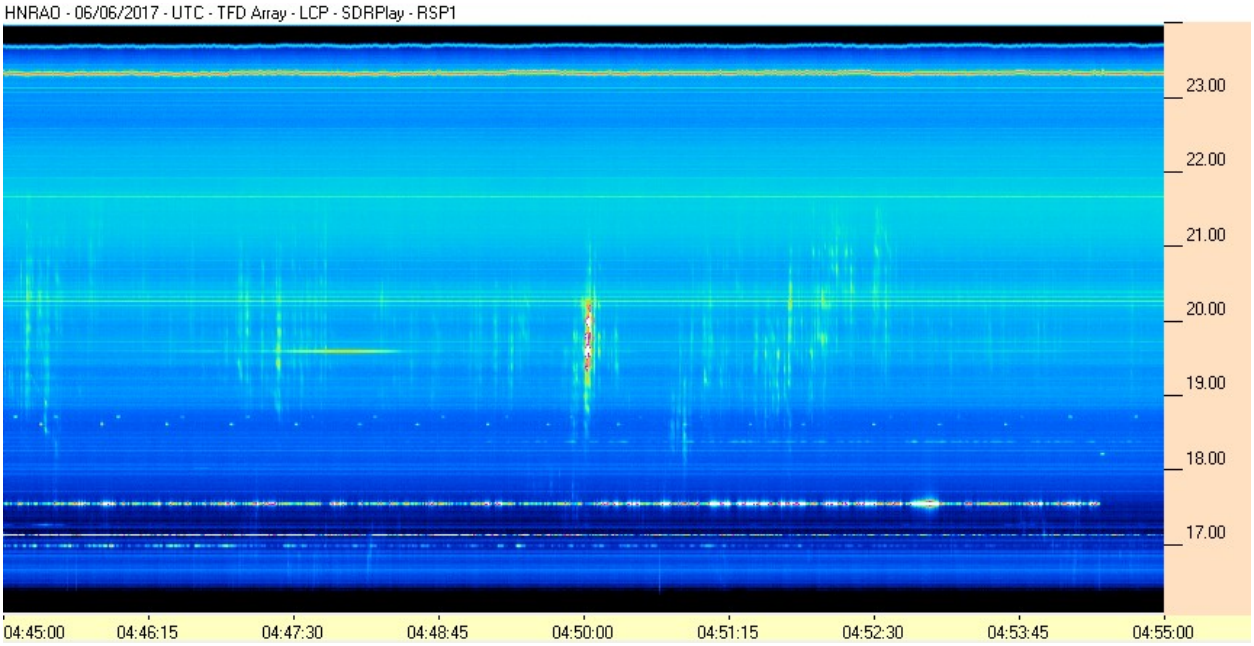
-91 kHz/sec
23.00
22.00
21.00
20.00
19.00
18.00
17.00
04:31:00
04:31:10
04:31:20
04:31:30
04:31:40
04:31:50
04:32:01
04:32:11
04:32:21


HNRAO - 06/06/2017 - UTC - TFD Array - LCP - SDRPlay - RSP1
23.00
22.00
21.00
20.00
19.00
18.00
17.00
04:35:00
04:36:15
04:37:30
04:38:45
04:40:00
04:41:15
04:42:30
04:43:45
04:45:00


HNRAO - 06/06/2017 - UTC - TFD Array - LCP - SDRPlay - RSP1
23.00
22.00
21.00
20.00
19.00
18.00
17.00
04:45:00
04:46:15
04:47:30
04:48:45
04:50:00
04:51:15
04:52:30
04:53:45
04:55:00

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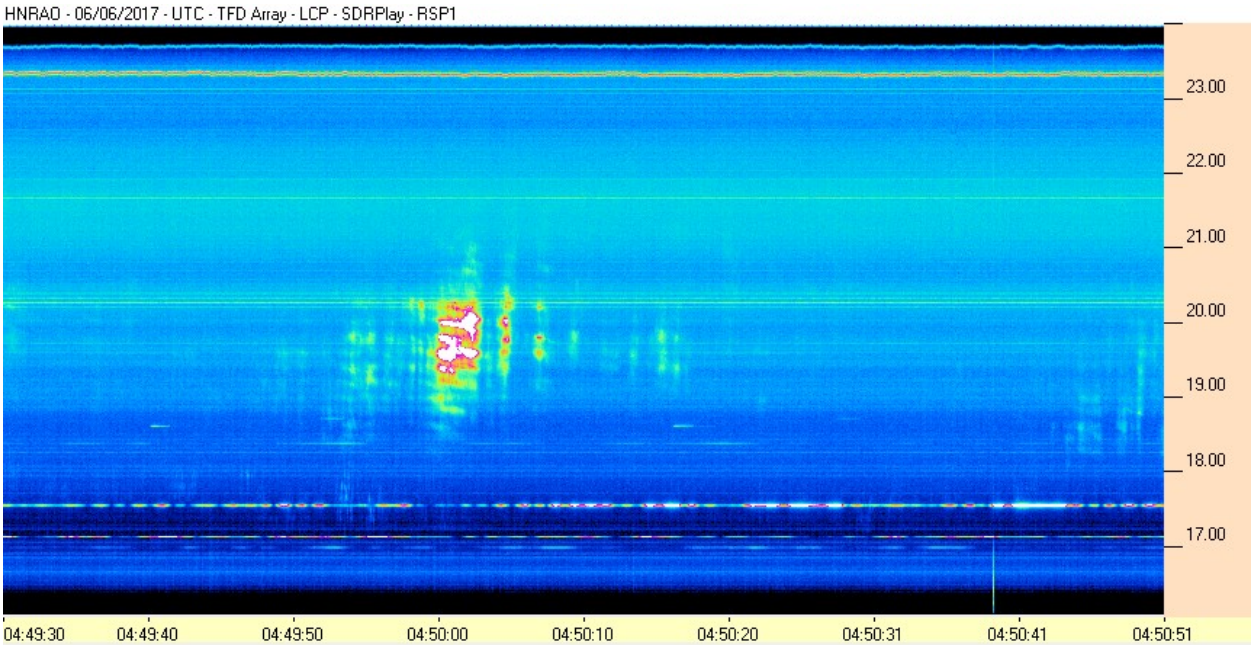

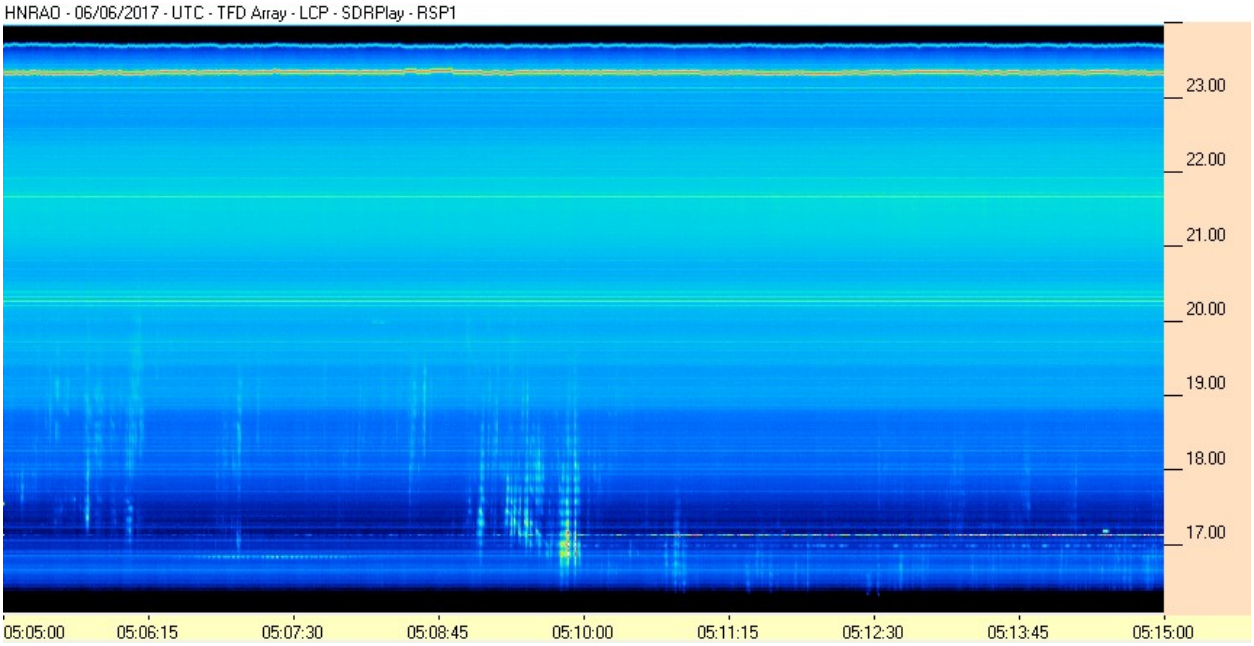

FSX-8S/TFD Pair