HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: 16 March 2018

Object: Jupiter – Io-A

Observer: Unattended

Start - Time UT:	**0837**	**Planetary K-index:**	**3**
Jupiter Altitude (deg):	**31.5**	**Jupiter Azimuth (deg):**	**170.9**
Jupiter CML:	**197.19**	**Jupiter Io Phase:**	**228.43**
Jupiter RA (hr/min):	**15:23**	**Jupiter Dec (hr/min):**	**-17:19**
Hour Angle (hr/min):	**-00:33**	**Polarization**	**RCP? LCP?**
Sun Altitude (deg):	**-32.1**	**Sun Azimuth (deg):**	**061.9**
Sun RA (hr/min):	**23:37**	**Sun Dec (hr/min):**	**-02:27**

End – Time UT:	**1018**		
Jupiter Altitude (deg):	**29.8**	**Jupiter Azimuth (deg):**	**199.0**
Jupiter CML:	**258.26**	**Jupiter Io Phase**	**242.76**
Hour Angle (hr/min):	**01:09**		
Sun Altitude (deg):	**-13.9**	**Sun Azimuth (deg):**	**081.0**

Observatory Configuration

Spectrograph Receiver	Antenna	Polarization	System Loss	Multicoupler	Multicoupler port	Calibrated
FSX-8S	TFD	RCP LCP	7.70 dB 7.70 dB	#2 RCP #1 LCP	Port 1 +10dB Port 1 +10dB	Twice daily Twice daily
FSX-2	LWA	RCP/LCP manual select		N/A	N/A	N/A
SDRPlay RSP2	TFD	RCP	-7.70 dB	#2 RCP	Port 2 +3dB	Twice daily
SDRPlay RSP2	TFD	LCP	-7.70 dB	#1 LCP	Port 2 +3dB	Twice daily
JOVE 1	TFD	RCP	-7.70 dB	#2 RCP	Port 3 +3 dB	03/08/2018
JOVE 1	TFD	LCP	-7.70 dB	#1 LCP	Port 3 +3 dB	03/08/2018
JOVE II	Jove dipoles	Linear	-3.19 dB	#3 Linear	Port 4 +3 dB	02/20/2018
SDRPlay RSP1	Experimental*					

JOVE dipoles phased @ 32 degrees for 2017-2018 season
TFD array phased @ 35 degrees for 2017-2018 season
LWA antenna phased @ 35 degrees and orientation for observation: 45 degrees
* Used for testing and evaluating antenna systems

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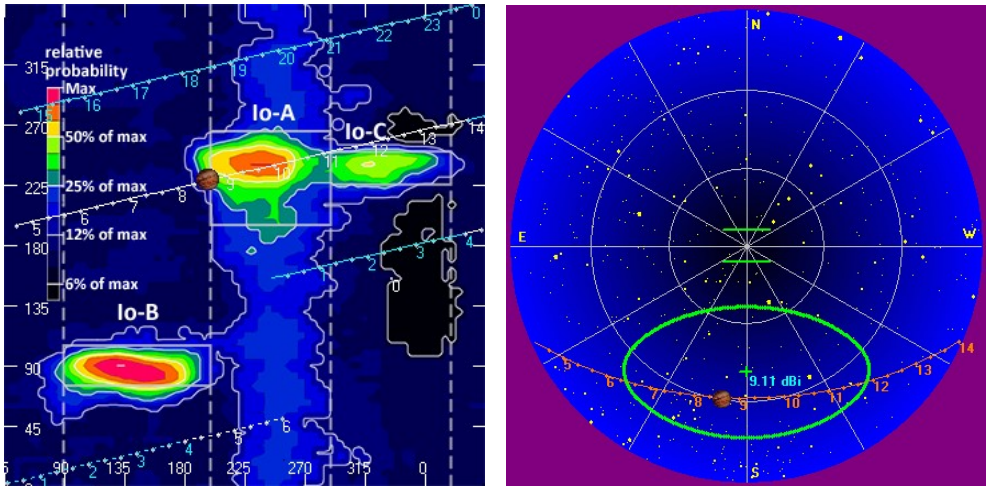
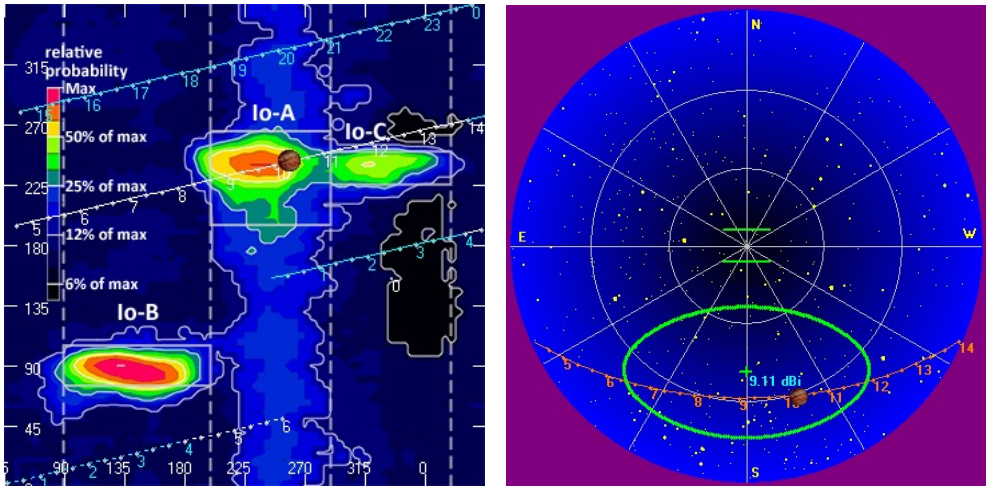


Beginning of Pass



End of Pass

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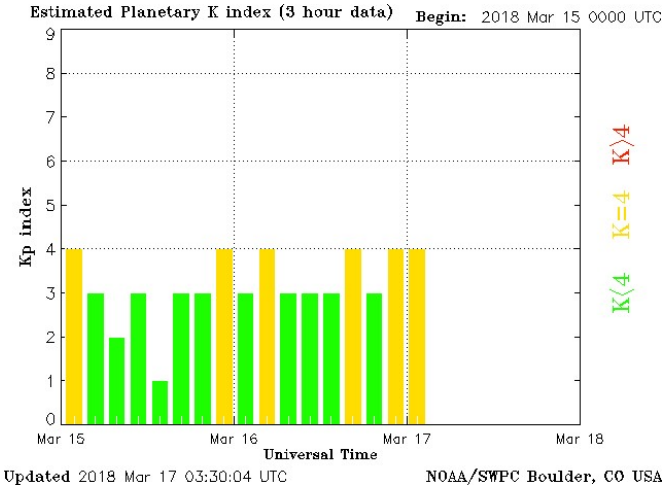
MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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

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	



This Io-A storm presents a puzzle that has no explanation from this observer.

Io-A is expected to be RCP emissions, however, one of my spectrographs shows stronger emission in LCP. The SDRPlay RSP2/TFD array spectrograph clearly shows stronger L-burst emission and L4 modulation lanes from the LCP side of the TFD array. The FSX-8S/TFD array spectrograph shows the same emission in RCP. The FSX-2/LWA spectrograph also shows it as RCP emission. The two SDRPlay RSP spectrographs disagree with both the FSX spectrographs. The SDRPlay RSP2 spectrographs show stronger emission in the left-hand polarization and weaker emission in the right-hand polarization.

Jupiter was well within the beam of the antenna and was 30 minutes before transit at the beginning of the storm.

Overall, the storm was extremely weak for being a near center pass of the Io-A emission region. L-burst emissions seemed to be predominantly above 21 MHz, with only a few emission groups dropping down to 15 MHz. The maximum frequency was about 27 MHz.

The discrepancy between the FSX spectrographs and the SDRPlay RSP2 spectrographs may go unsolved and this storm will be listed as an anomaly.

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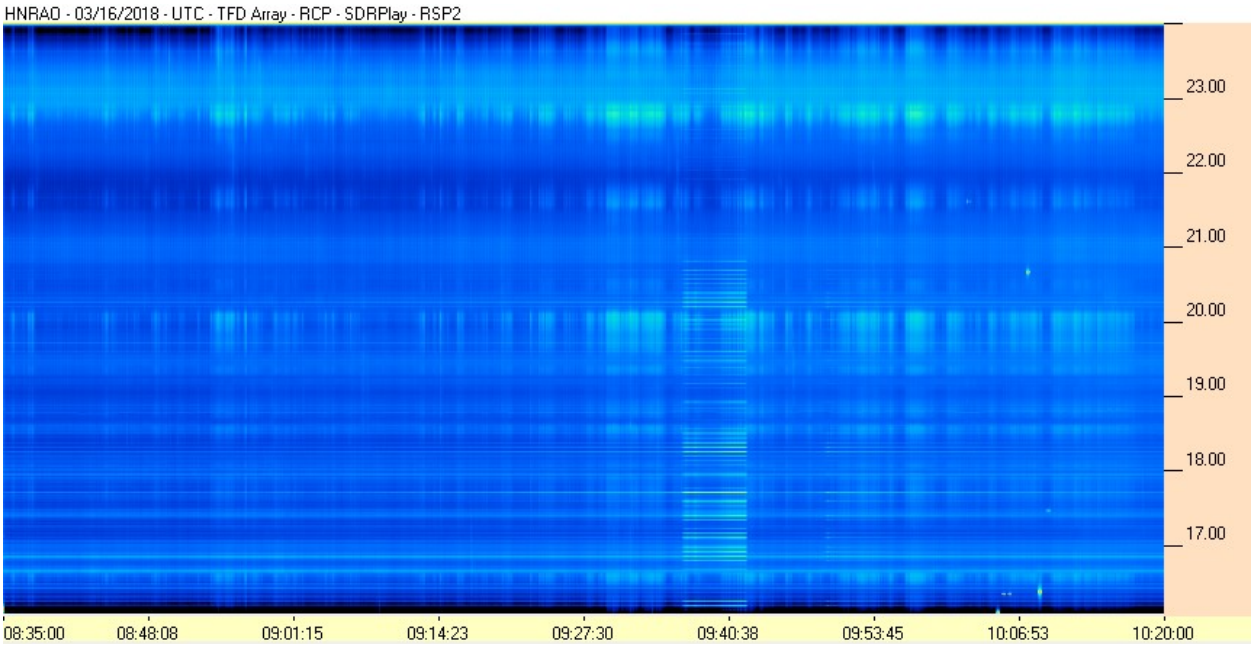
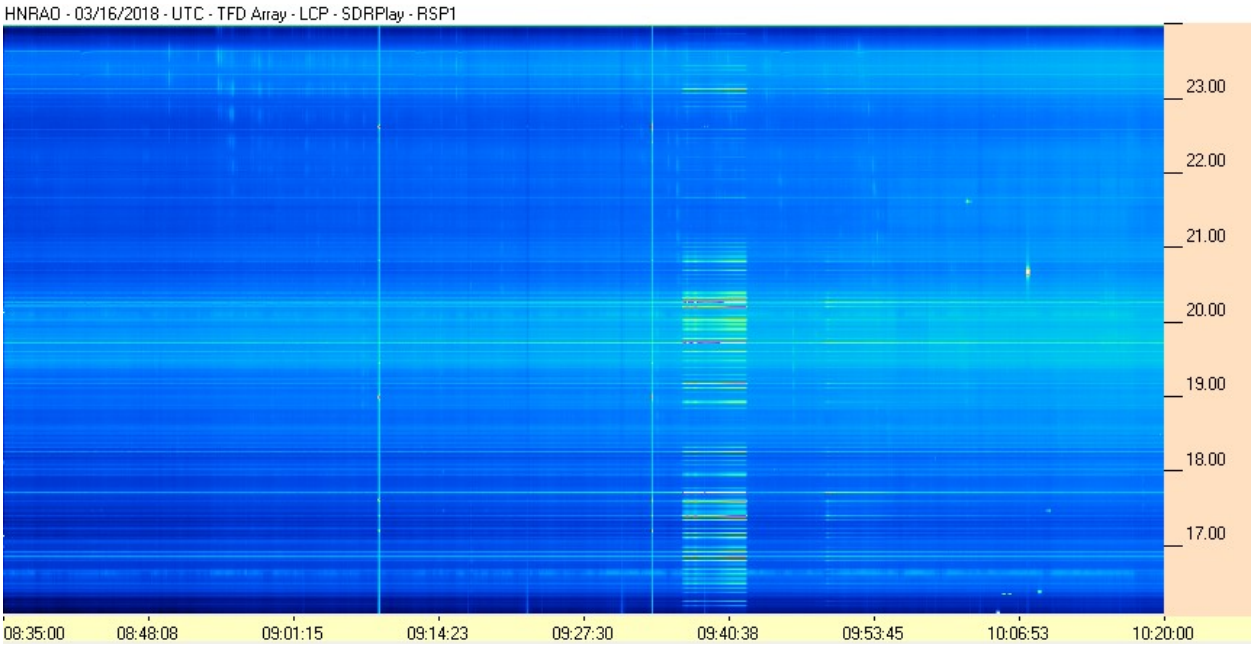
SDRPlay RSP2/TFD/RCP



SDRPlay RSP2/TFD/LCP



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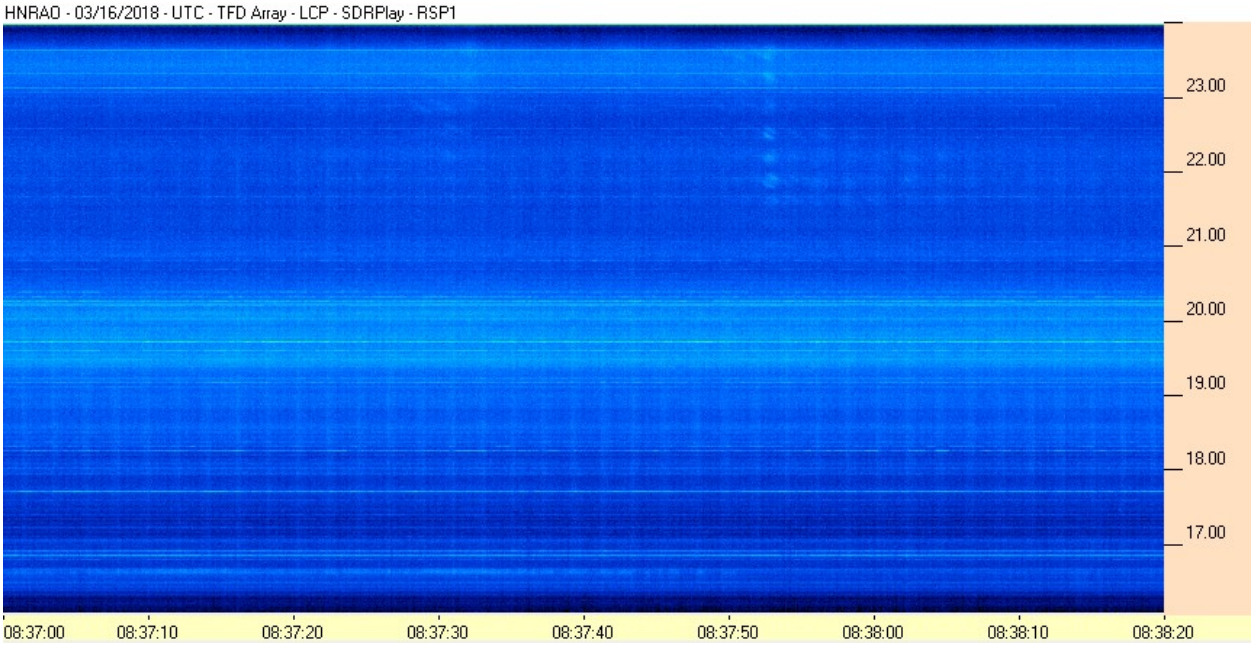

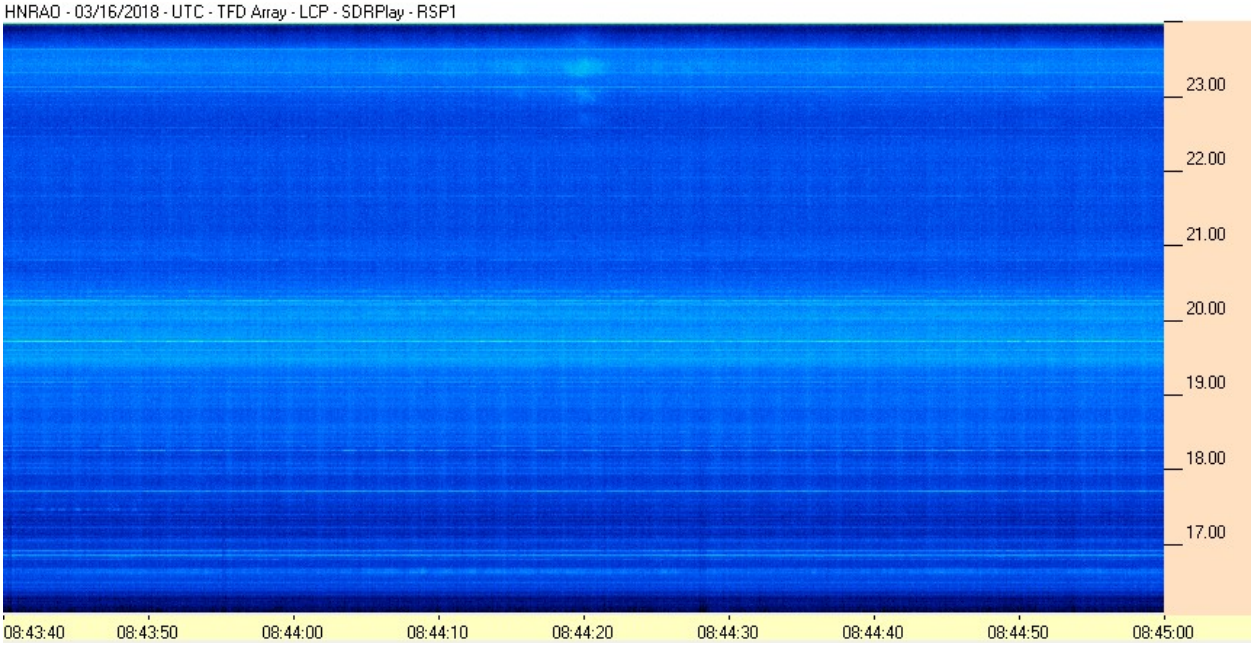

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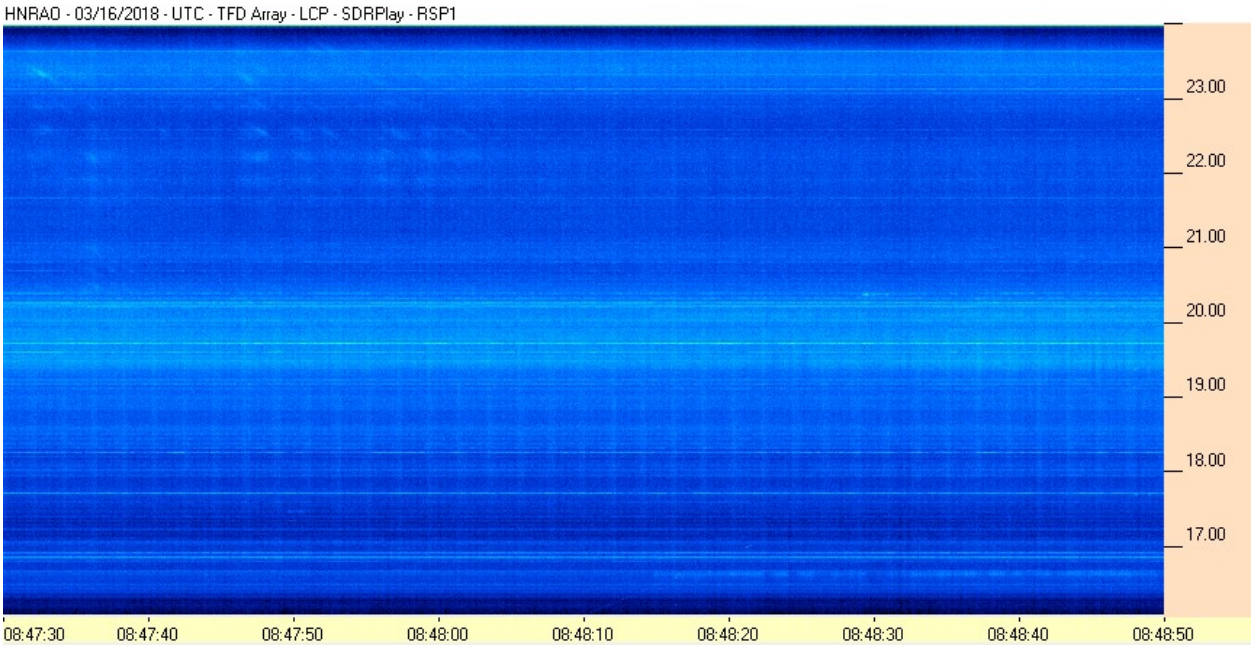

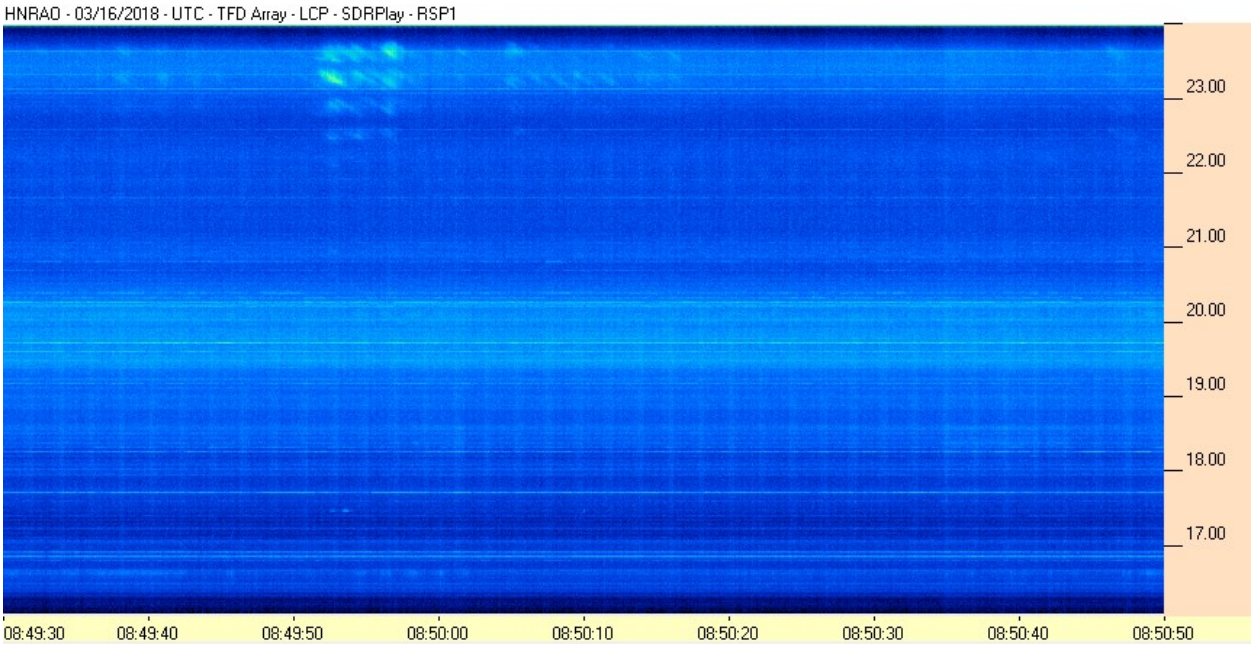

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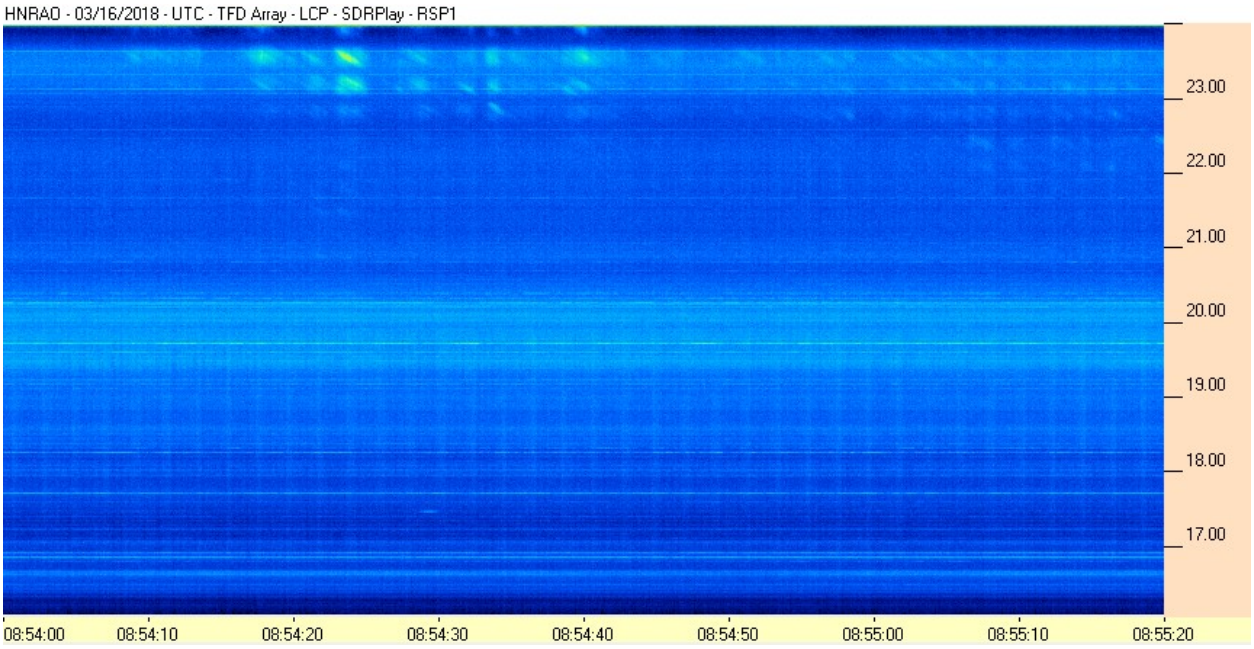

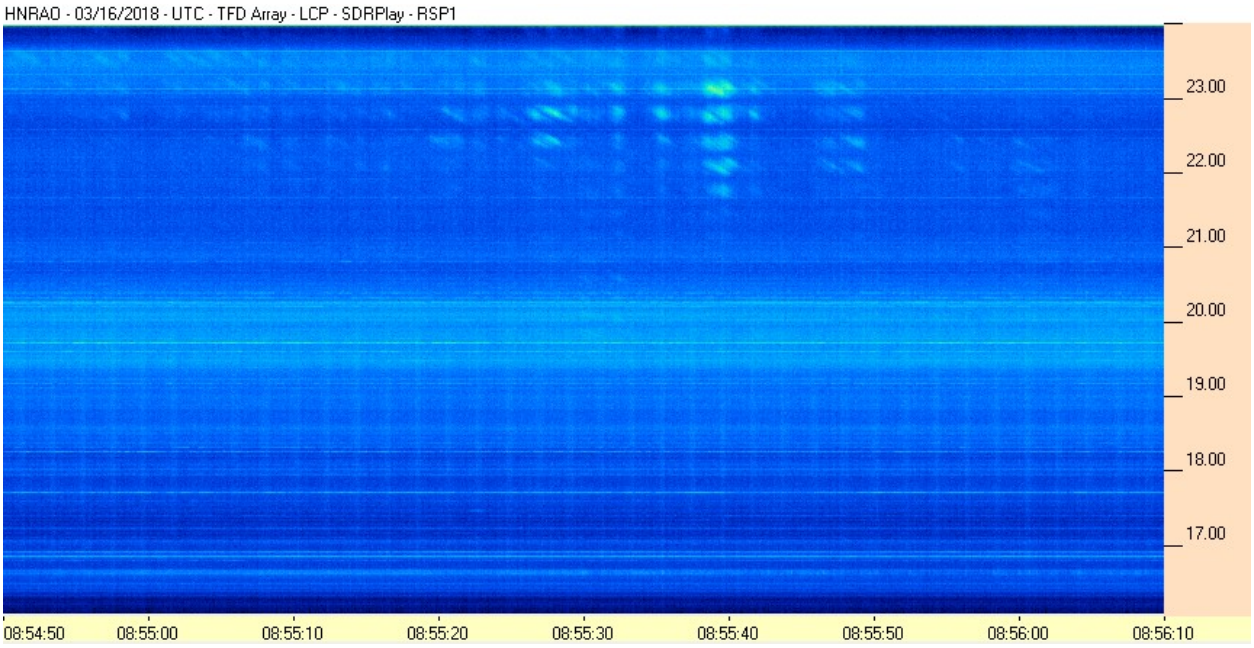

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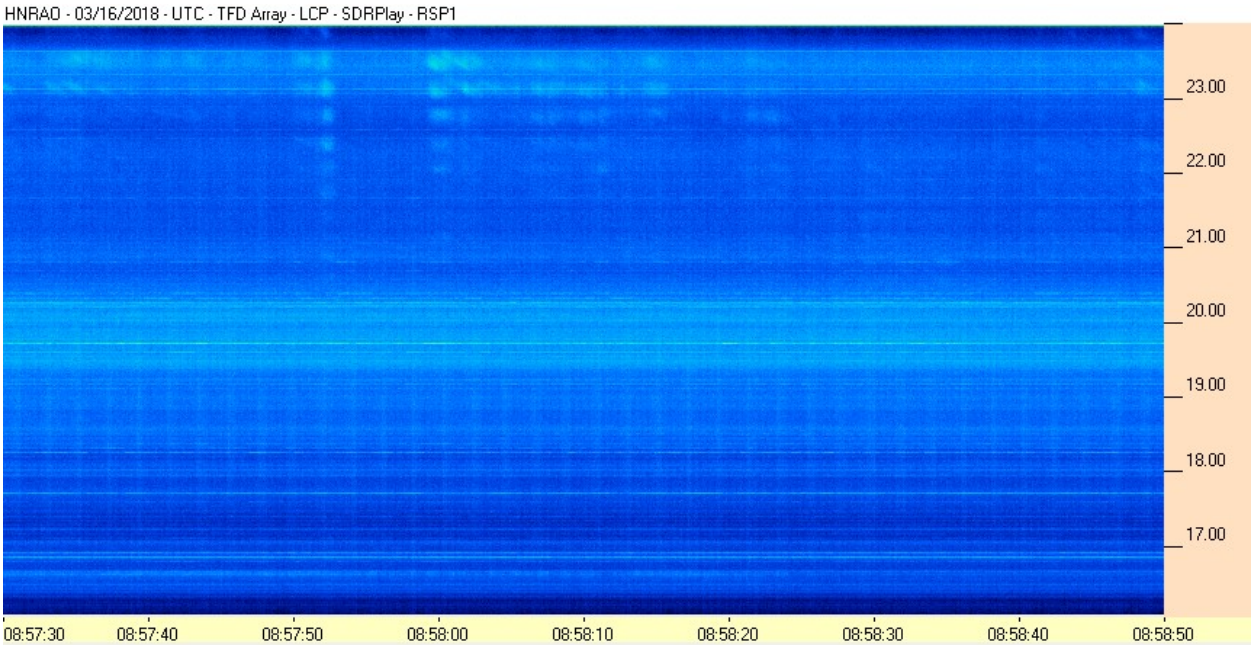

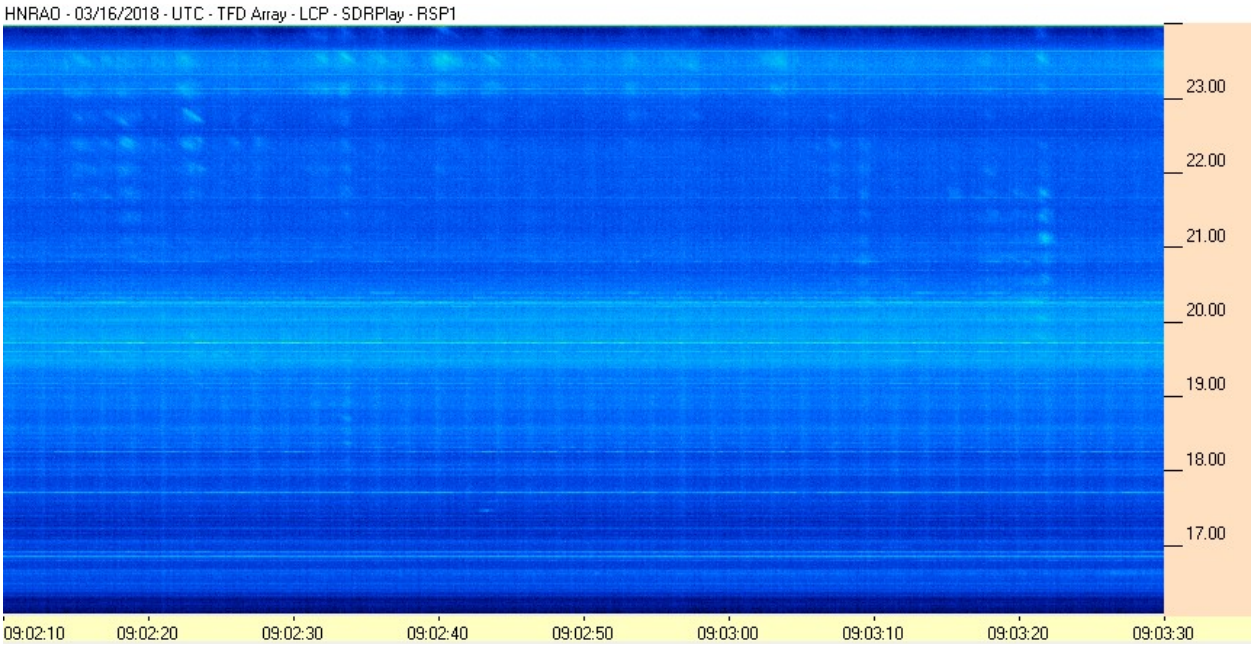

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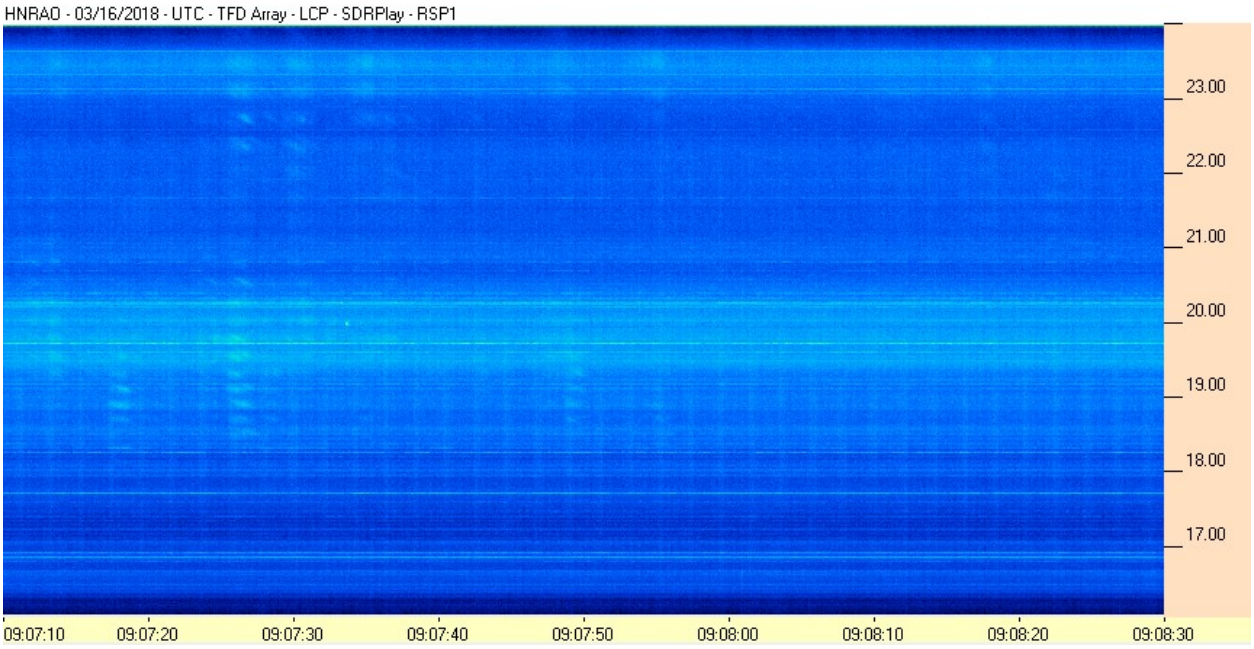

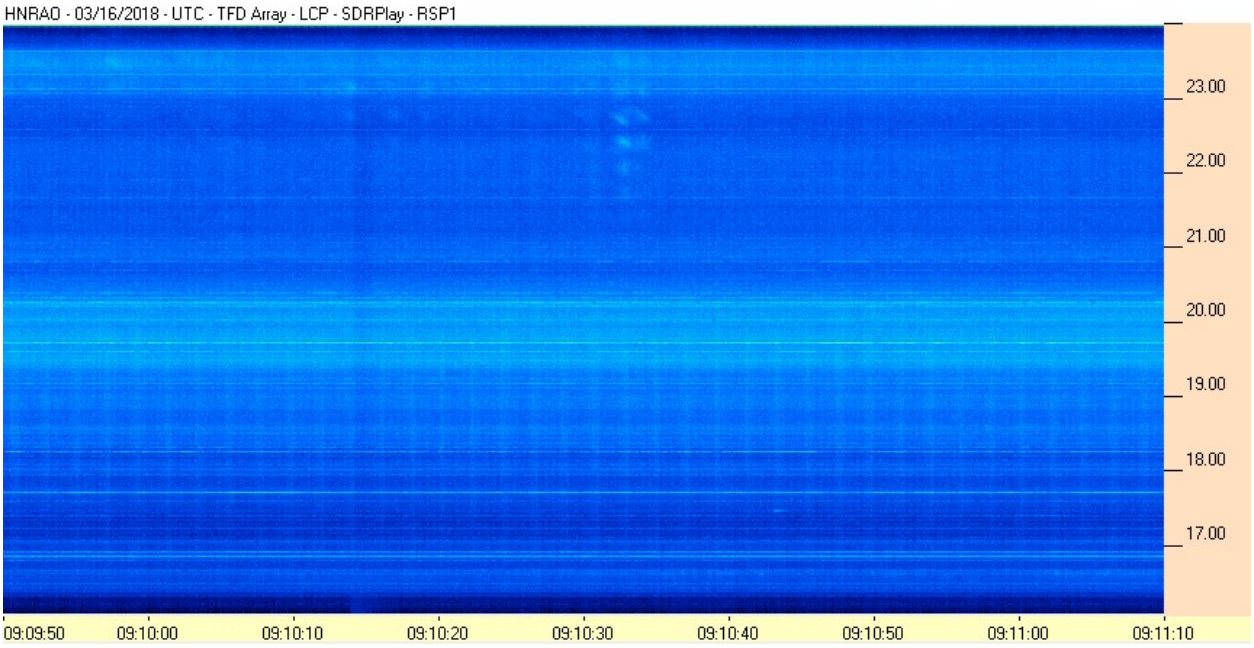

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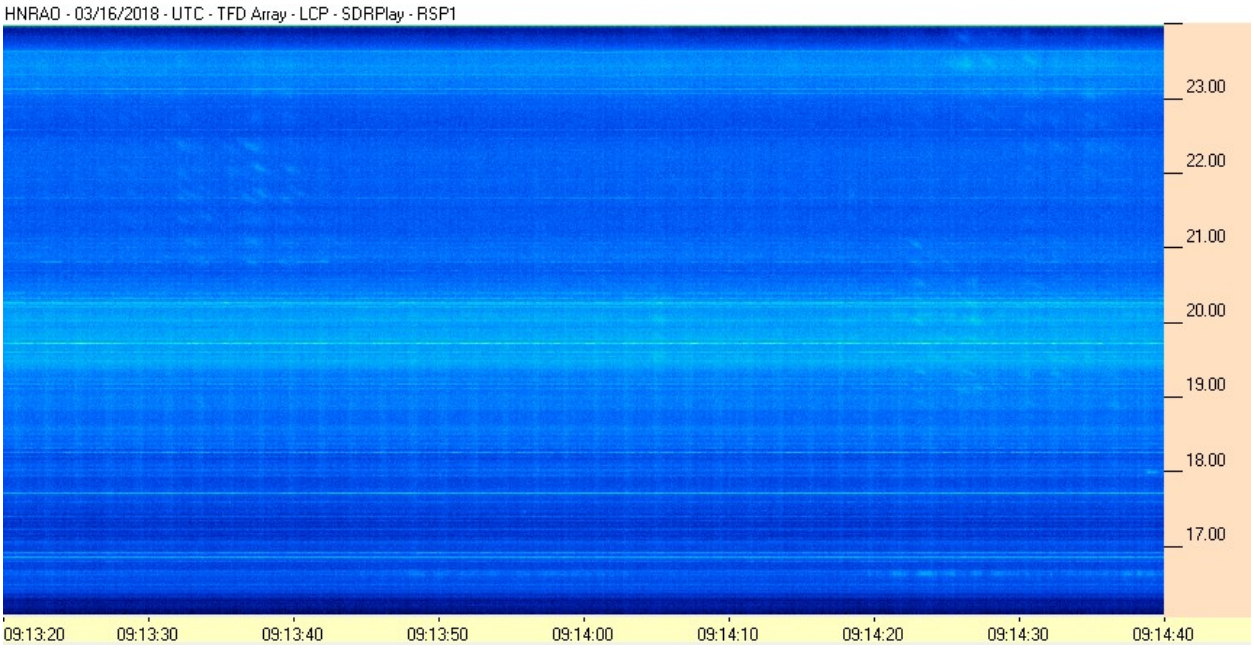

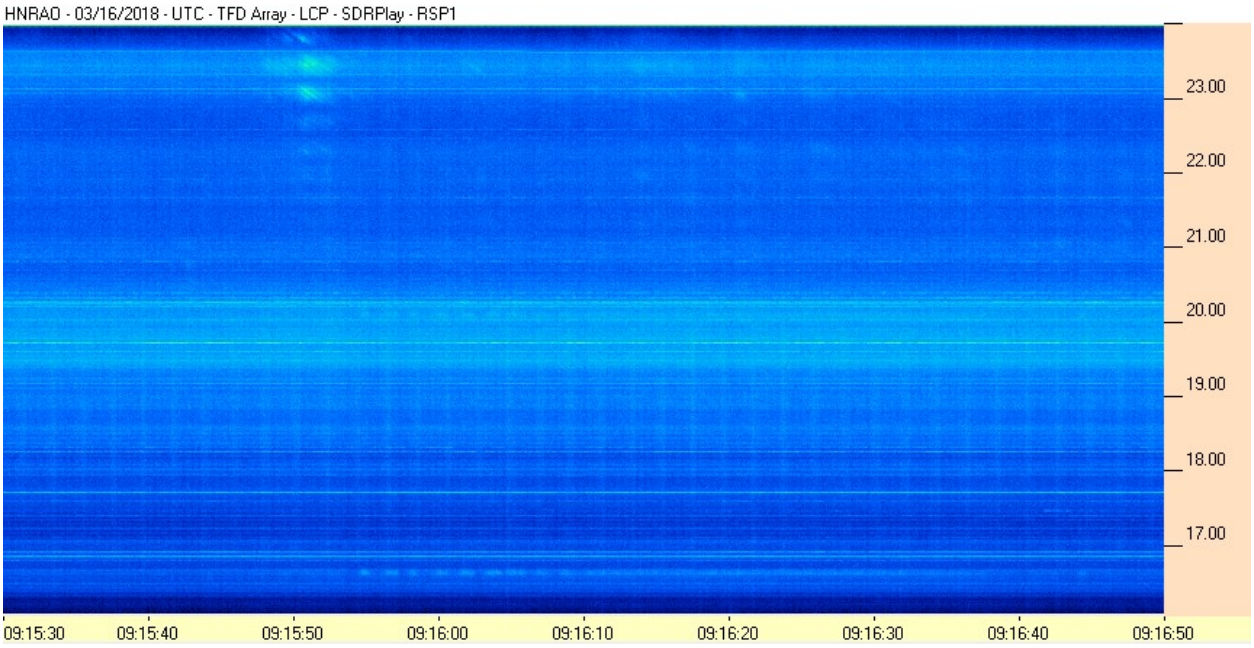

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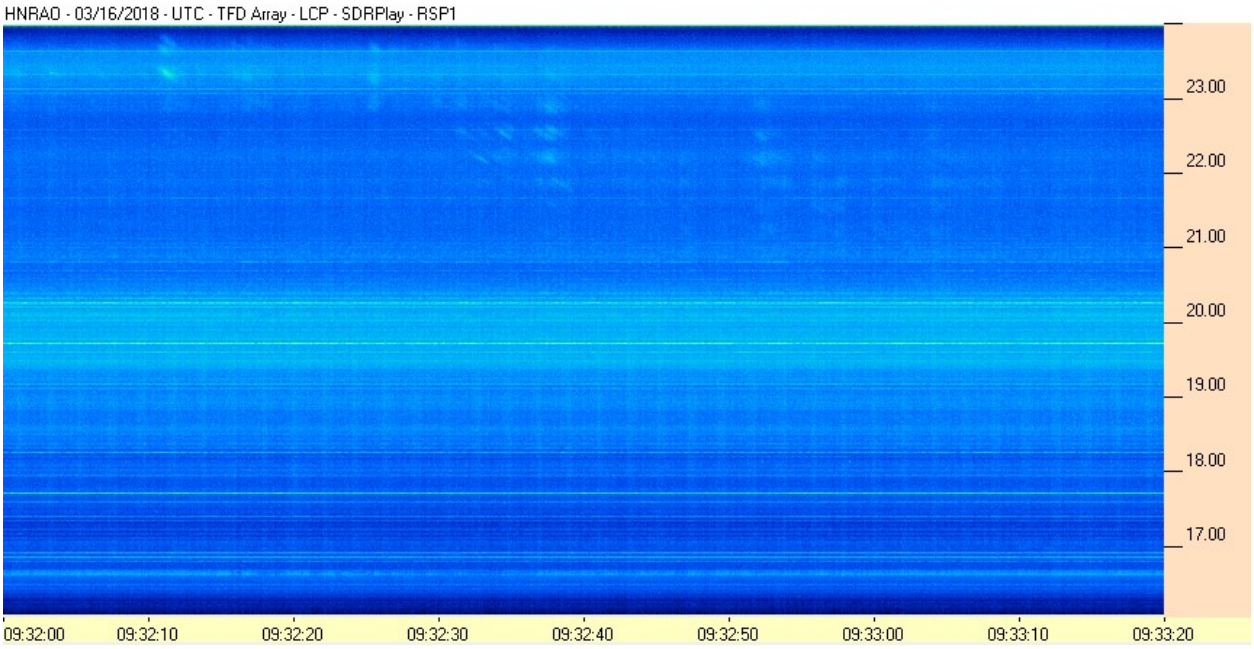

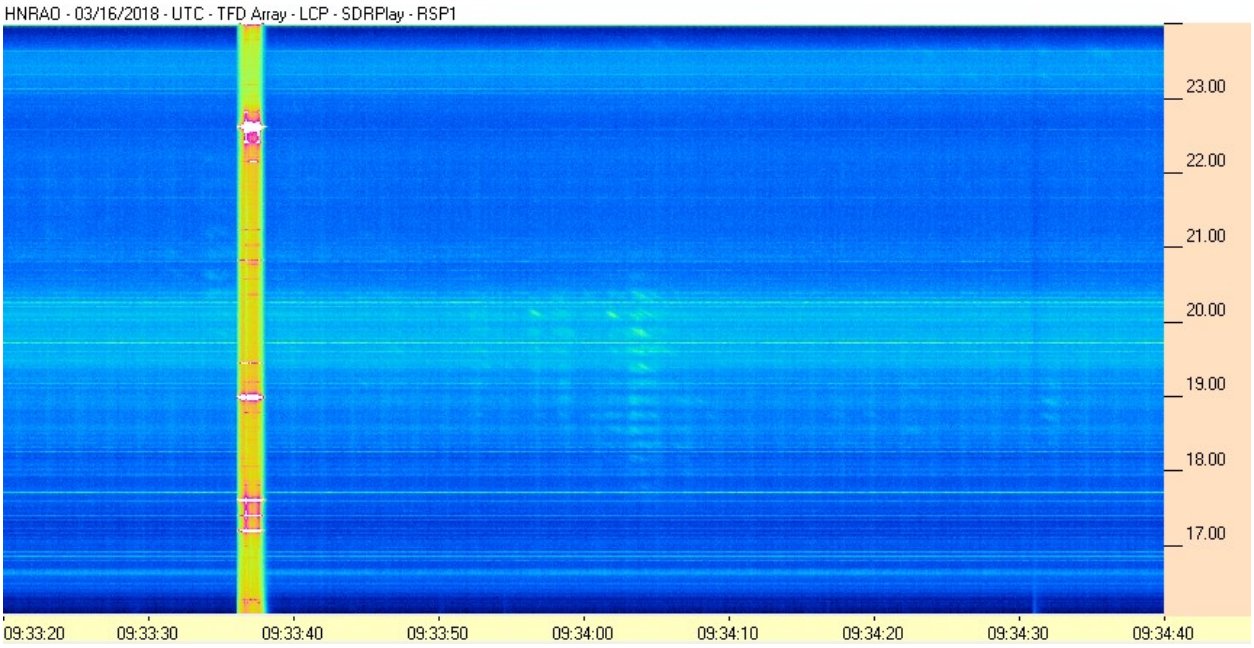

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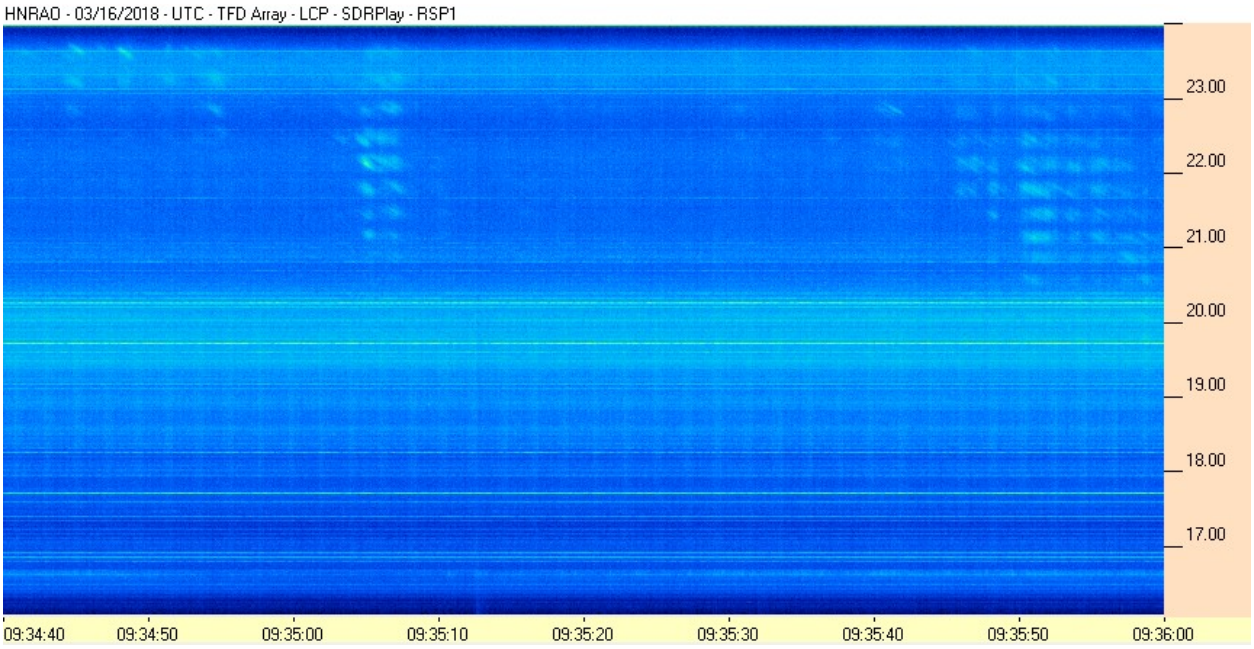
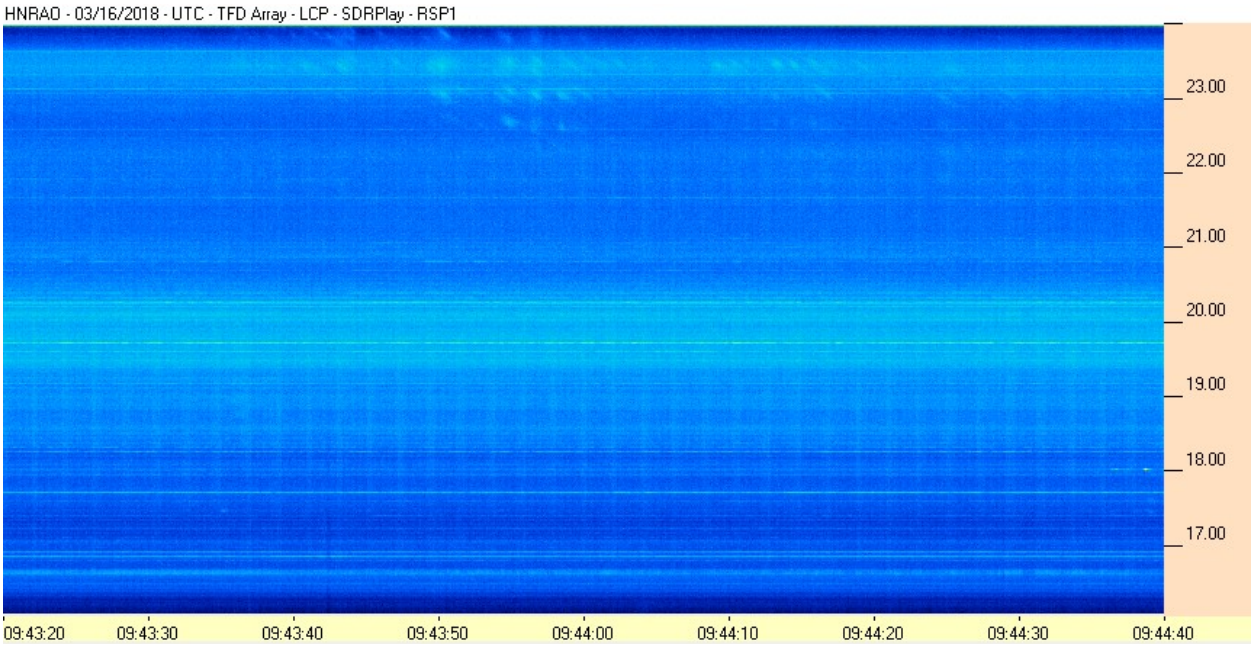
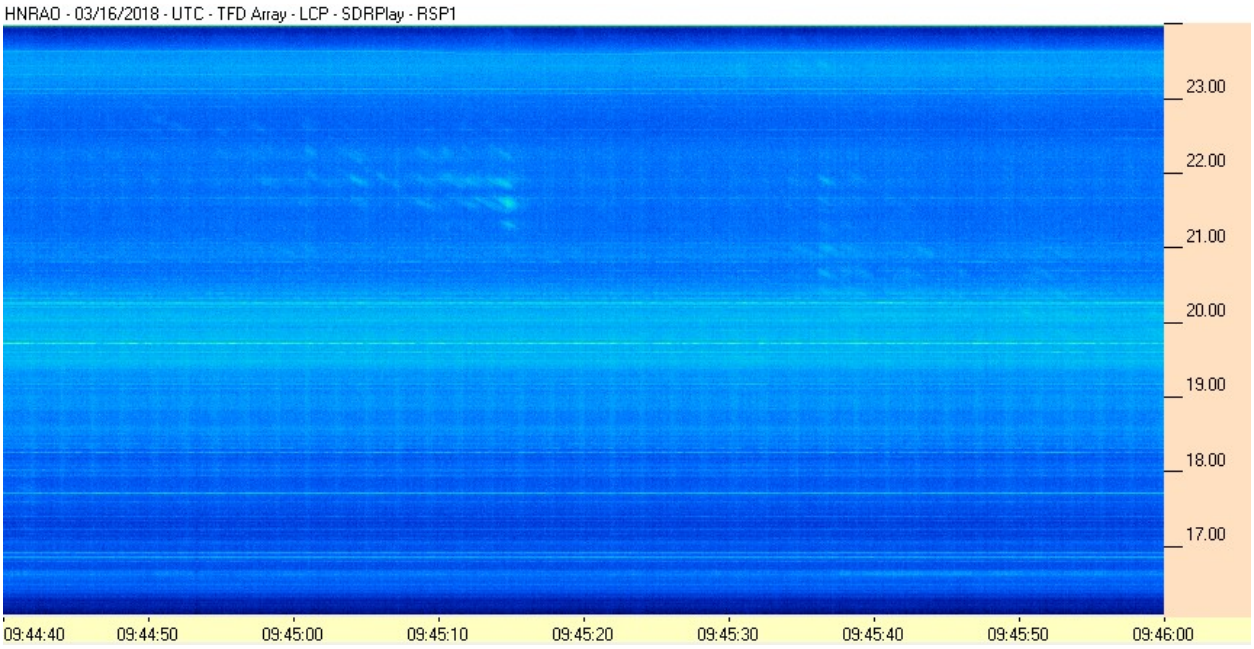
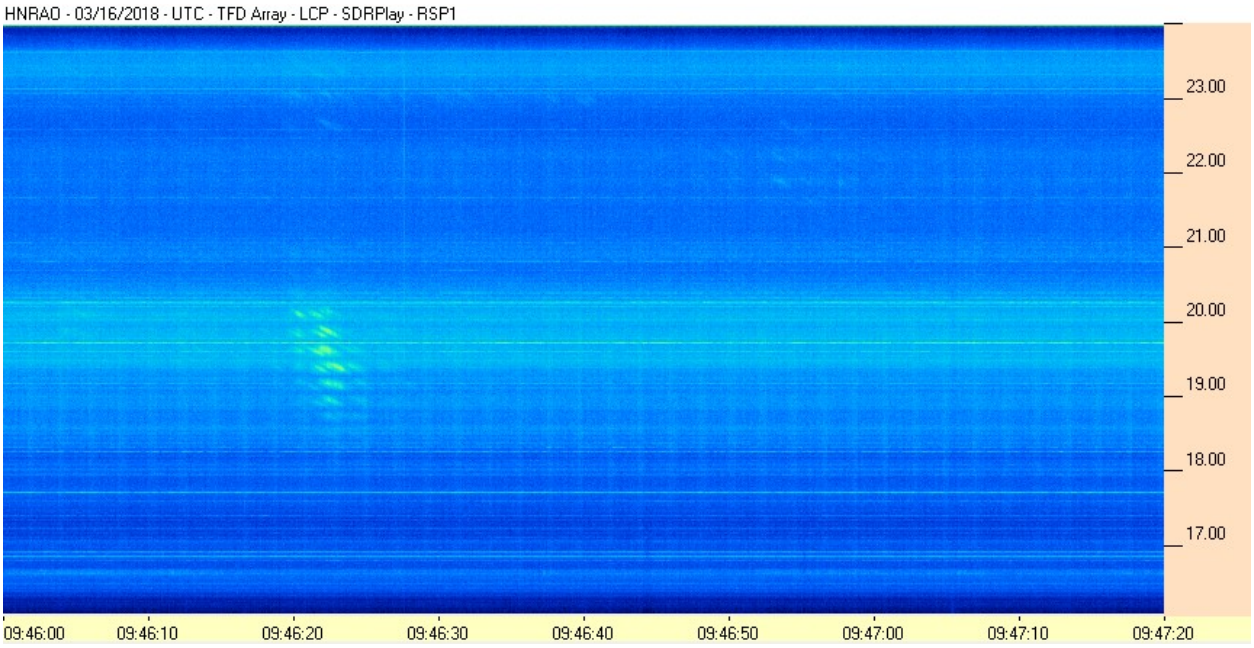





HNRAO - 03/16/2018 - UTC - TFD Array - LCP - SDRPlay - RSP1
23.00
22.00
21.00
20.00
19.00
18.00
17.00
09:44:40
09:44:50
09:45:00
09:45:10
09:45:20
09:45:30
09:45:40
09:45:50
09:46:00


HNRAO - 03/16/2018 - UTC - TFD Array - LCP - SDRPlay - RSP1
23.00
22.00
21.00
20.00
19.00
18.00
17.00
09:46:00
09:46:10
09:46:20
09:46:30
09:46:40
09:46:50
09:47:00
09:47:10
09:47:20

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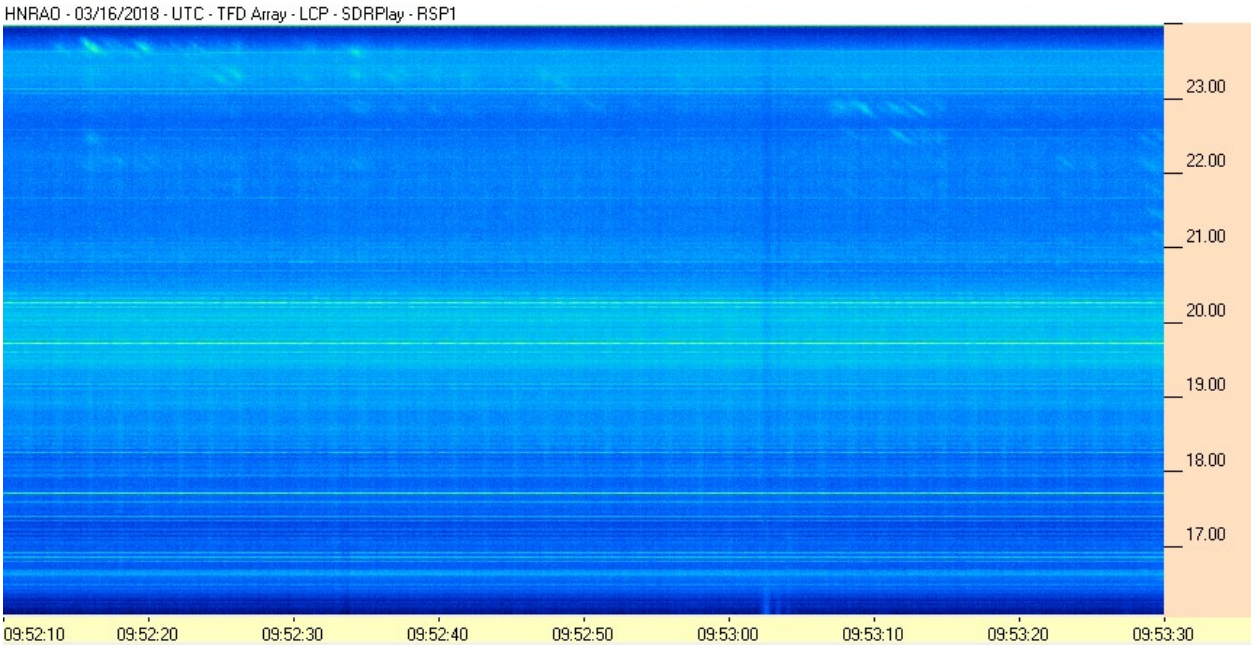
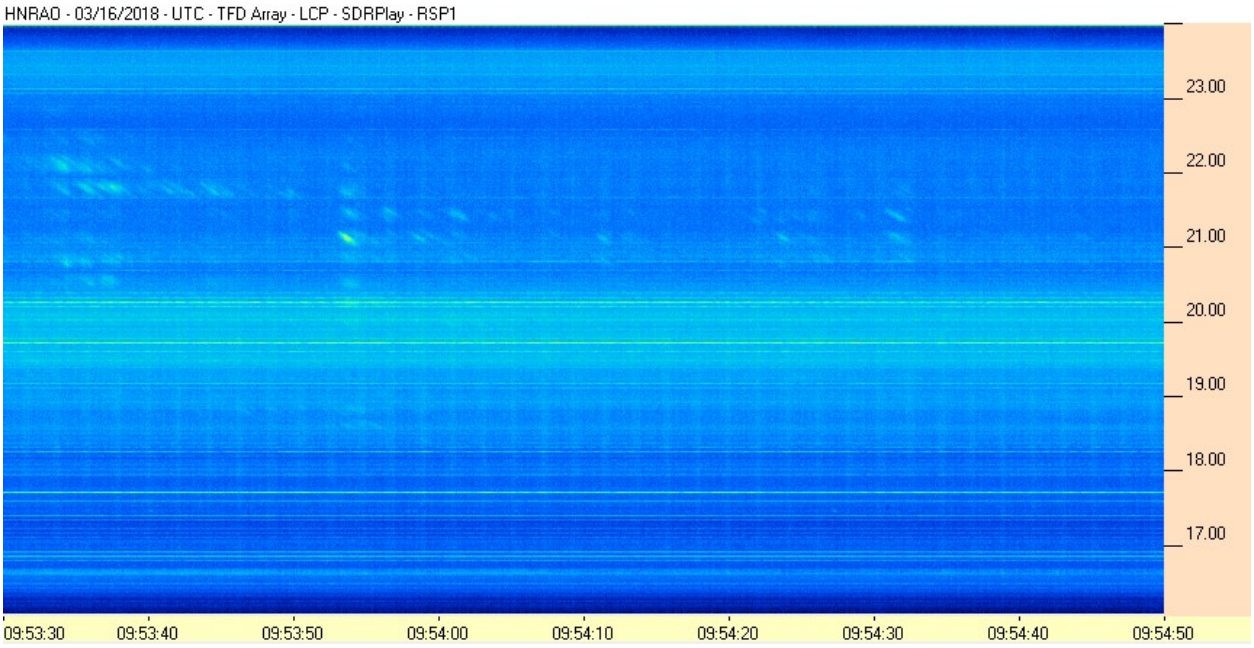
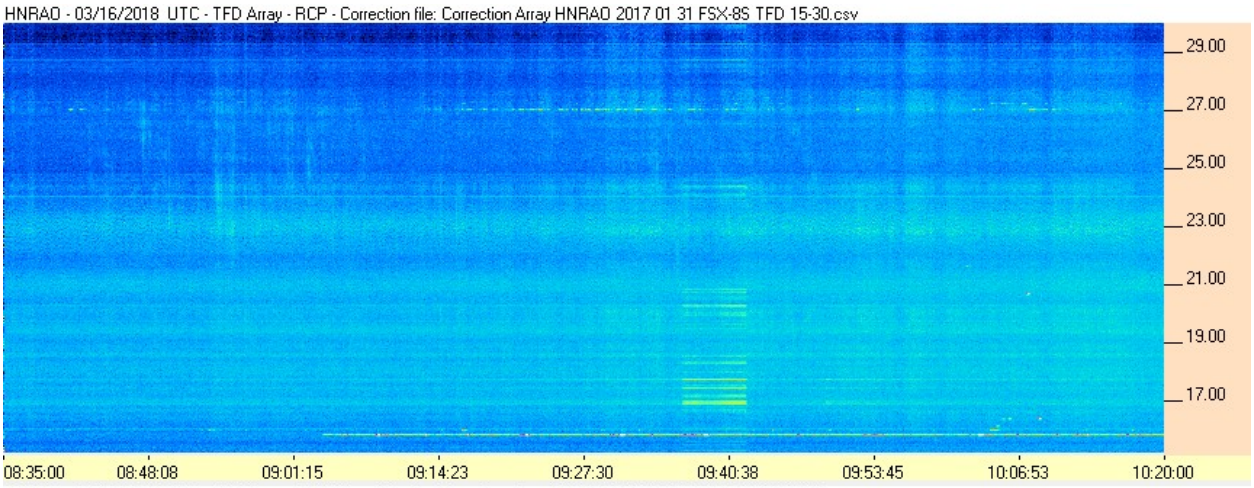




FSX-8S/TFD



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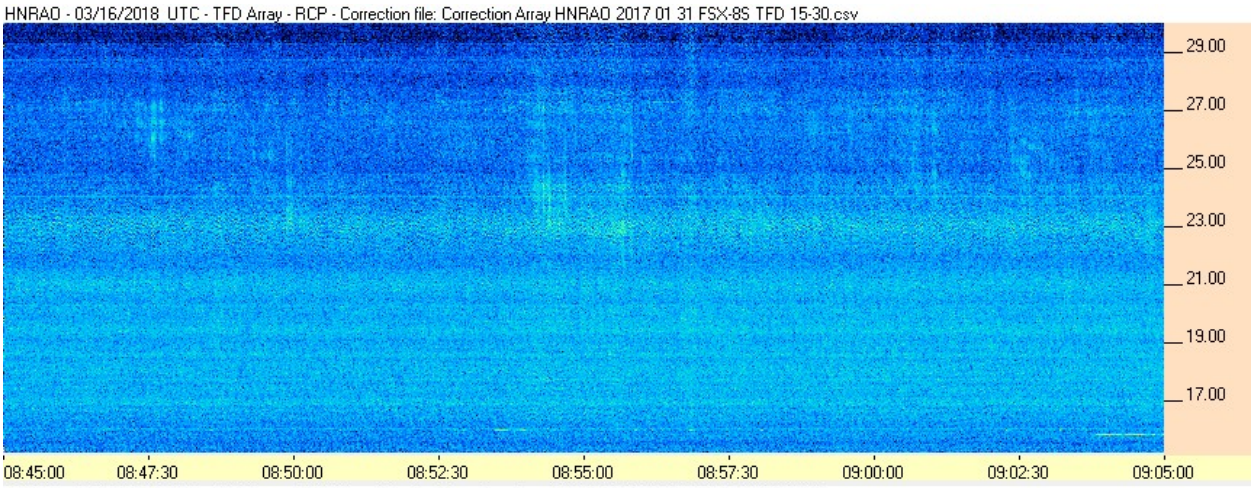

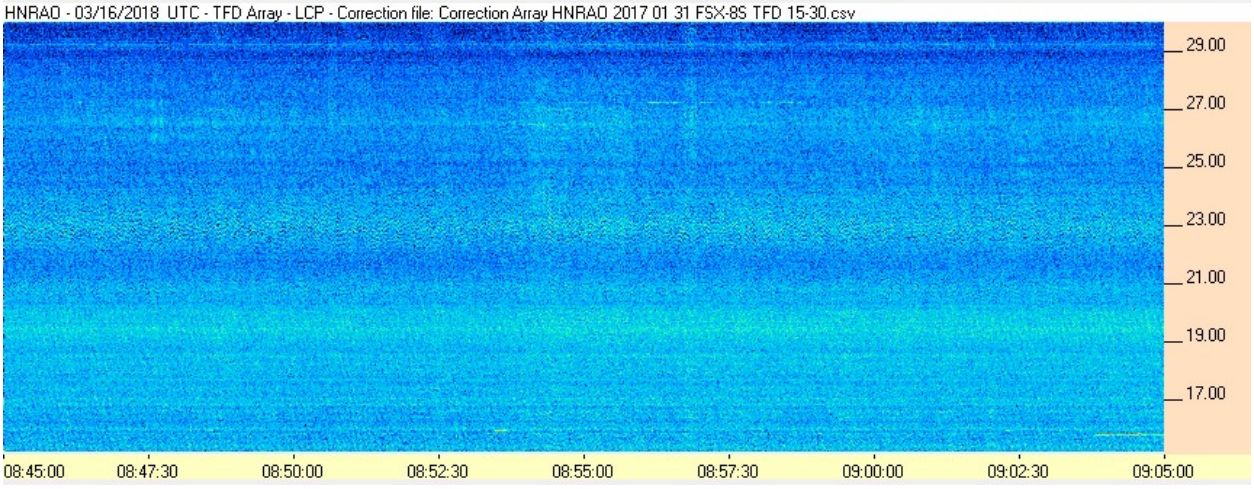

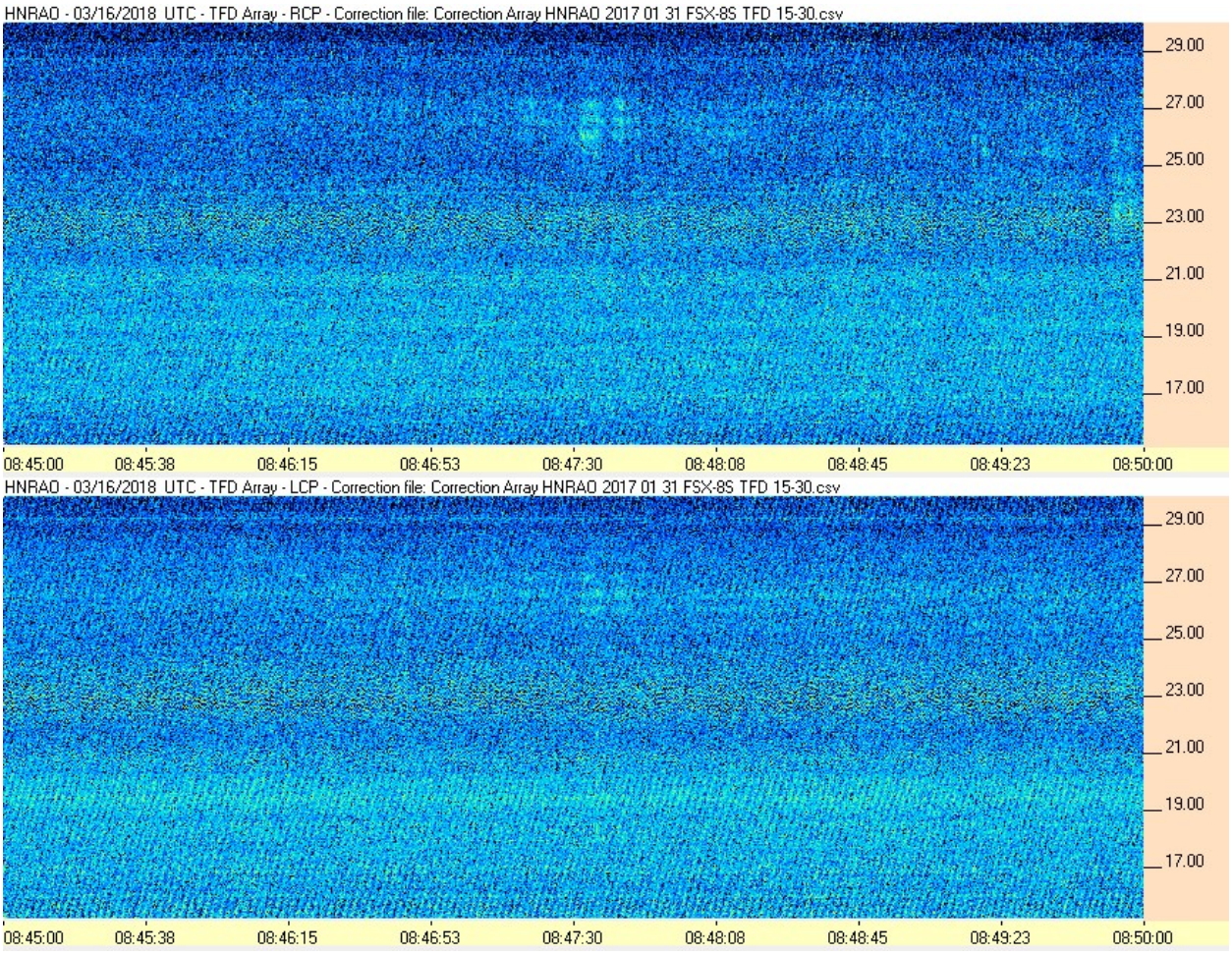
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29.00
27.00
25.00
23.00
21.00
19.00
17.00
08:45:00
08:45:38
08:46:15
08:46:53
08:47:30
08:48:08
08:48:45
08:49:23
08:50:00
HNRAO - 03/16/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
29.00
27.00
25.00
23.00
21.00
19.00
17.00
08:45:00
08:45:38
08:46:15
08:46:53
08:47:30
08:48:08
08:48:45
08:49:23
08:50:00

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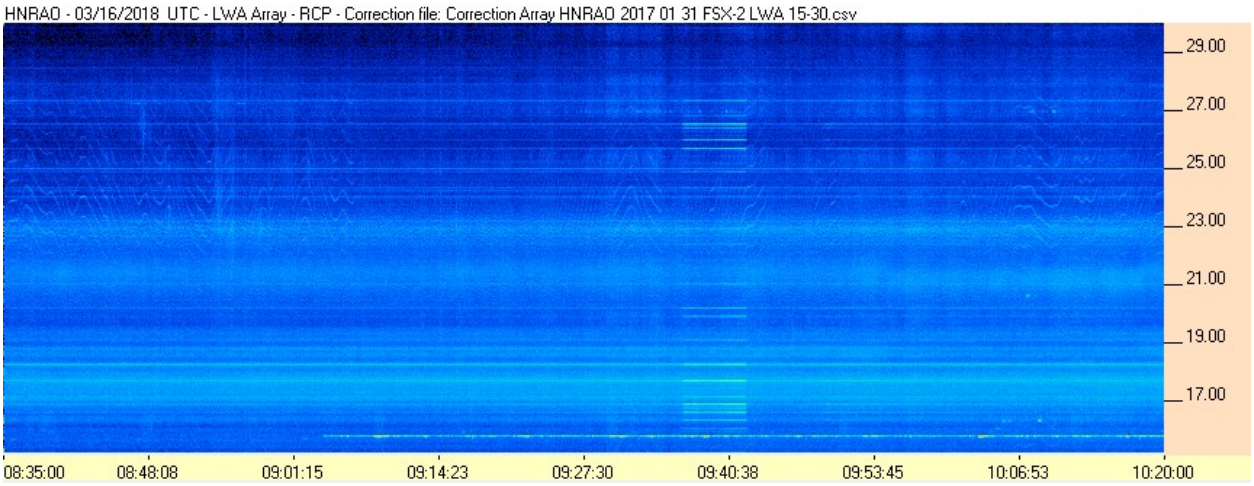

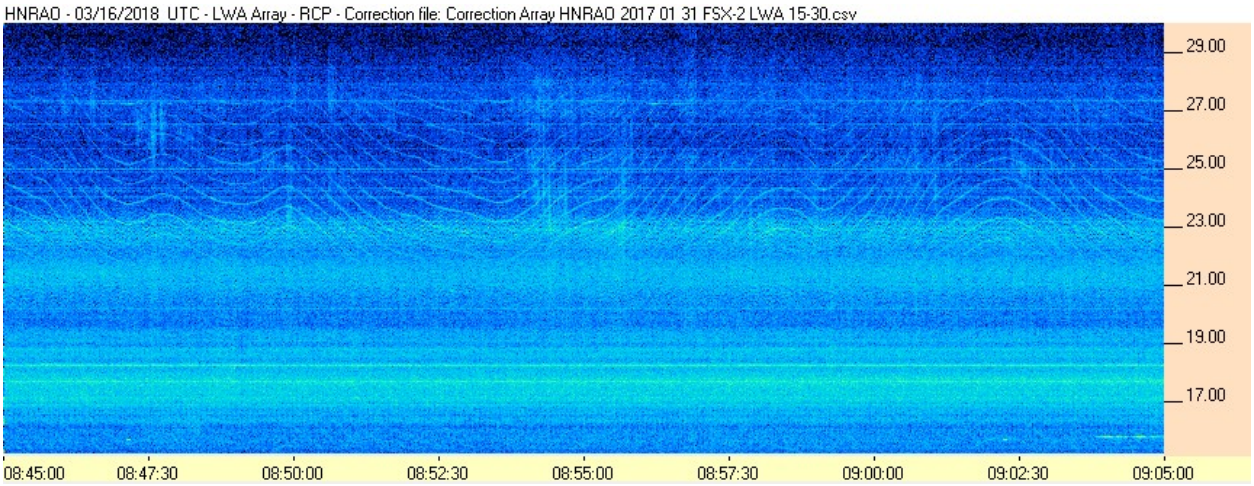

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