HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: March 12, 2019

Object: Jupiter – Io-A

Observer: Unattended

Start - Time UT:	**0955**	**Planetary K-index:**	**2**
Jupiter Altitude (deg):	**23.3**	**Jupiter Azimuth (deg):**	**157.2**
Jupiter CML:	**198.72**	**Jupiter Io Phase:**	**229.34**
Jupiter RA (hr/min):	**17:28**	**Jupiter Dec (hr/min):**	**-22:37**
Hour Angle (hr/min):	**-01:31**	**Polarization**	**RCP**
Sun Altitude (deg):	**-18.6**	**Sun Azimuth (deg):**	**079.1**
Sun RA (hr/min):	**23:22**	**Sun Dec (hr/min):**	**-04:07**

End – Time UT:	**1135**	**De:**	**-2.8**
Jupiter Altitude (deg):	**26.7**	**Jupiter Azimuth (deg):**	**181.1**
Jupiter CML:	**256.15**	**Jupiter Io Phase**	**242.70**
Hour Angle (hr/min):	**00:04**	**Duration (min):**	**180**
Sun Altitude (deg):	**-00.7**	**Sun Azimuth (deg):**	**094.8**
Max Frequency MHz	**24**	**Min Frequency MHz**	**16**

Data from Radio-Jupiter Pro 3.8.2

Observatory Configuration

Spectrograph Receiver	Antenna	Polarization	System Loss	Multicoupler	Multicoupler port	Calibrated
FSX-8S	TFD	RCP LCP	-8.35 dB -7.59 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	-8.35 dB	#2 RCP	Port 2 +3dB	Twice daily
SDRPlay RSP2	TFD	LCP	-7.59 dB	#1 LCP	Port 2 +3dB	Twice daily
JOVE 1	TFD	RCP	-8.35 dB	#2 RCP	Port 3 +3 dB	04/20/2018
JOVE 1	TFD	LCP	-7.59 dB	#1 LCP	Port 3 +3 dB	04/20/2018
JOVE II	Jove dipoles	Linear	-3.66 dB	#3 Linear	Port 4 +3 dB	08/21/2018
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
Software Radio Sky Spectrograph 2.8.50
Red = Offline

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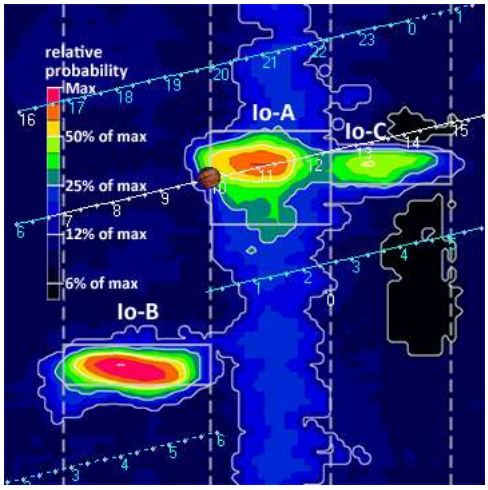
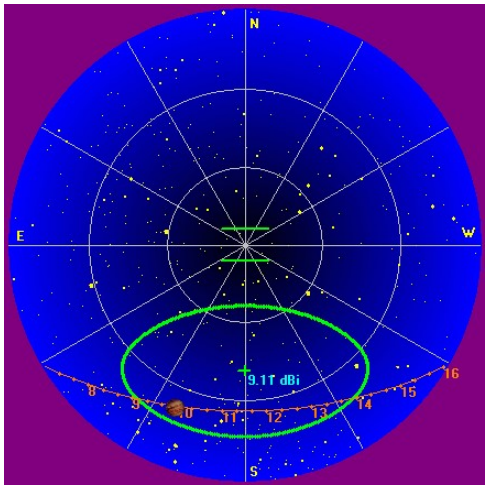
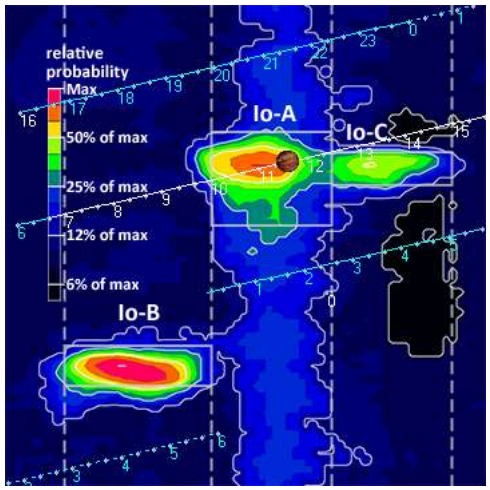
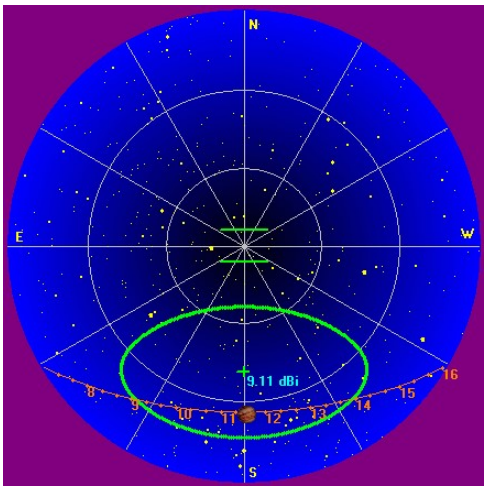




Beginning of Pass





End of Pass

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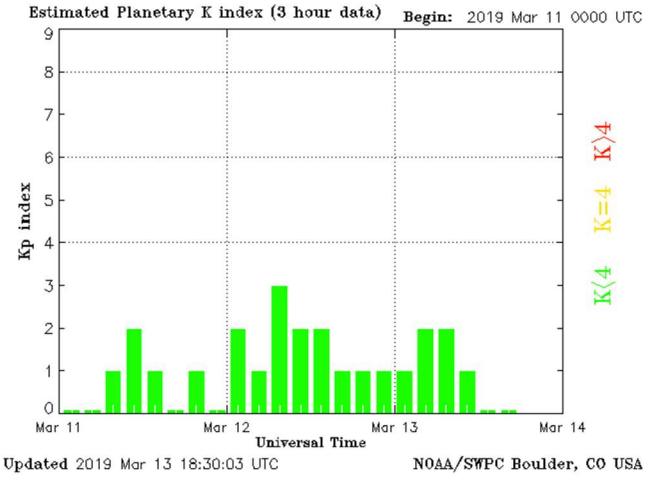

MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	Late	Also called "main source"
non-Io-A	(230-280)	0-360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

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An Io-A storm consisting of L-bursts. Emissions first observed here at 0955 UT and the last signs of emissions were at 1135UT. Weather at the observatory was clear and cold.

Instruments that recorded the storm were the FSX-8S/TFD array, FSX-2/LWA array, SDRPlay RSP2/TFD array and the JOVE II receiver/JOVE dipole array.

Negative drift L-bursts with emissions beginning at approx. 20 MHz. Emissions spanned the range of the RSP2 spectrograph; 24 MHz to 16 MHz. No S-bursts were apparent.

L4 modulation lanes for the duration of the storm, with L3 type apparent at 1107 UT.

Positive drift emission groups came in irregular intervals with scintillation evident.

The calibrated JOVE II/JOVE dipole array recorded L-bursts exceeding 300 MK. All data from this storm have been uploaded to the Radio JOVE data archive.

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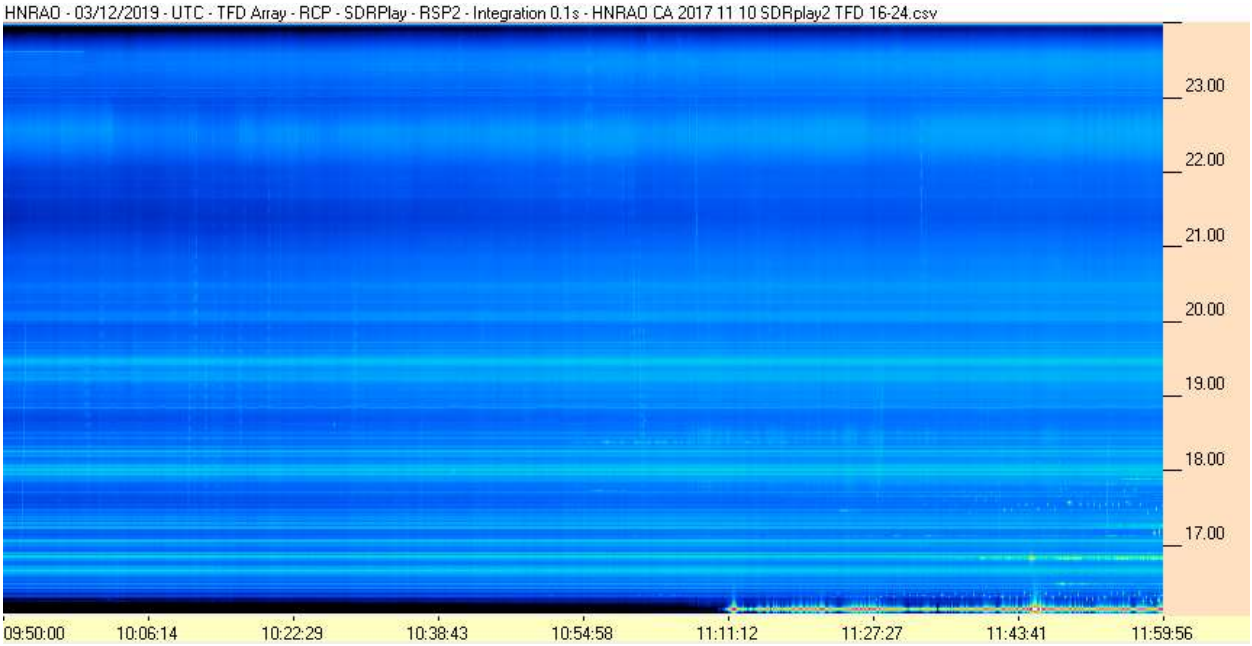
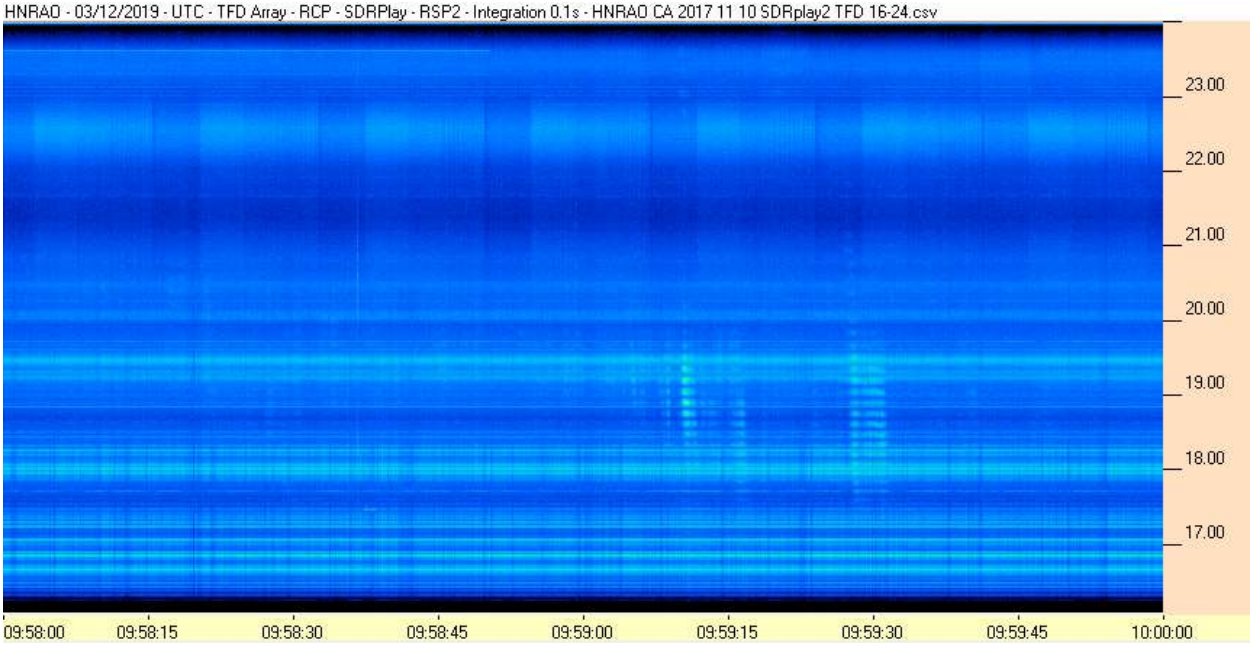
SDRPlay RSP2 – TFD Array





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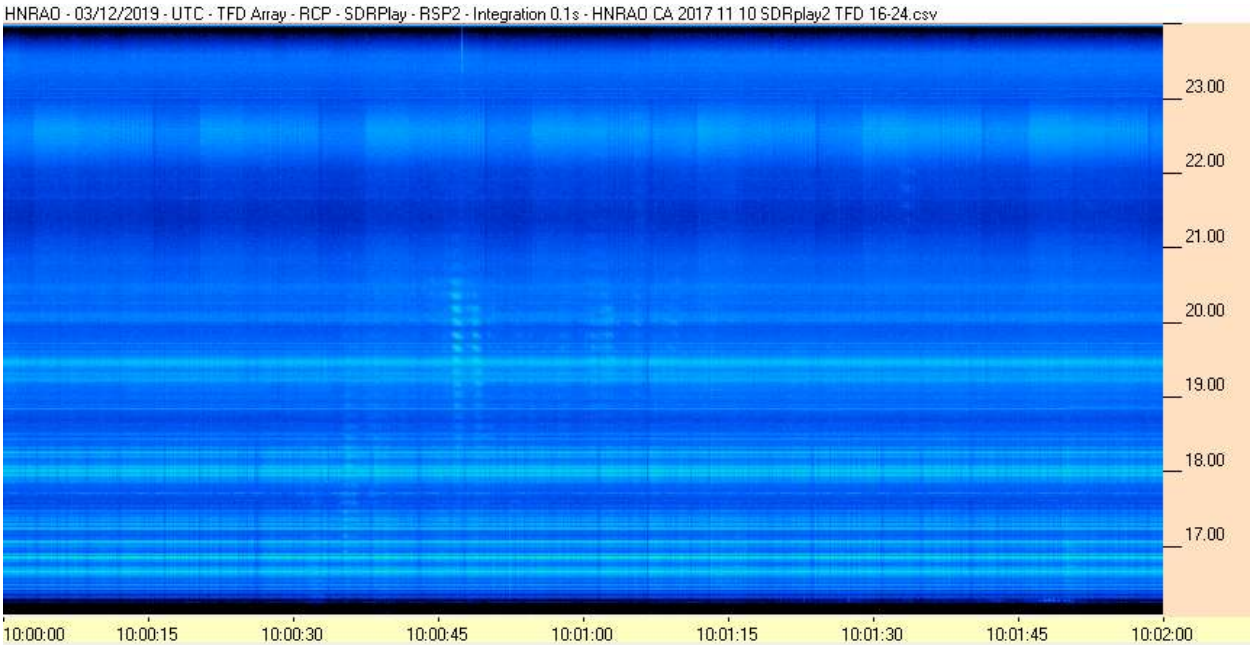

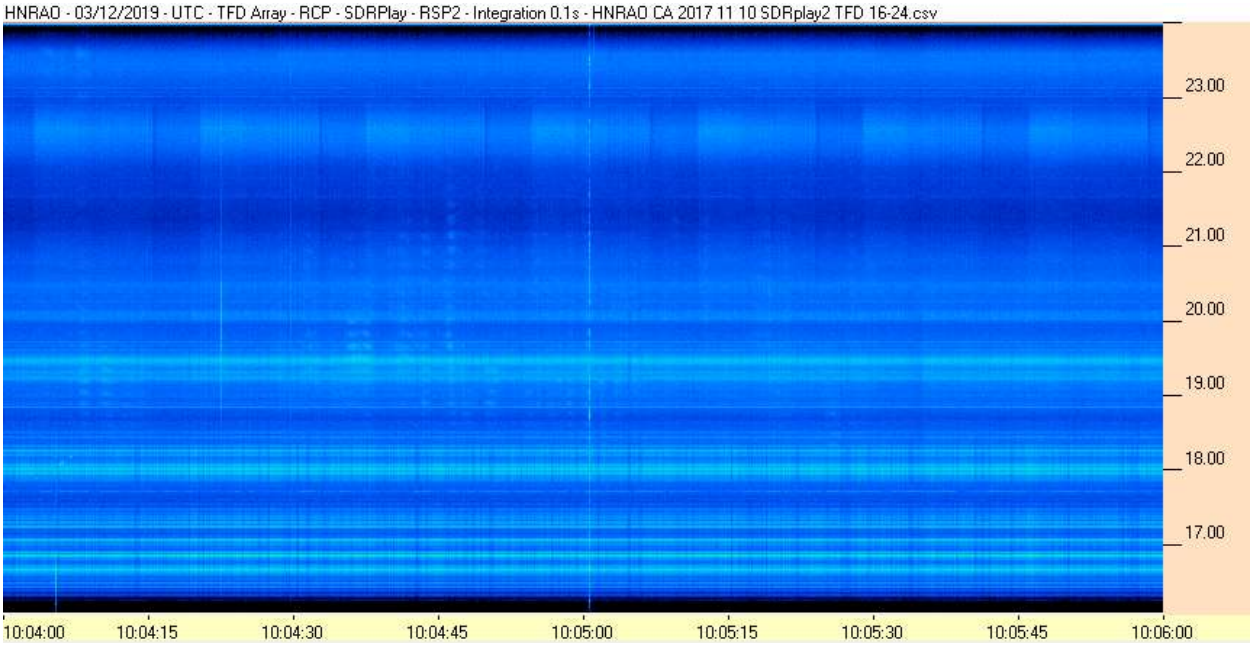

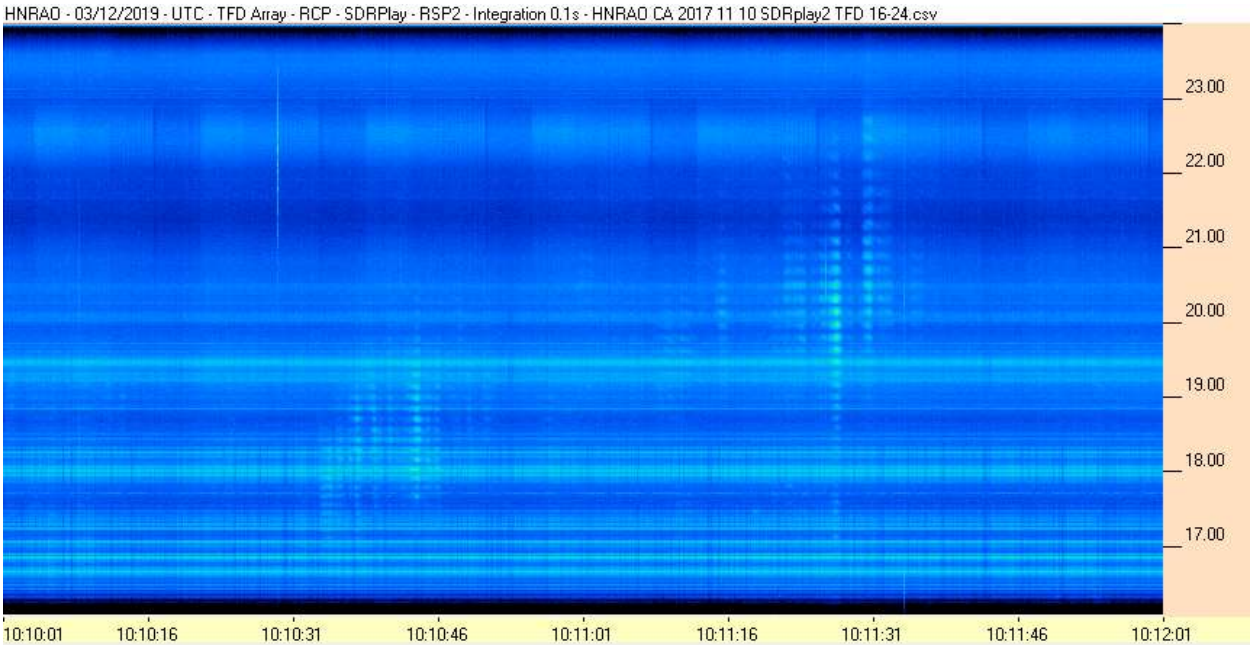
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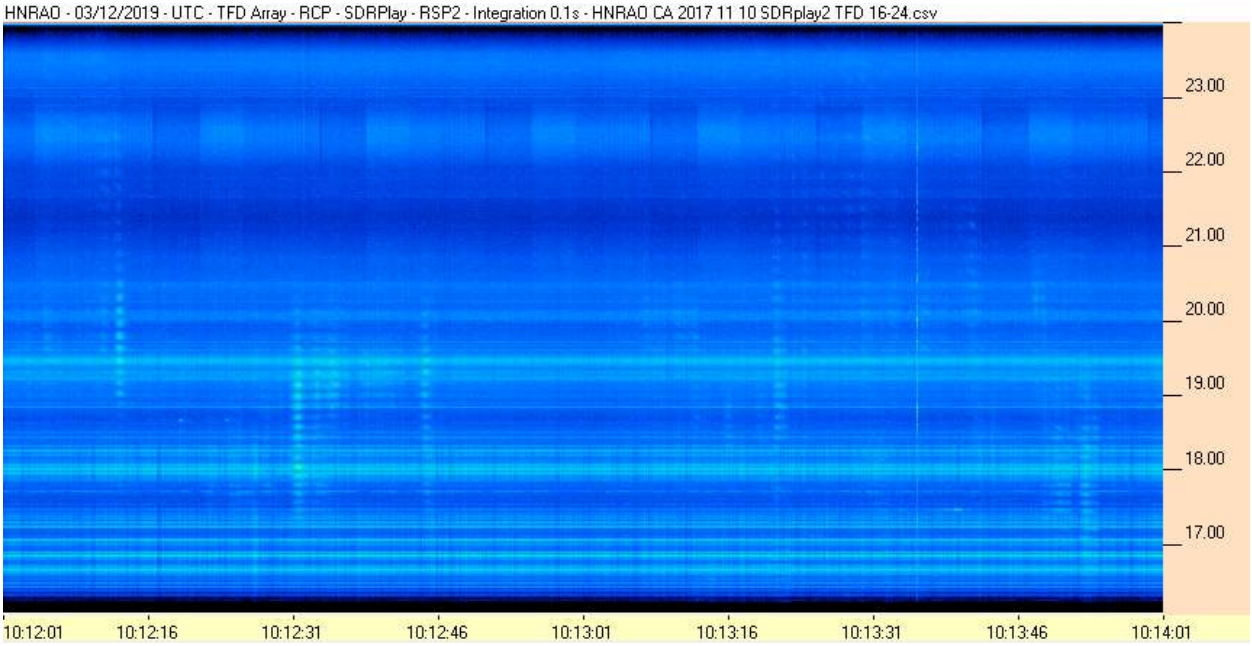
10:11:16
10:11:31
10:11:46
10:12:01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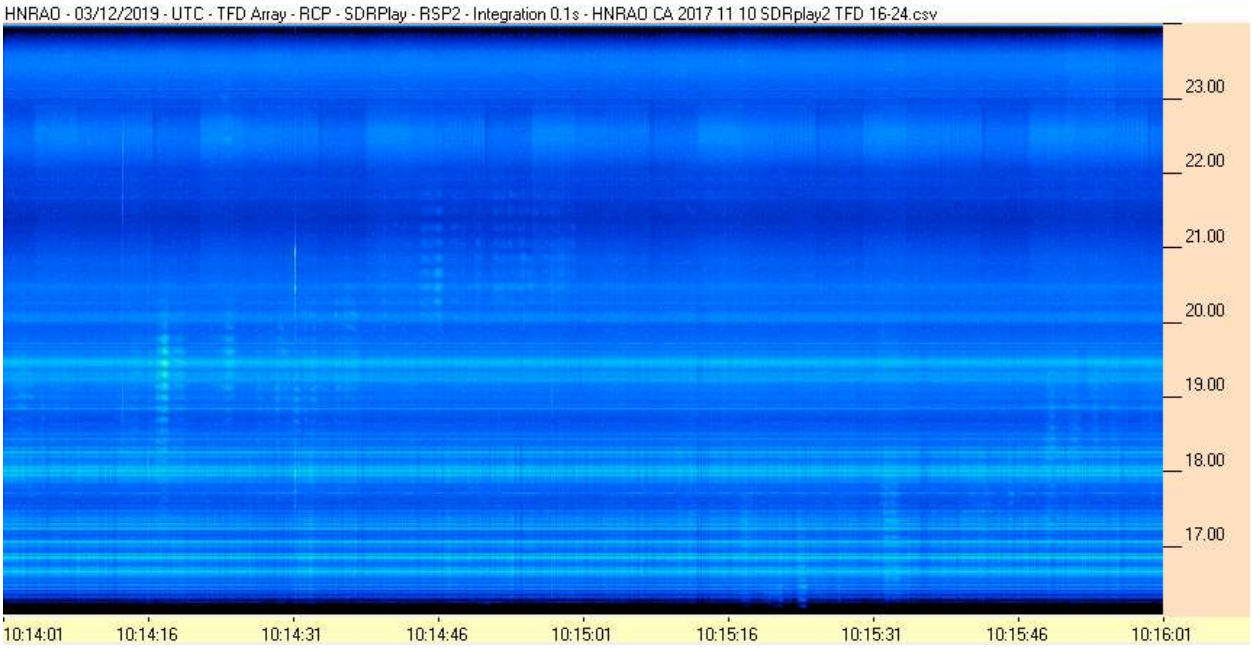

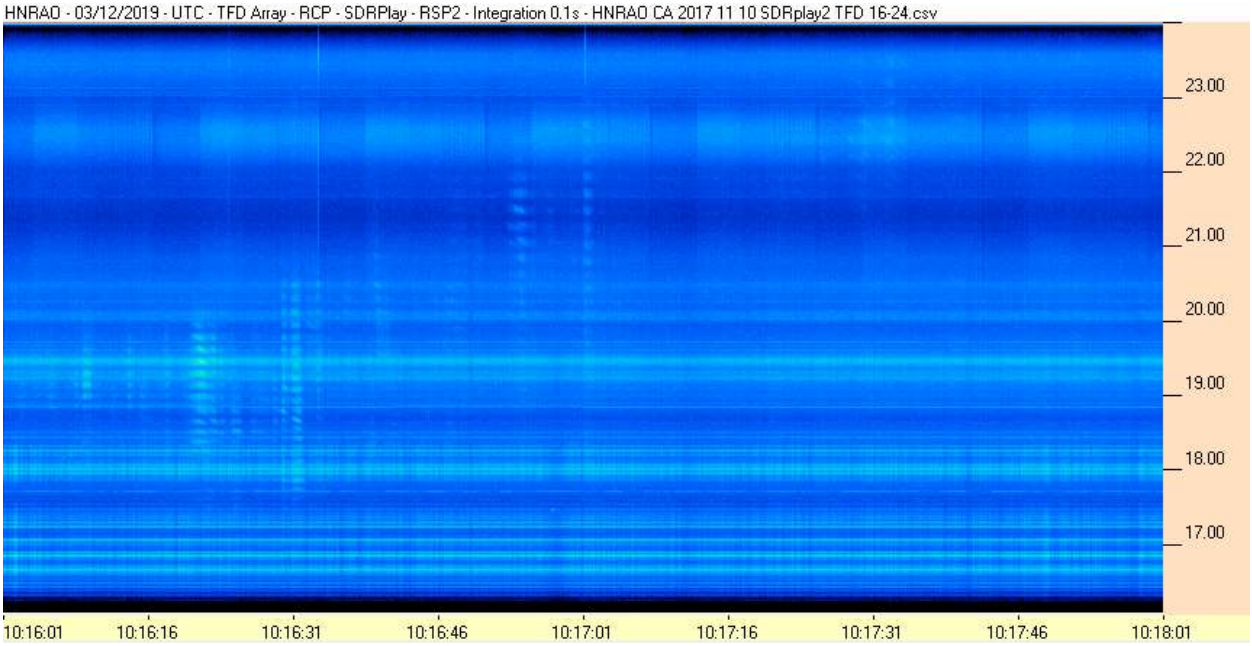

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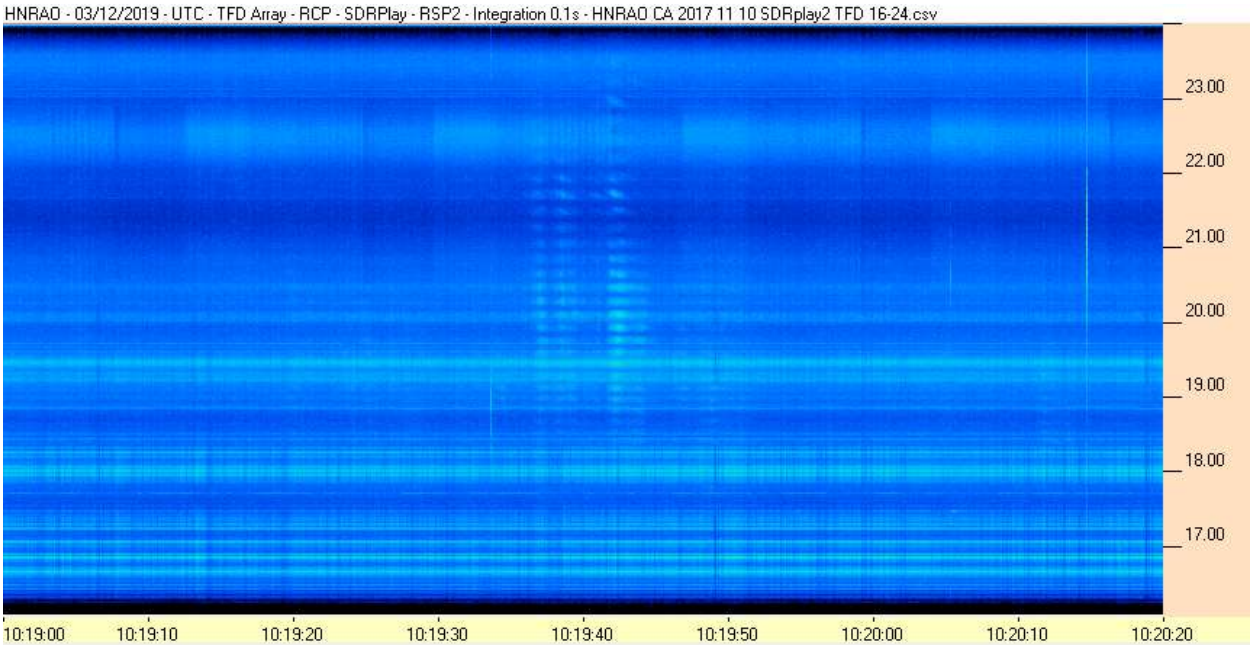

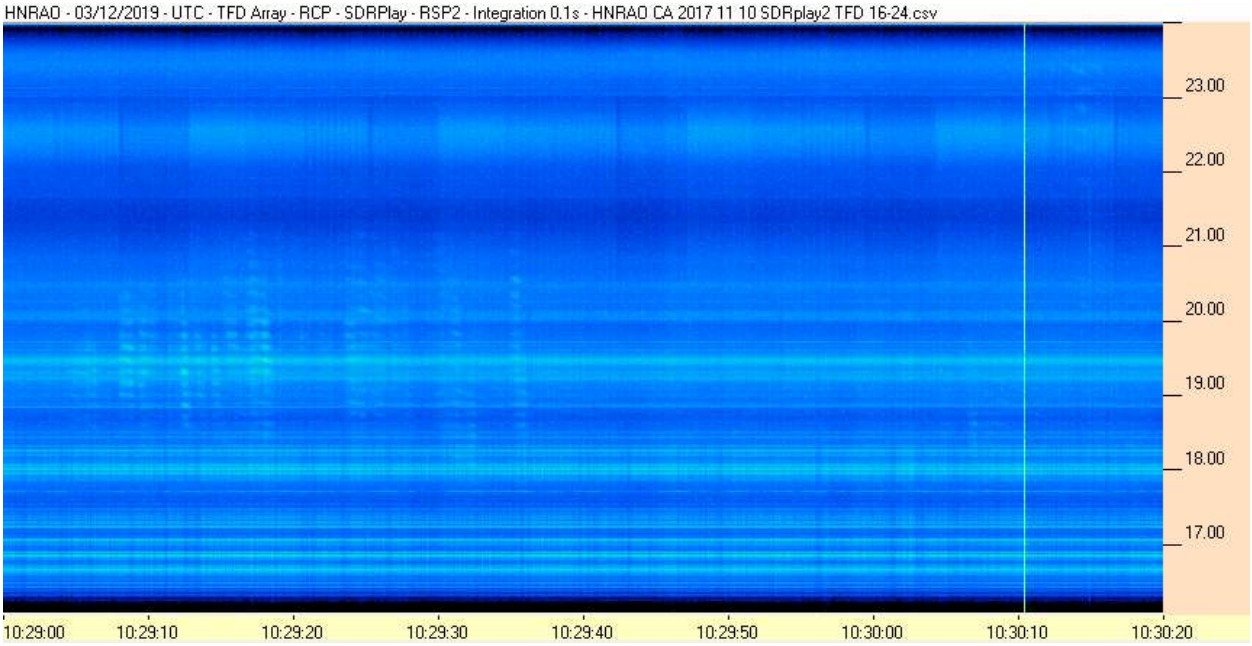

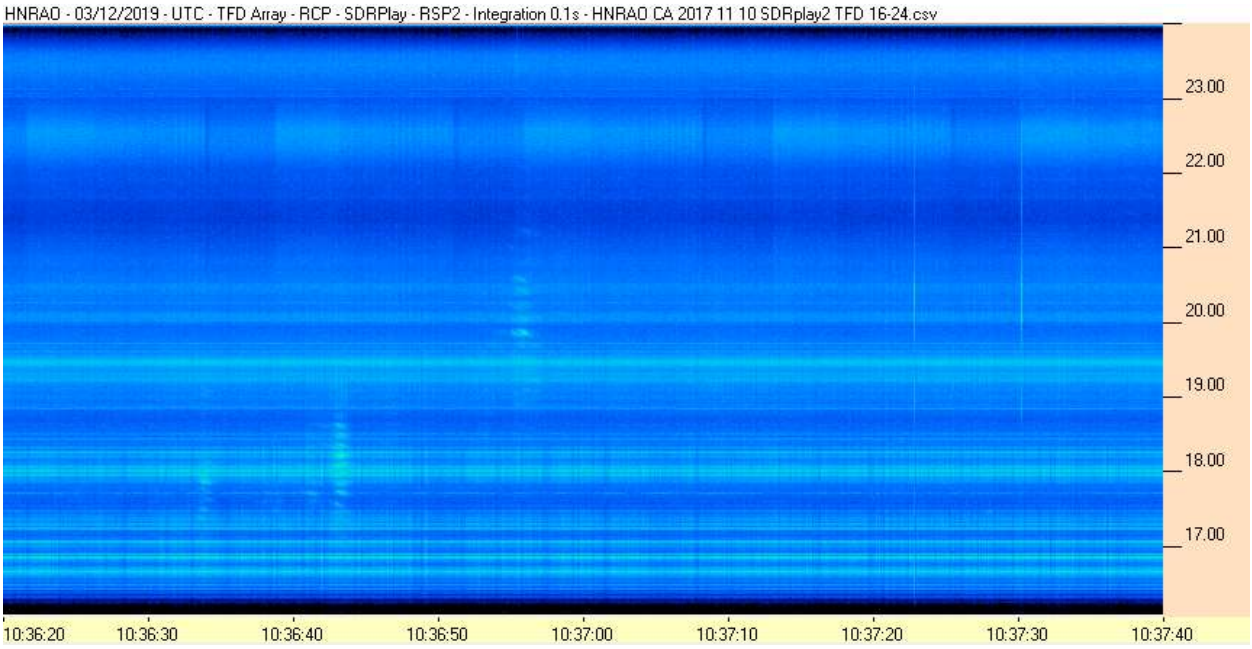
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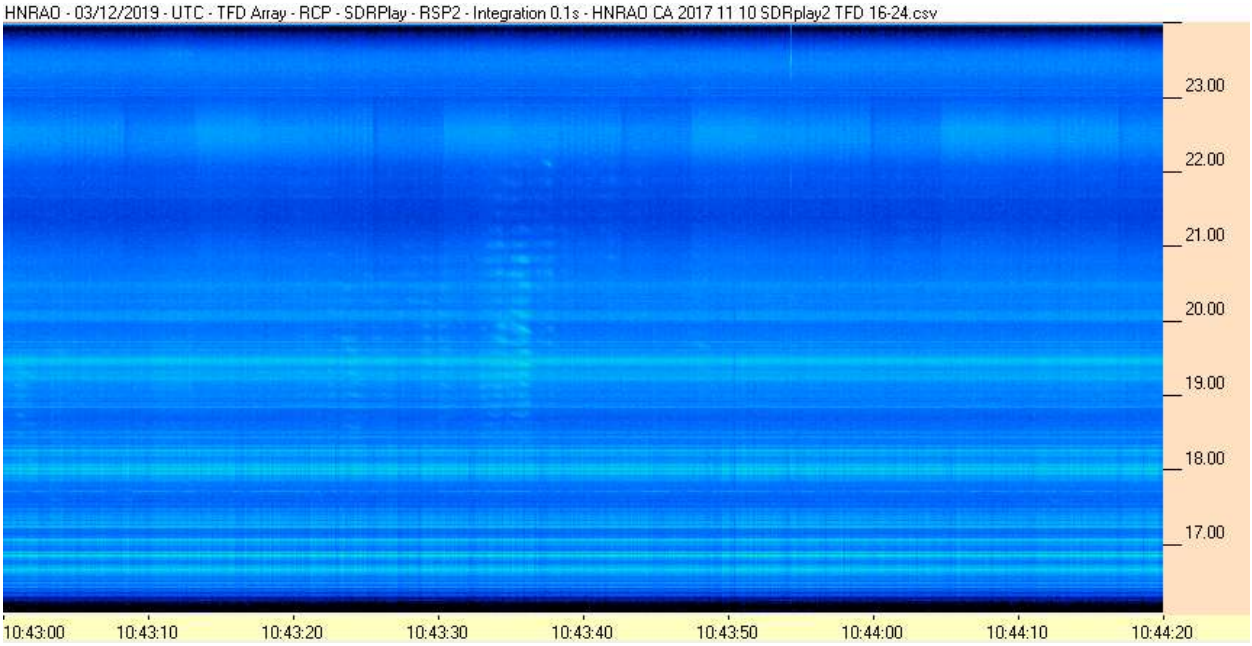
10:37:30
10:37:40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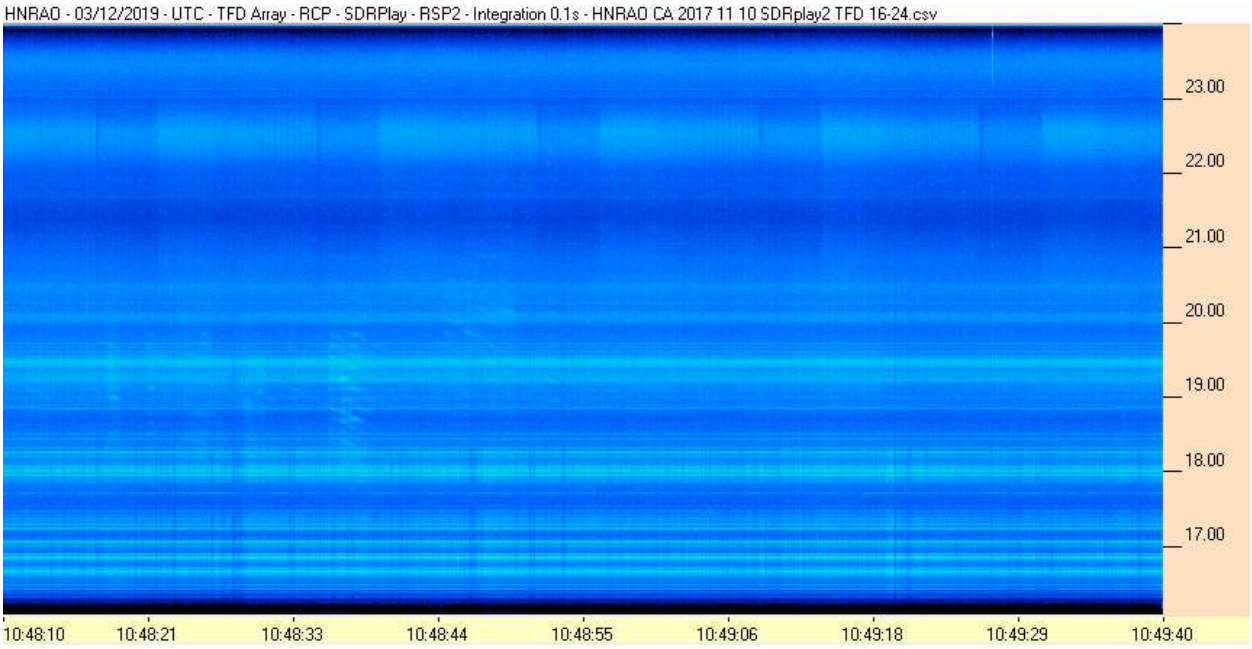

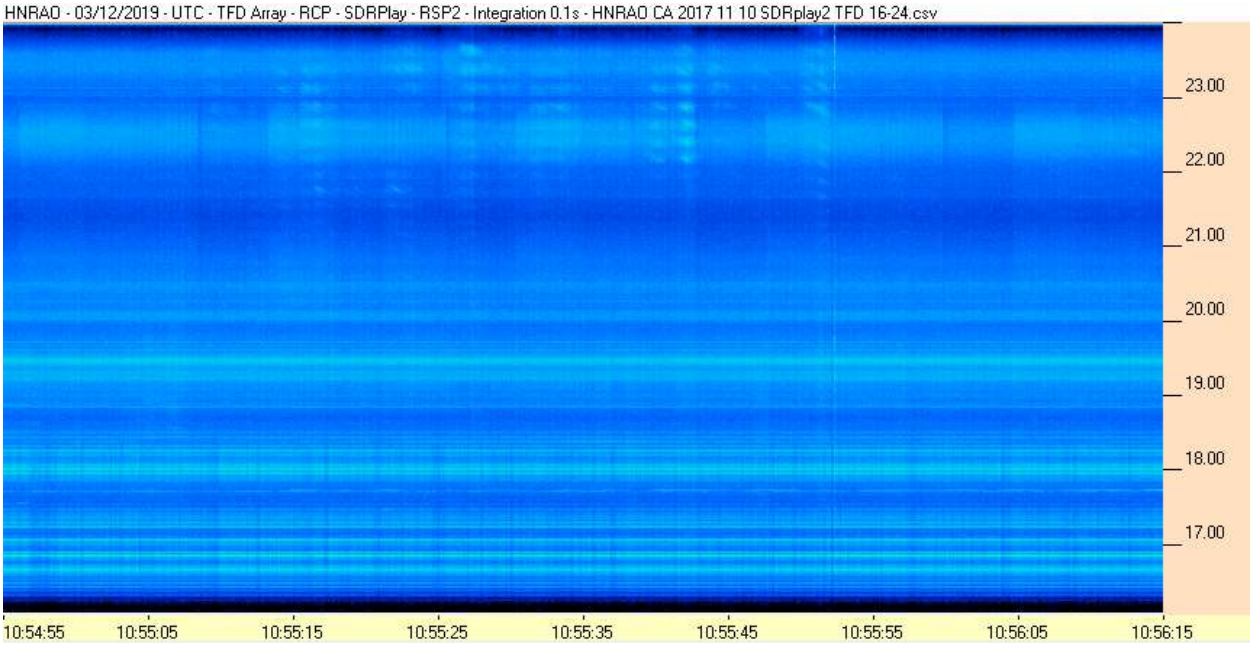

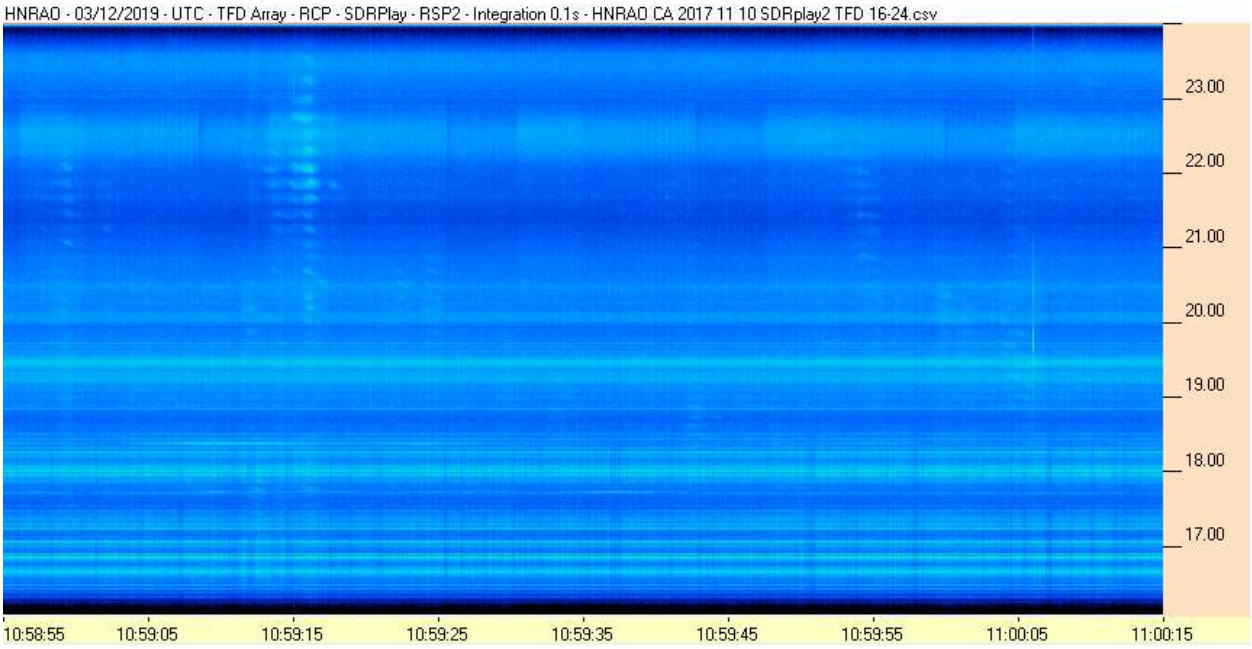
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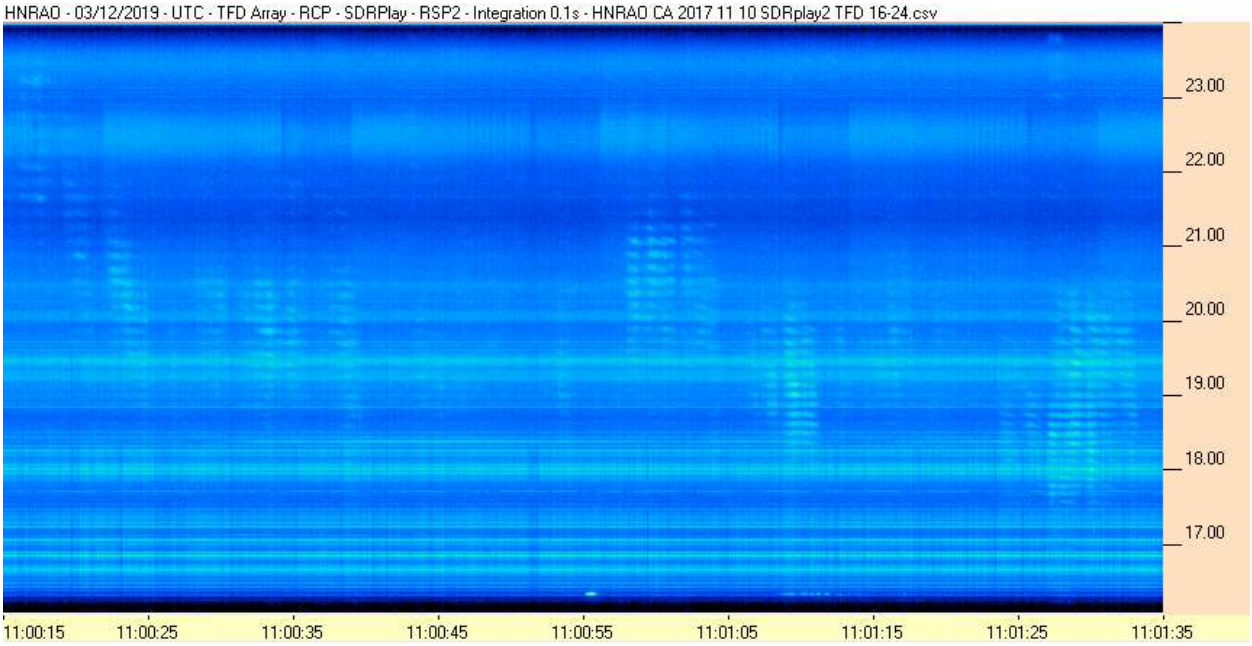
11:00:15


HNRAO - 03/12/2019 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s - HNRAO CA 2017 11 10 SDRplay2 TFD 16-24.csv
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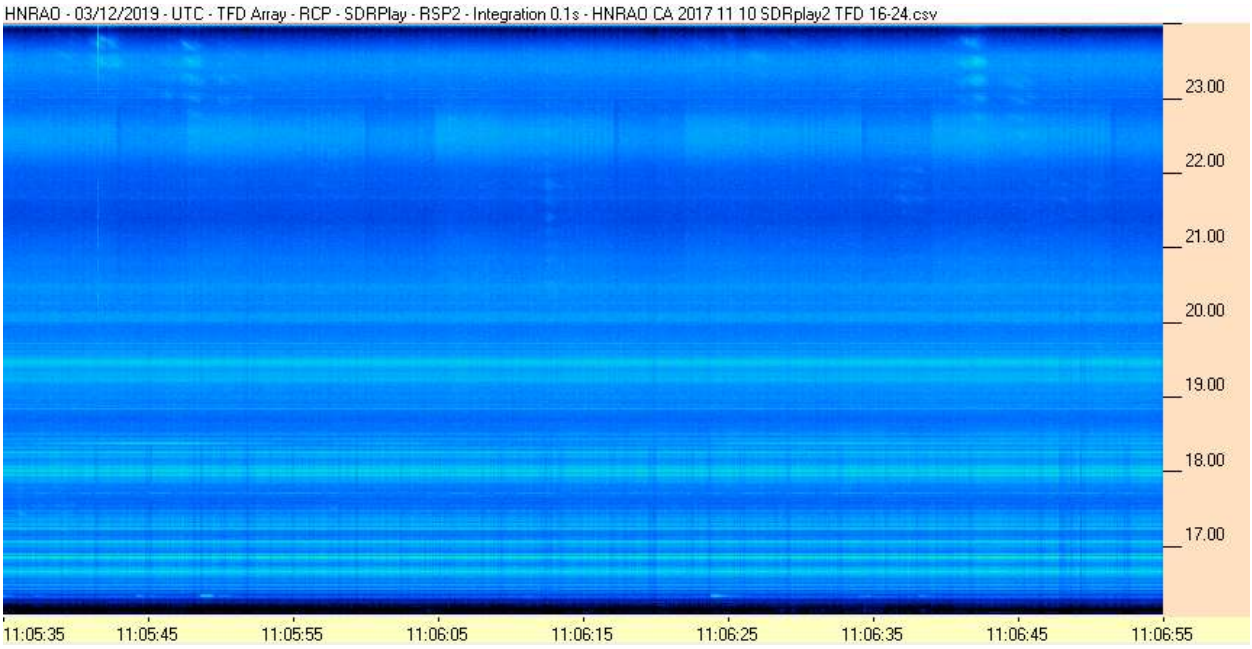

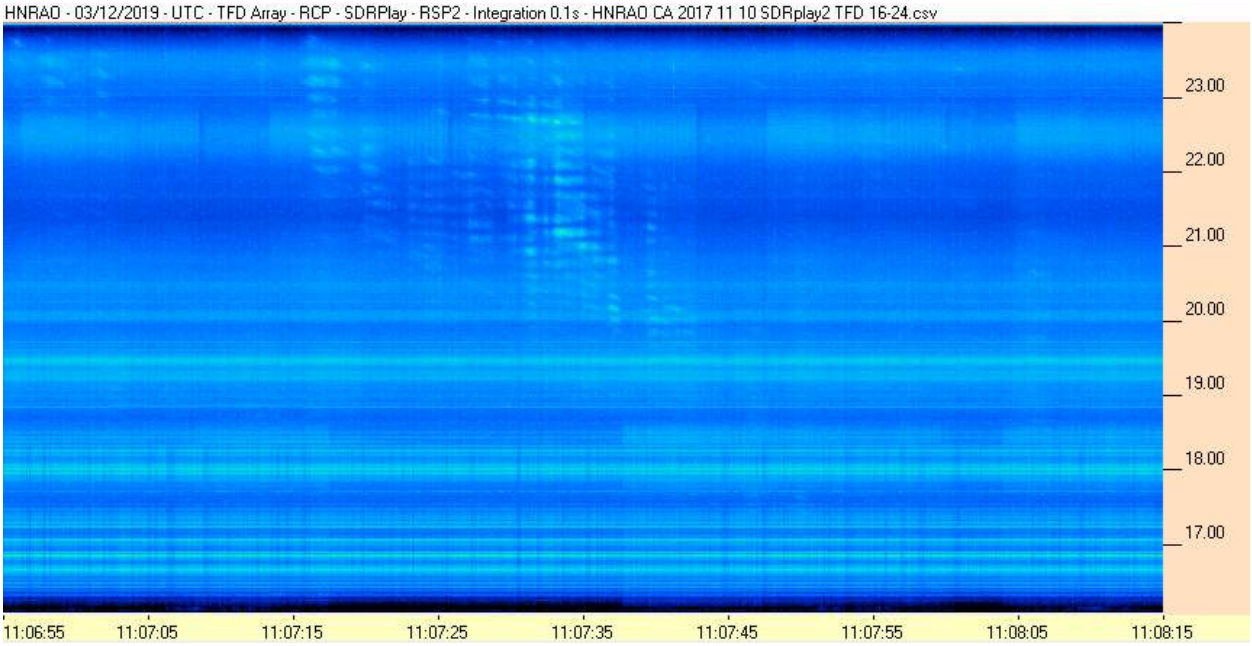

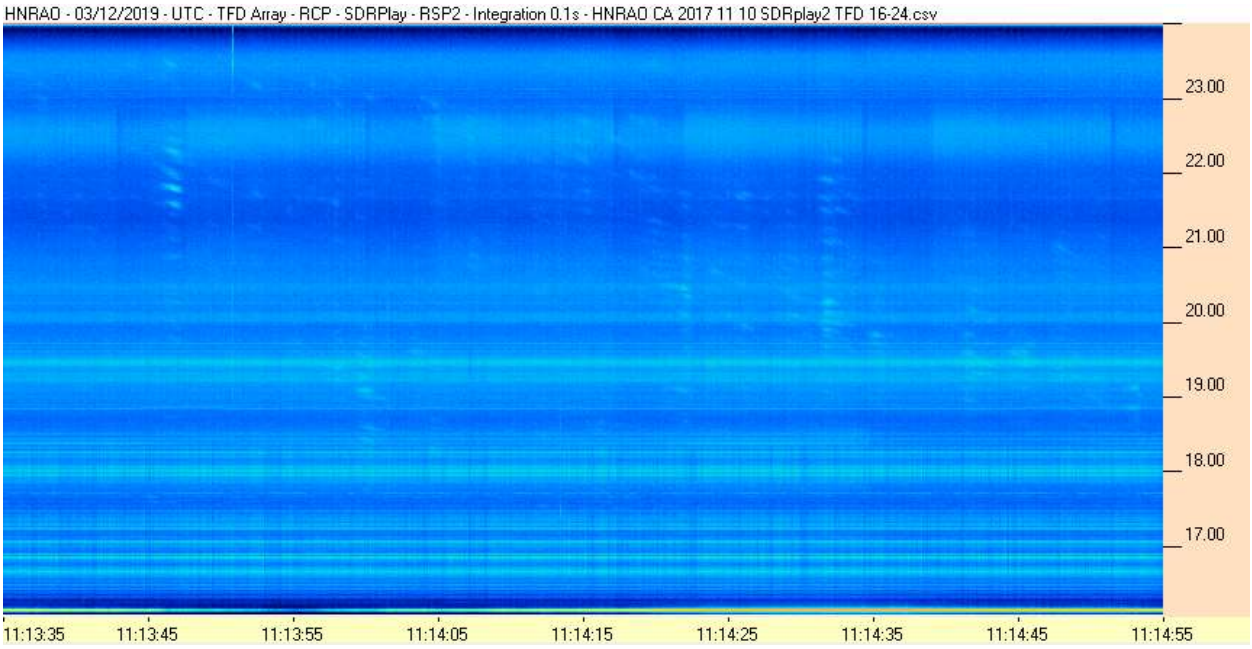
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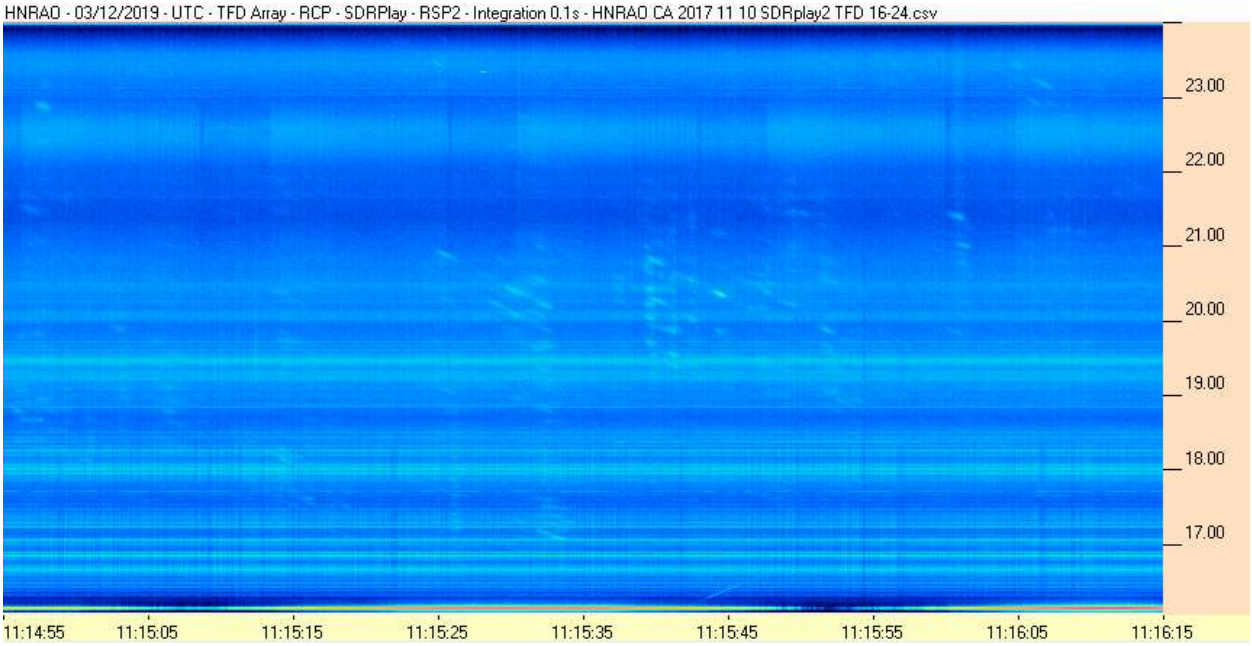
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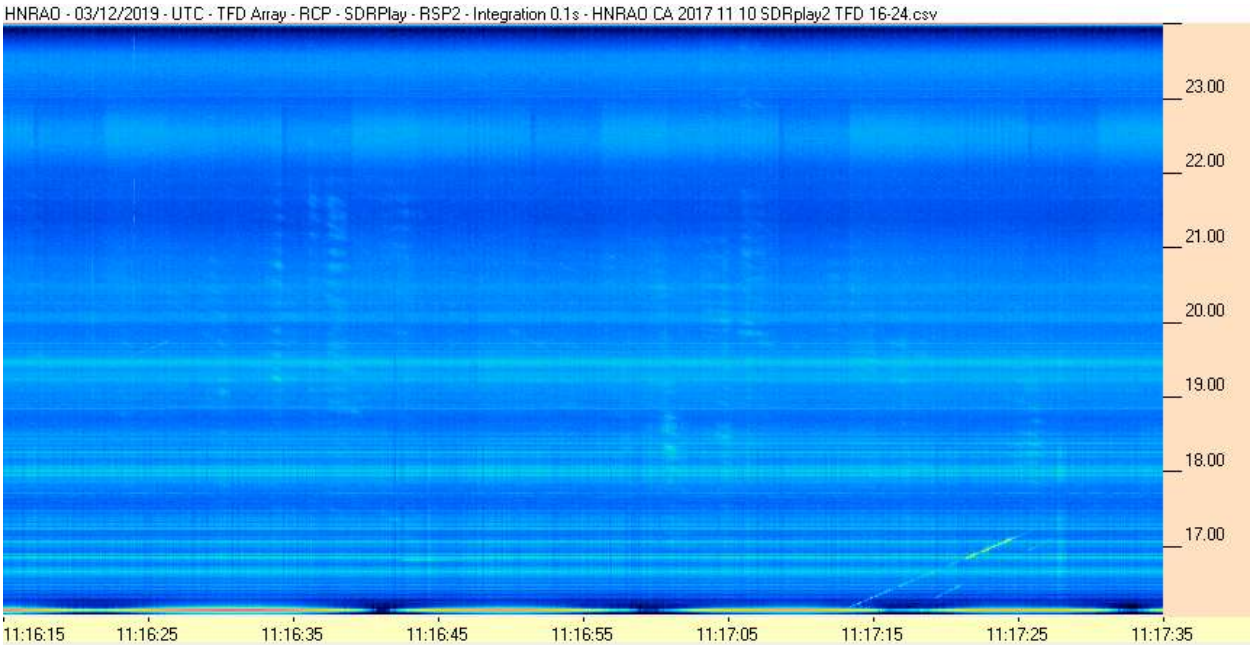

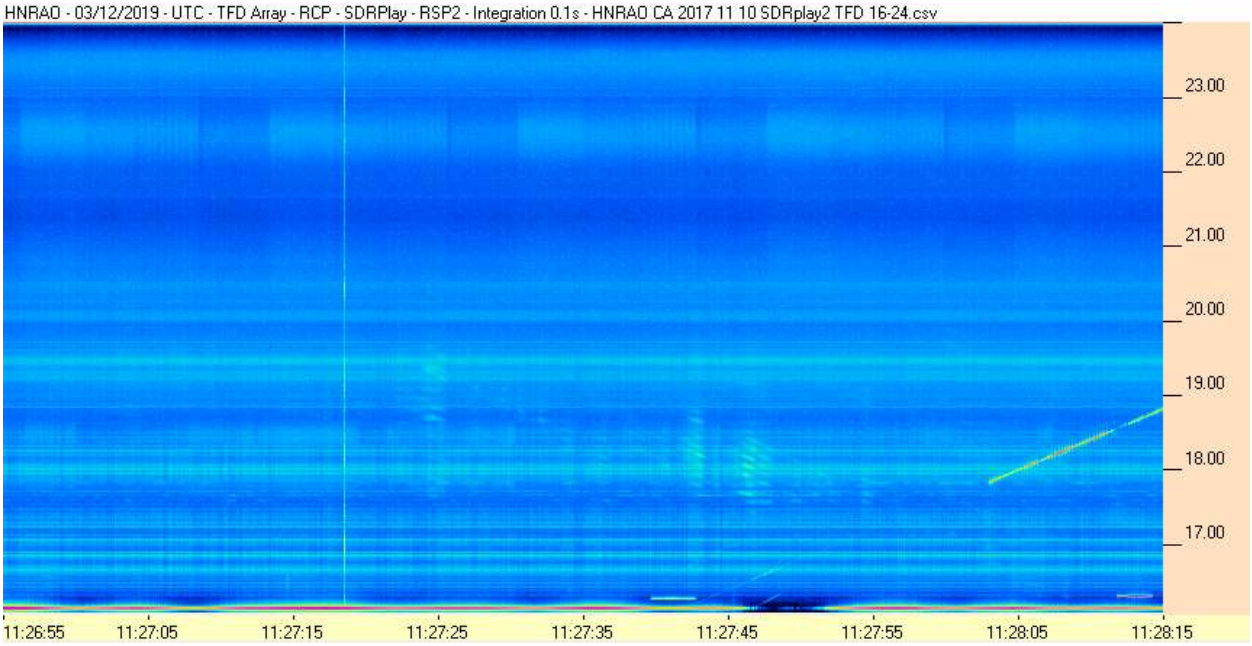

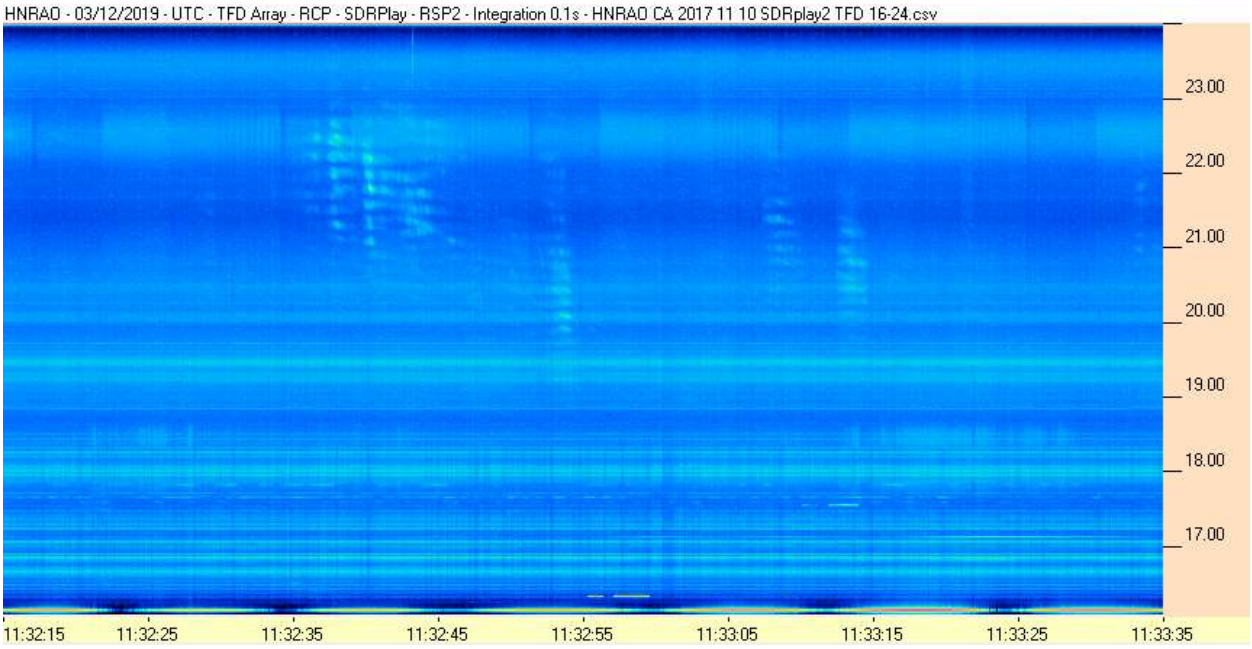
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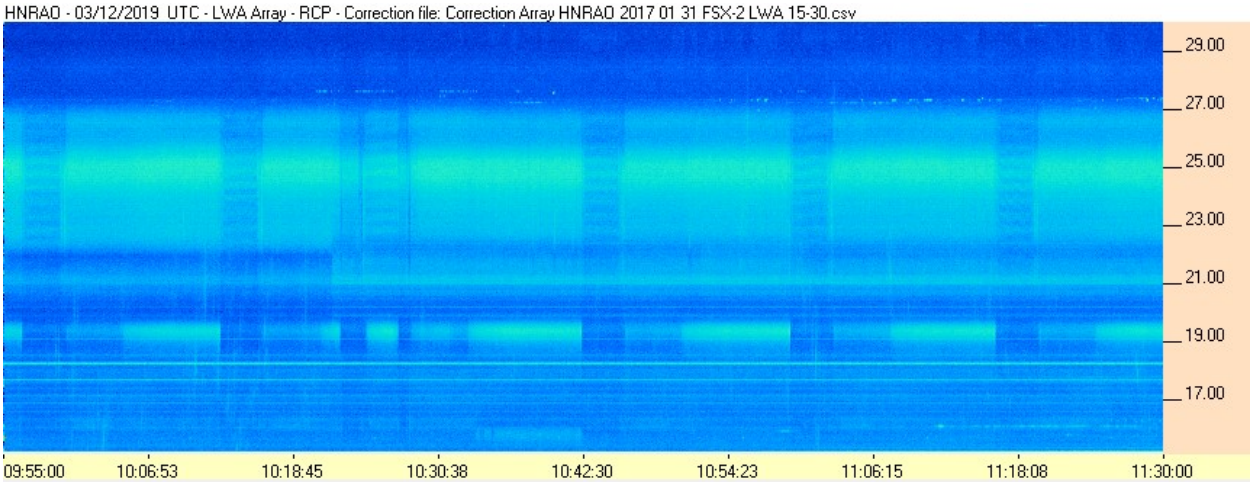
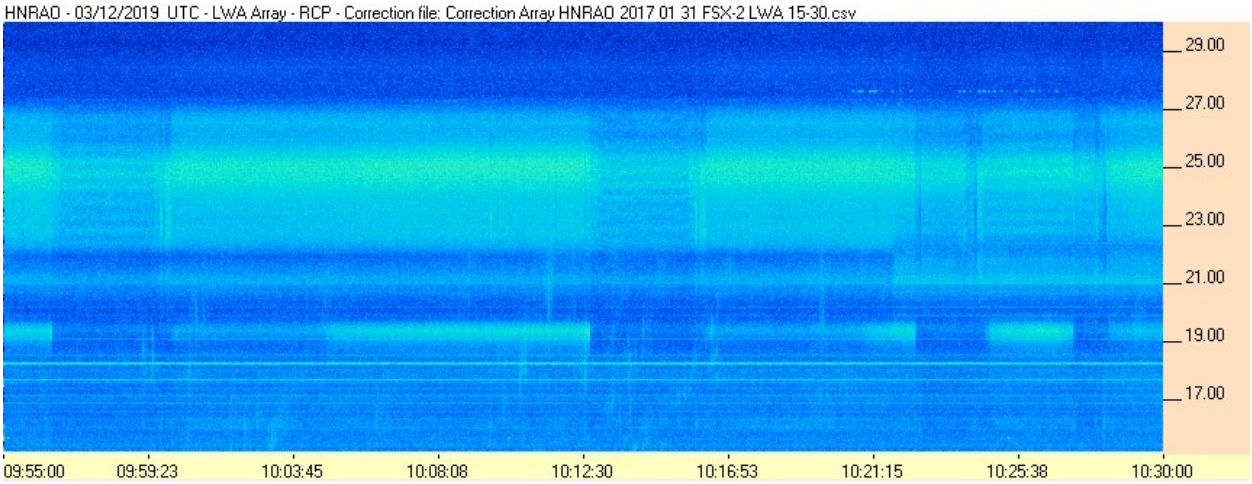
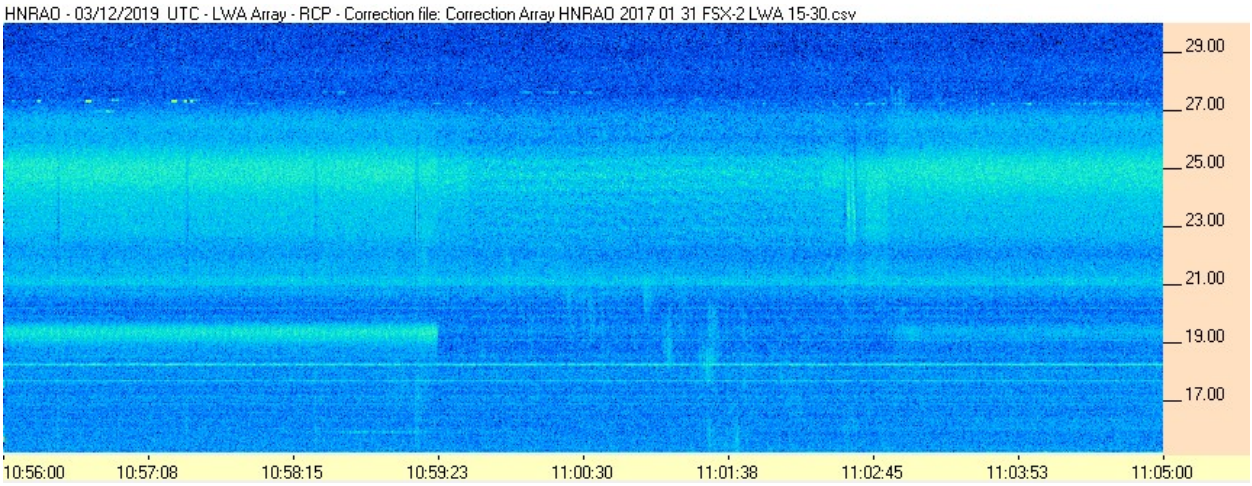
FSX-2 – LWA Array



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21.00
19.00
17.00
10:56:00
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10:58:15
10:59:23
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11:01:38
11:02:45
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11:05:00

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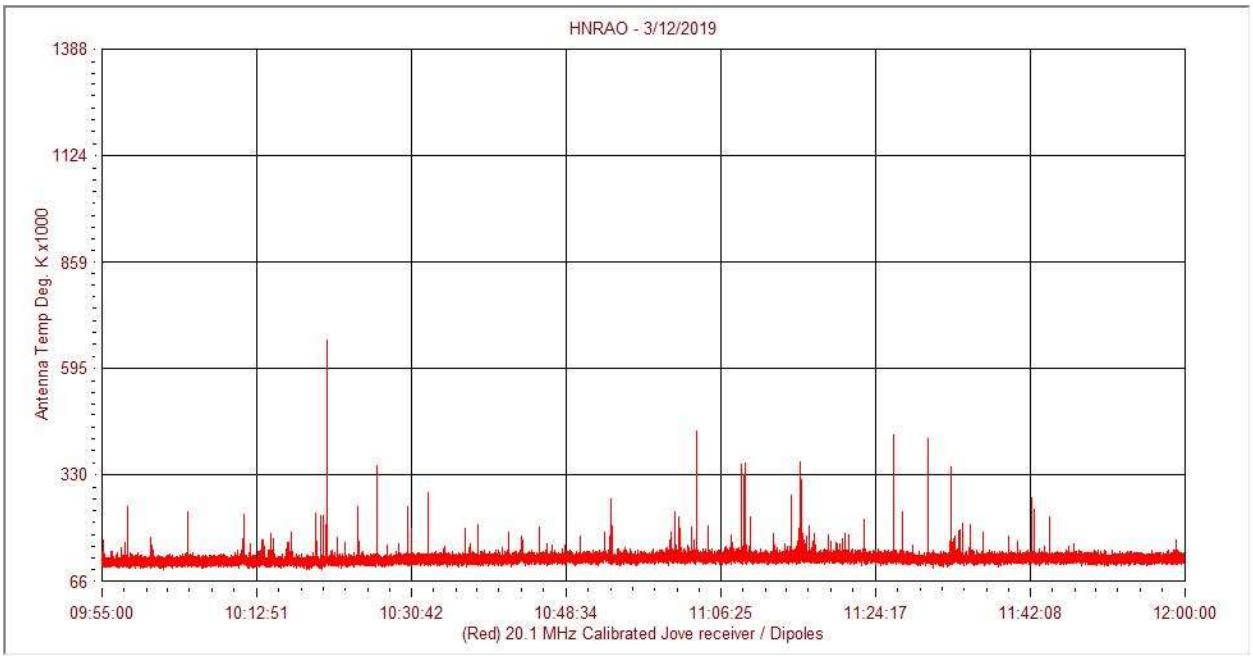
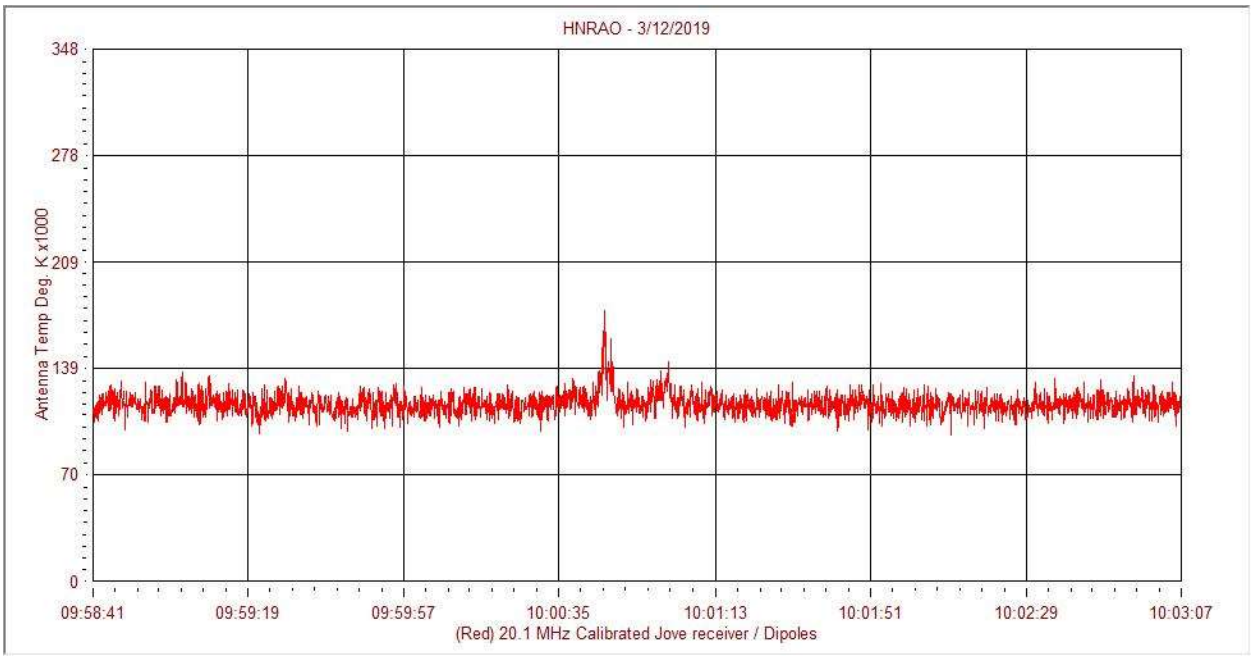
Radio JOVE II – JOVE Phased Dipole Array





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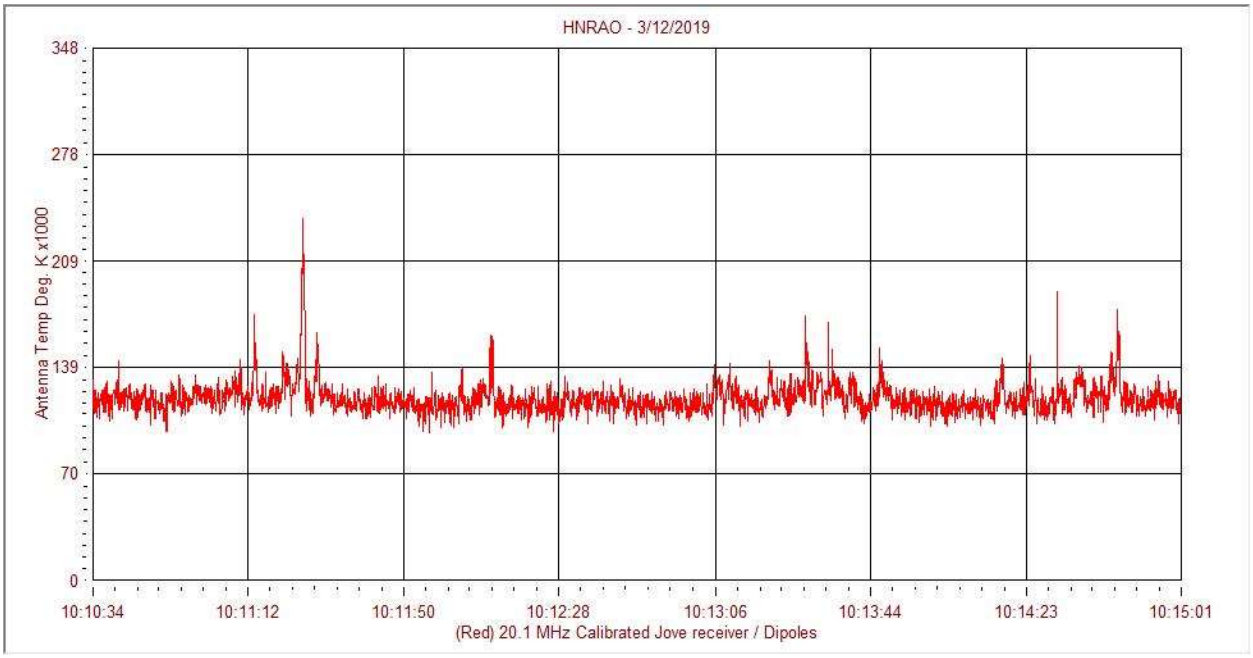

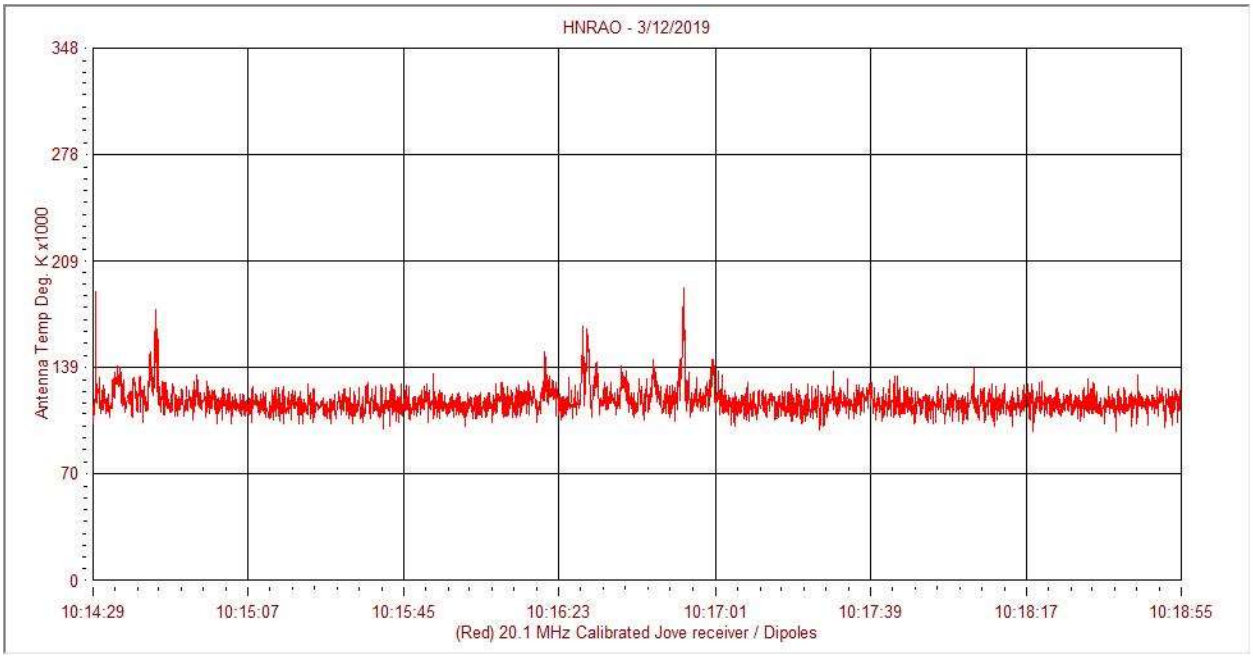

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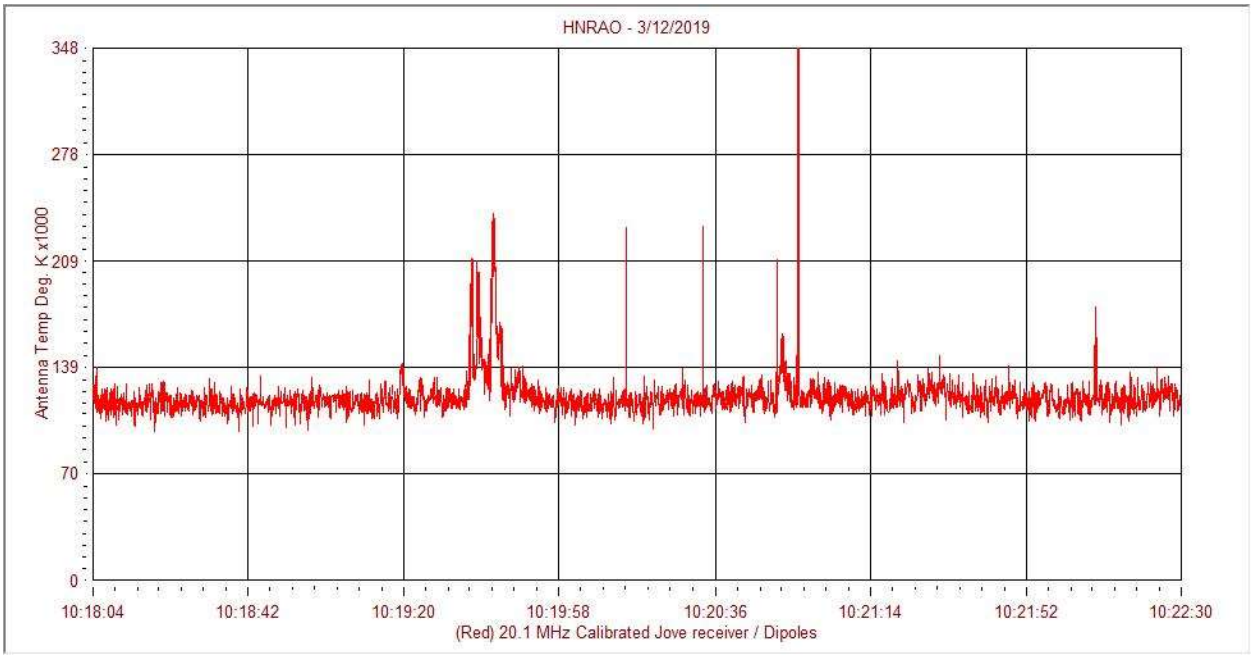

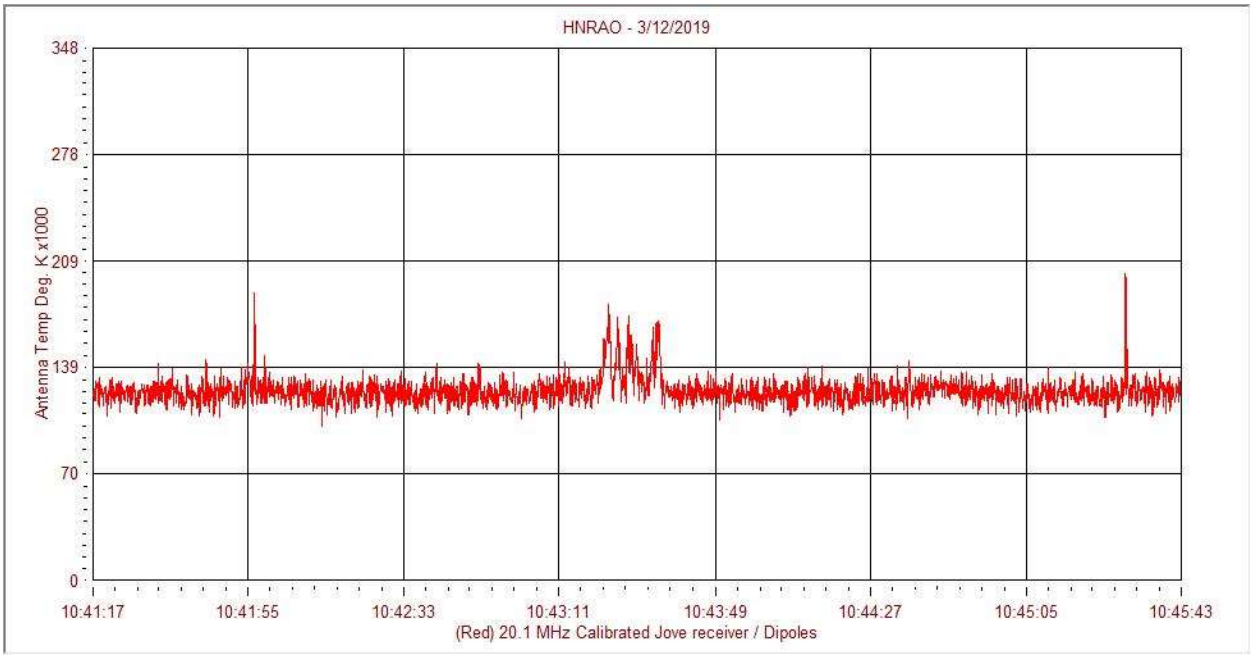

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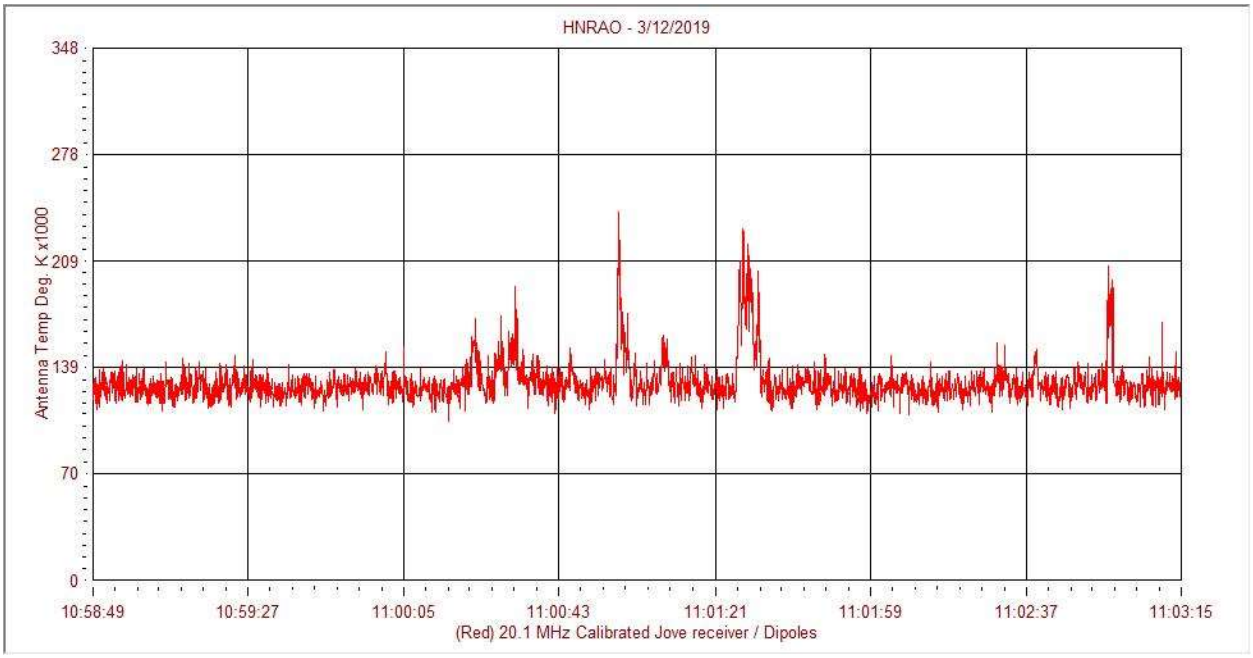

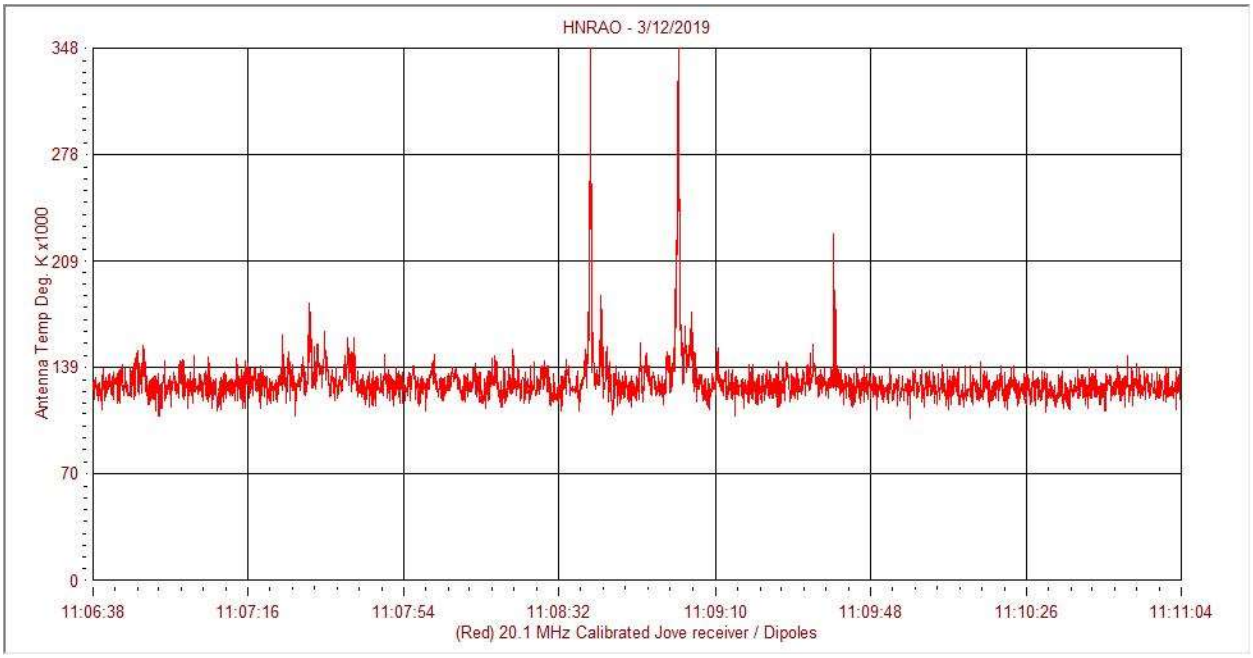

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq