

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date: July 12, 2018

Object: Jupiter – Io-B

Observer: Unattended

Start - Time UT:	0150	Planetary K-index:	1
Jupiter Altitude (deg):	32.6	Jupiter Azimuth (deg):	198.5
Jupiter CML:	83.75	Jupiter Io Phase:	072.48
Jupiter RA (hr/min):	14:44	Jupiter Dec (hr/min):	-14:45
Hour Angle (hr/min):	01:40	Polarization	RCP
Sun Altitude (deg):	-10.5	Sun Azimuth (deg):	311.8
Sun RA (hr/min):	07:17	Sun Dec (hr/min):	22.15

End – Time UT:	0355	De:	-3.1
Jupiter Altitude (deg):	19.3	Jupiter Azimuth (deg):	228.9
Jupiter CML:	159.31	Jupiter Io Phase	090.03
Hour Angle (hr/min):	03:09	Duration (min):	205
Sun Altitude (deg):	-24.1	Sun Azimuth (deg):	338.6
Max Frequency MHz	24	Min Frequency MHz	

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	-3.12 dB	#3 Linear	Port 4 +3 dB	06/23/2018
SDRPlay RSP1	Experimental*					

JOVE dipoles phased @ 32 degrees for 2017-2018 season

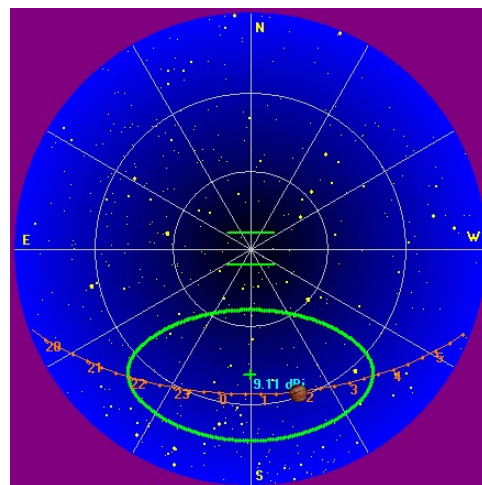
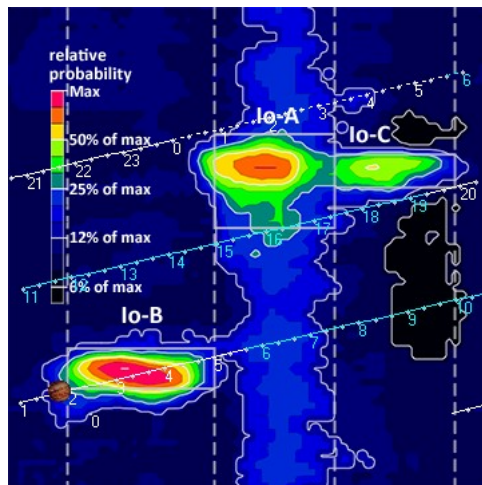
TFD array phased @ 35 degrees for 2017-2018 season

LWA antenna phased @ 35 degrees and orientation for observation: 45 degrees

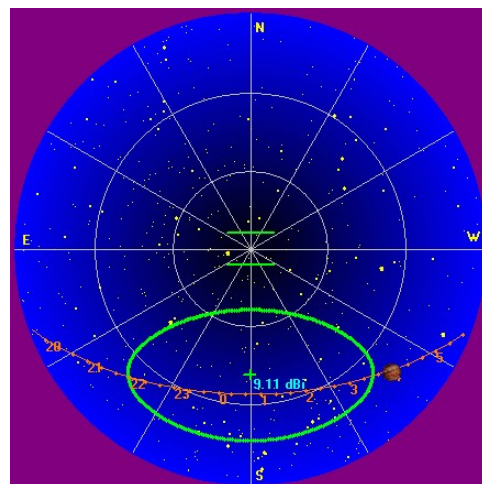
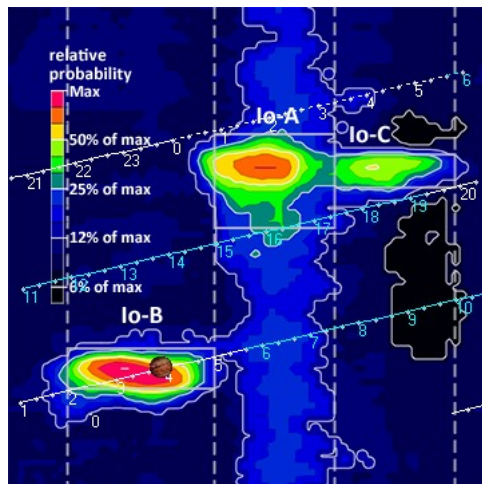
* Used for testing and evaluating antenna systems

Software Radio Sky Spectrograph 2.8.50

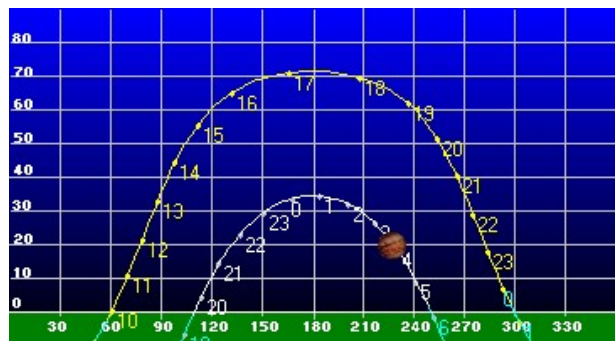
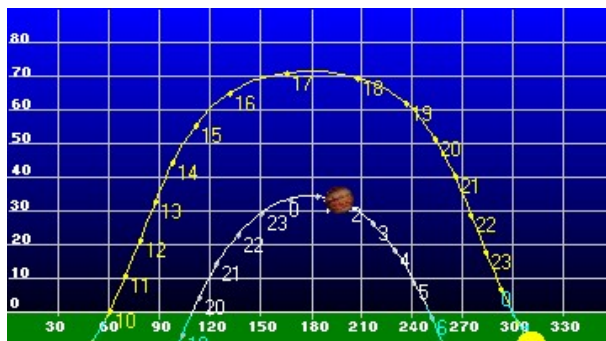
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Beginning of Pass



End of Pass



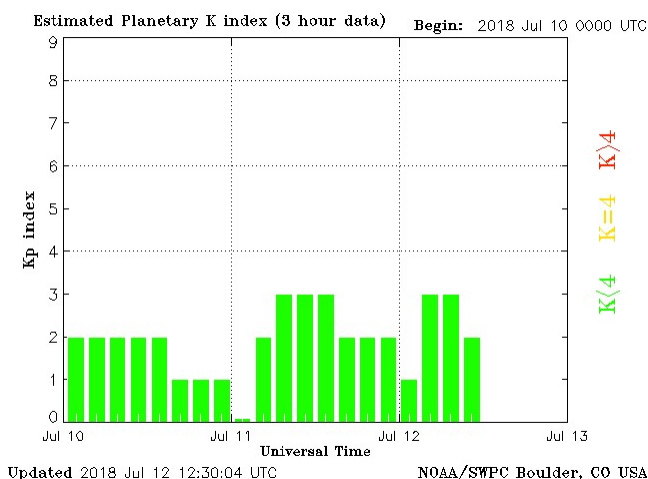
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MODE	CML RANGE	Io RANGE	MAX F	POLAR	ARC	NOTES
Io-D	0-200	95-130	18	LH	Early	Also called "fourth source"
Io-B	(105 - 185)	(80-110)	39.5	RH	Early	Also called "early source"
non Io-B	80-200	0-360	38	RH	Early	Voyager info
Io-A	(200-270)	(205-260)	38	RH	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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Io-B storm observed with FSX-8S/TFD array, FSX-2/LWA array and SDRPlay RSP2/TFD array. No emissions nor any of the strongest S-bursts were recorded on either FSX spectrograph. Weather conditions were clear but distant lightning seen in spectrographs.

For a center pass of Io-B, the emissions were, with few exceptions, just above the GB. It started out with a few L-bursts but transitioned into S-bursts as the storm progressed.

First indication of emission at 0149:30 UT were L2 modulation lanes a few percent above GB at 22 MHz. More L2 modulation lanes at 0150:20 UT at 18 MHz followed by more at 0150:45 at 19 MHz and some extremely faint emission at 0150:40. With few exceptions, the remainder of emissions were only a few percent above GB.

At 0240:10 UT, the L-burst emissions transitioned into S-bursts with a short S-burst N-event. More S-bursts began to appear at 0306 UT between 16 MHz and 17 MHz. Stronger S-bursts at 0309 UT between 18 MHz and 20 MHz. Another strong grouping of S-bursts at 0310:30 UT at 19.5 MHz.

The strongest S-bursts of the storm thus far were at 0318:10 UT between 17 MHz and 22 MHz. The Jove 2 receiver / Jove dipole linear polarized array recorded several of these bursts at 20 MHz at above 950 kK.

A relatively long period of weak or no activity, then at 0342:15 UT, a stronger cluster of S-bursts at 22 MHz. 10 seconds later another stronger burst also at 22 MHz.

The very last observable S-bursts were at 0354:55 UT at 21 MHz.

The only thing remarkable about this storm was the lack of activity in a center Io-B pass.

The SkyPipe data for the brief S-bursts at 20 MHz have been uploaded to the Radio Jove archive.

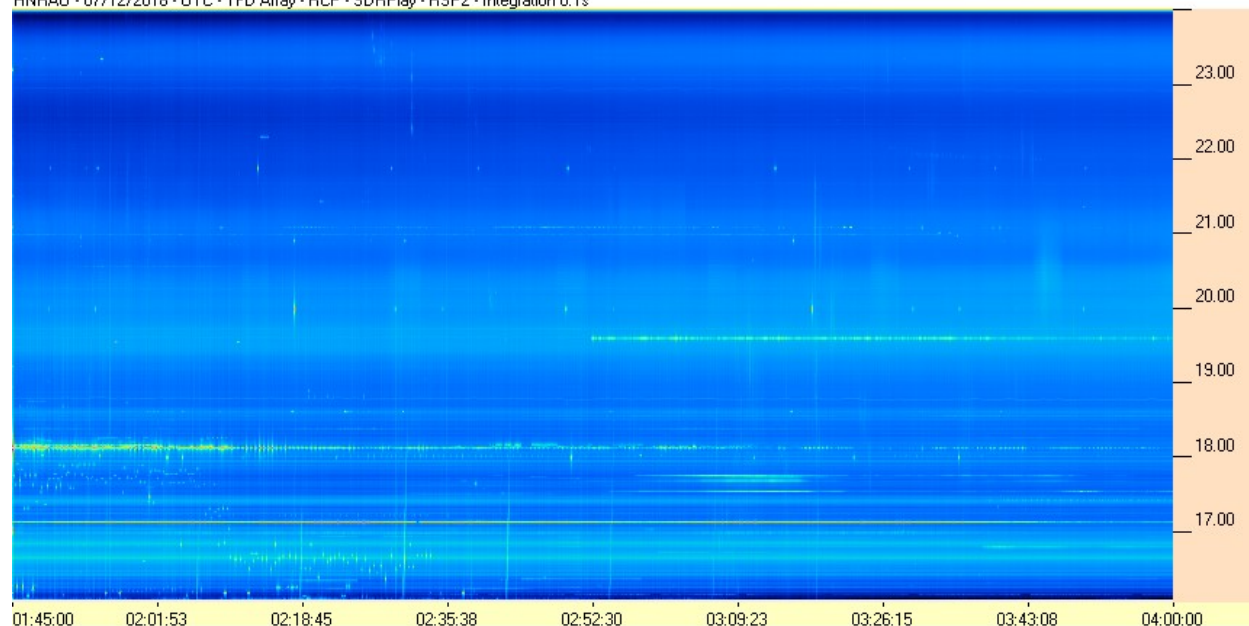
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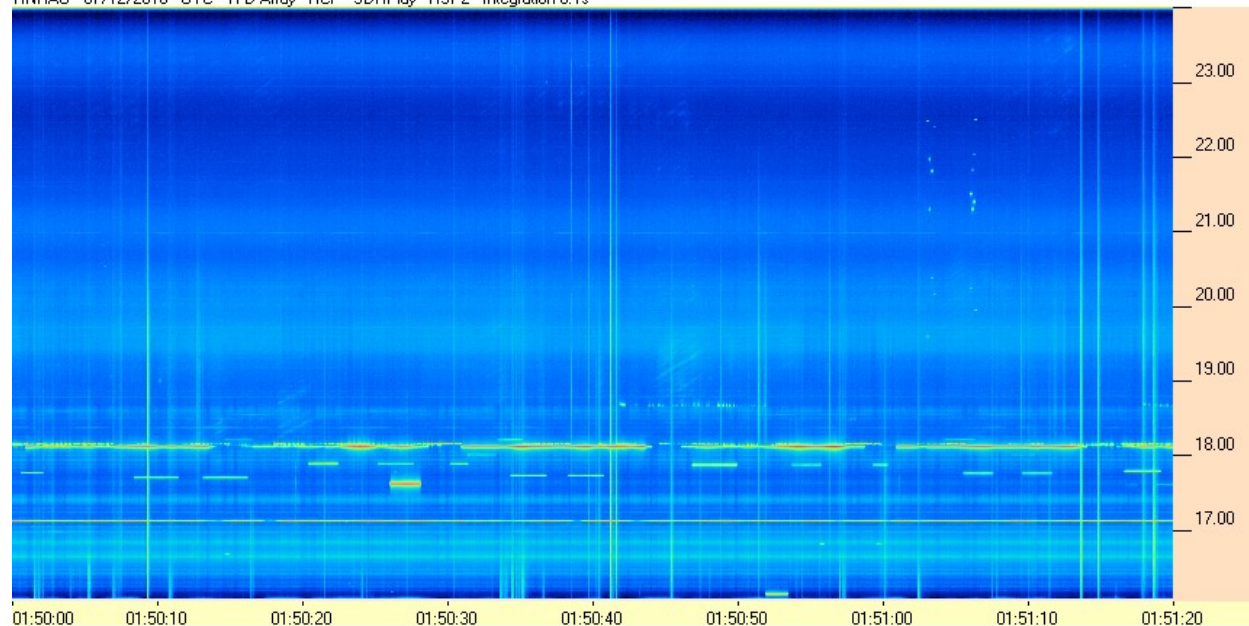


SDRPlay RSP2 / TFD Array

HNRAO - 07/12/2018 - UTC - TFD Array - RCP - SDRPlay - RSP2 - Integration 0.1s



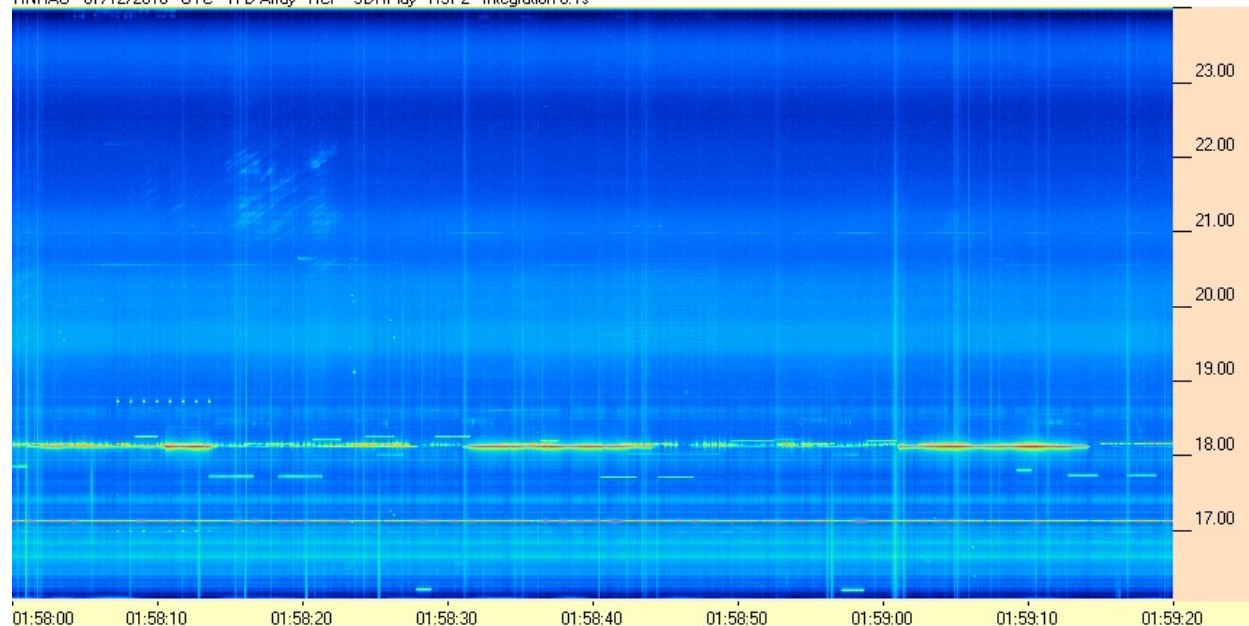
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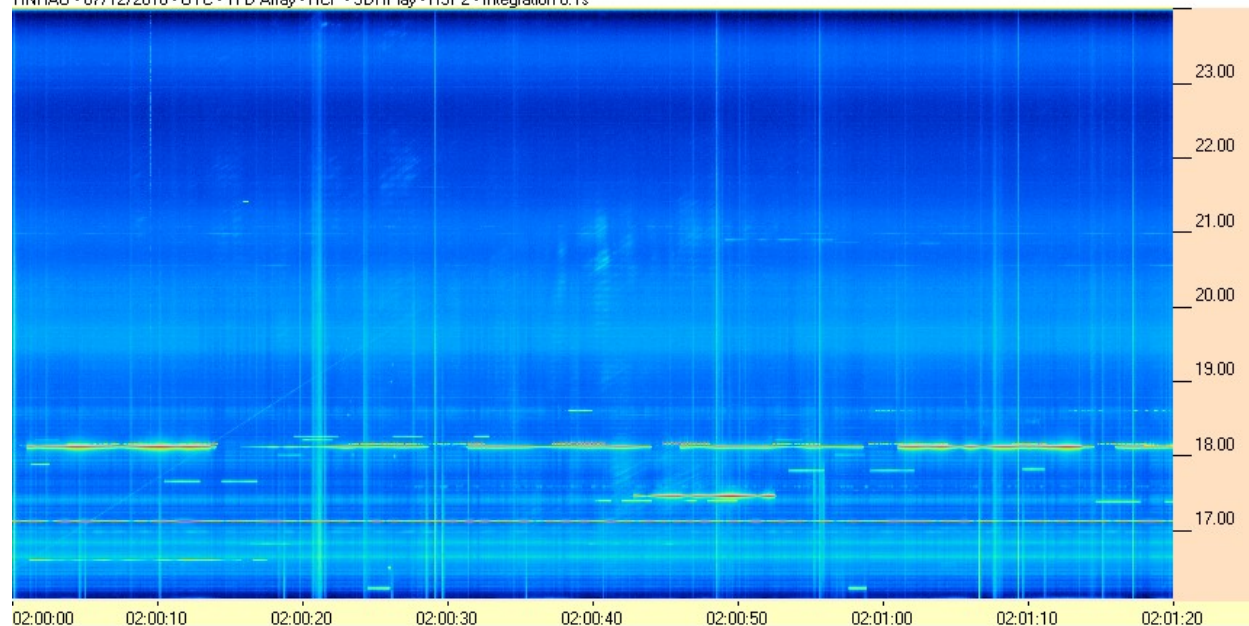
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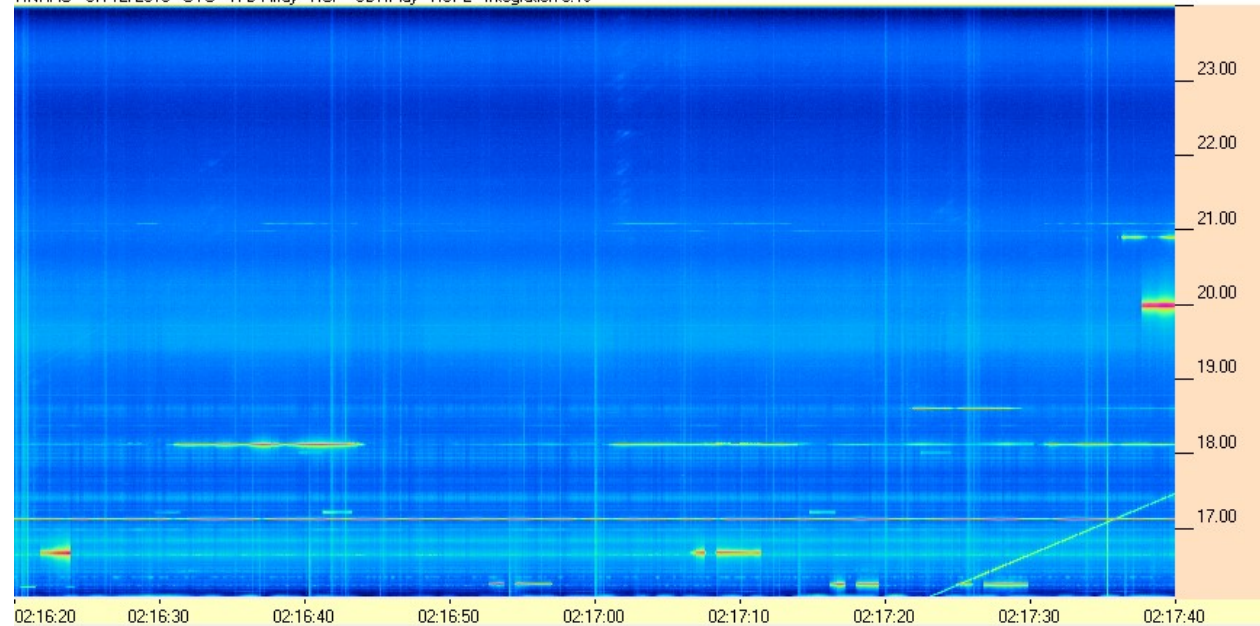
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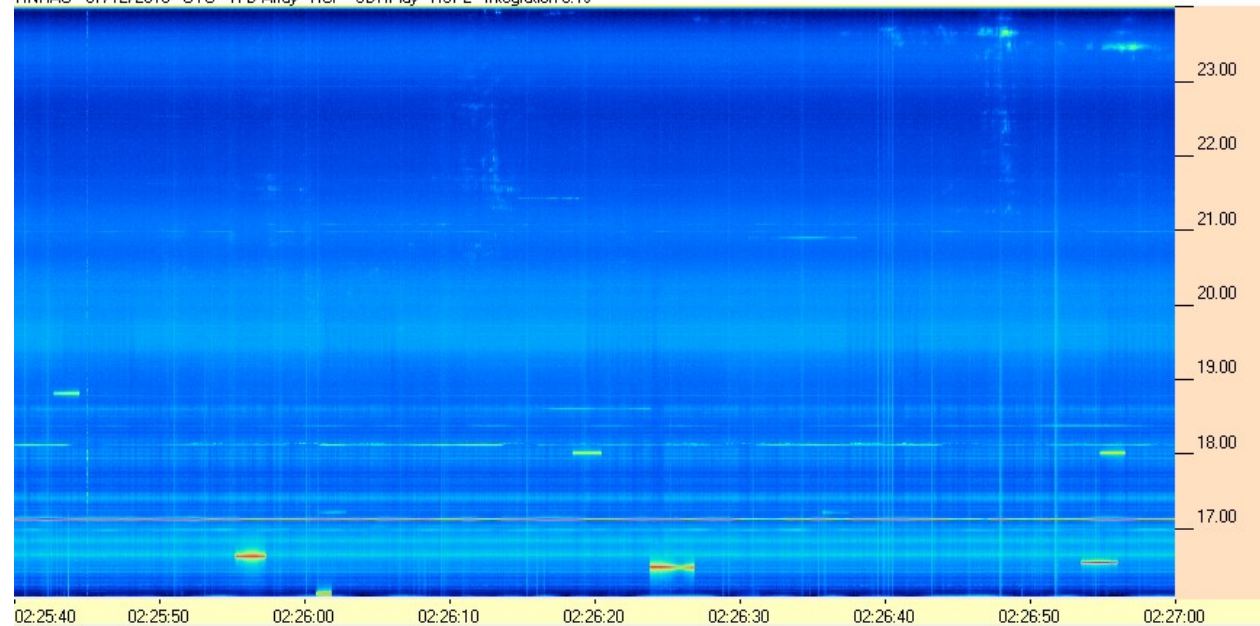
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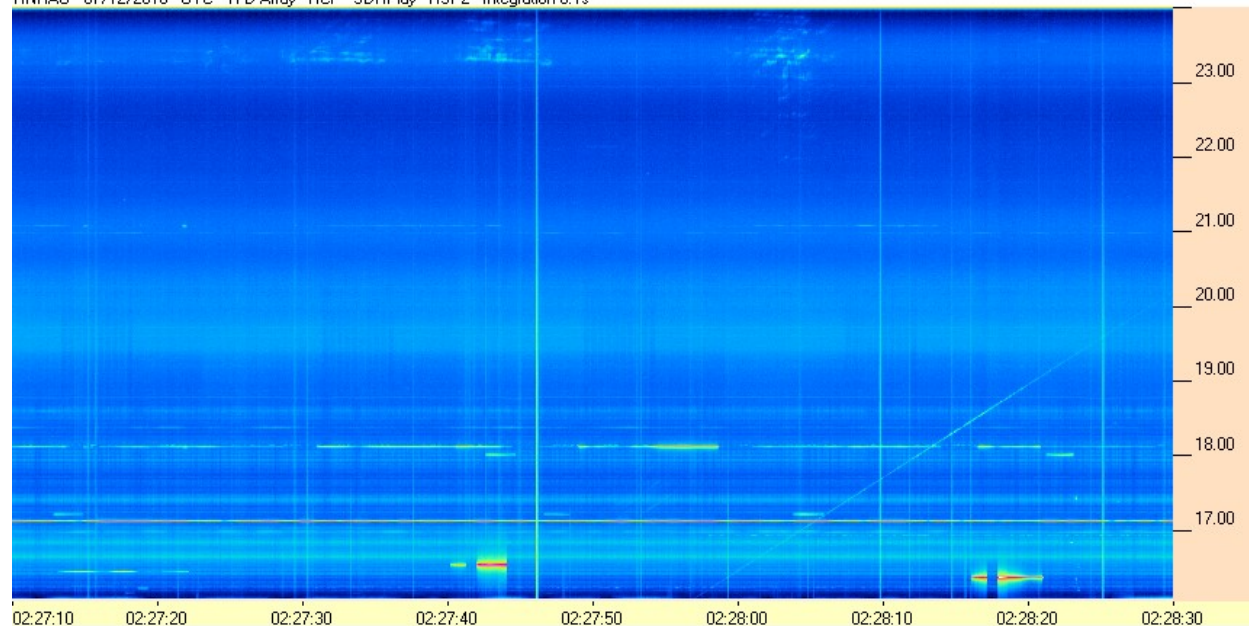
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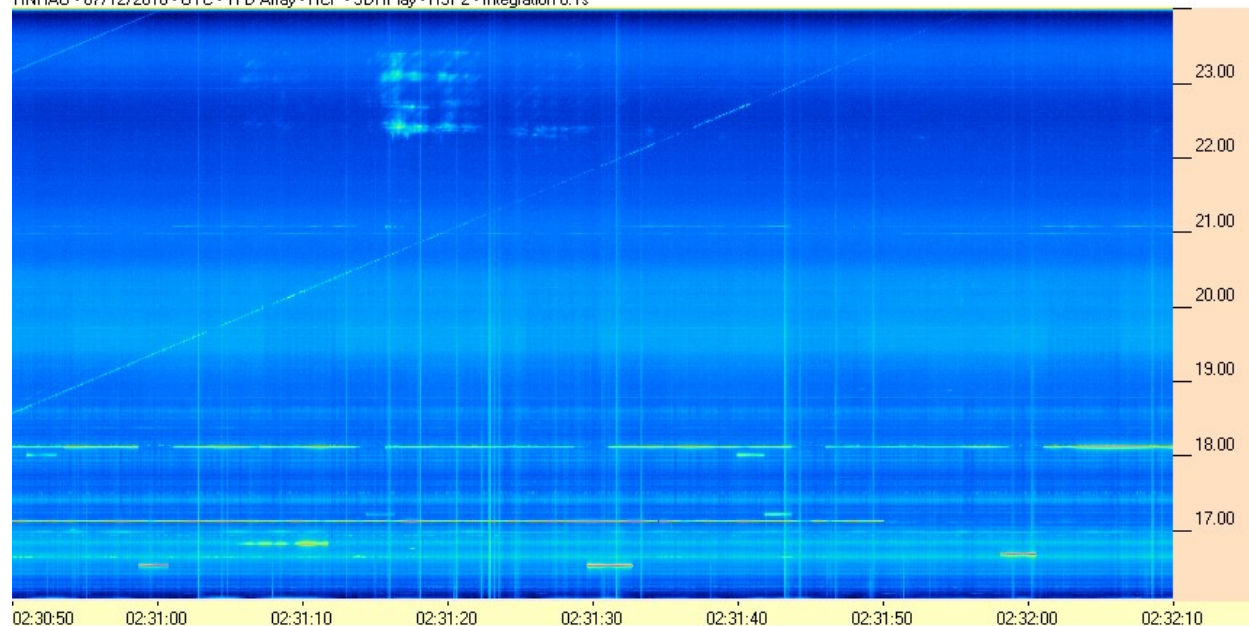
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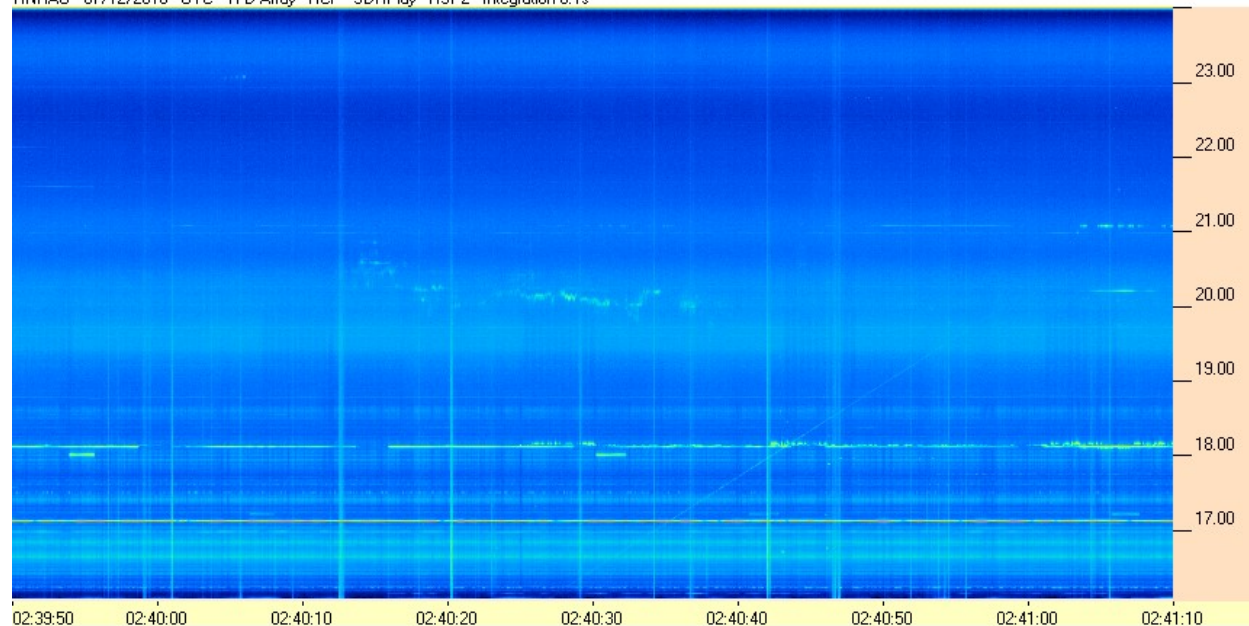
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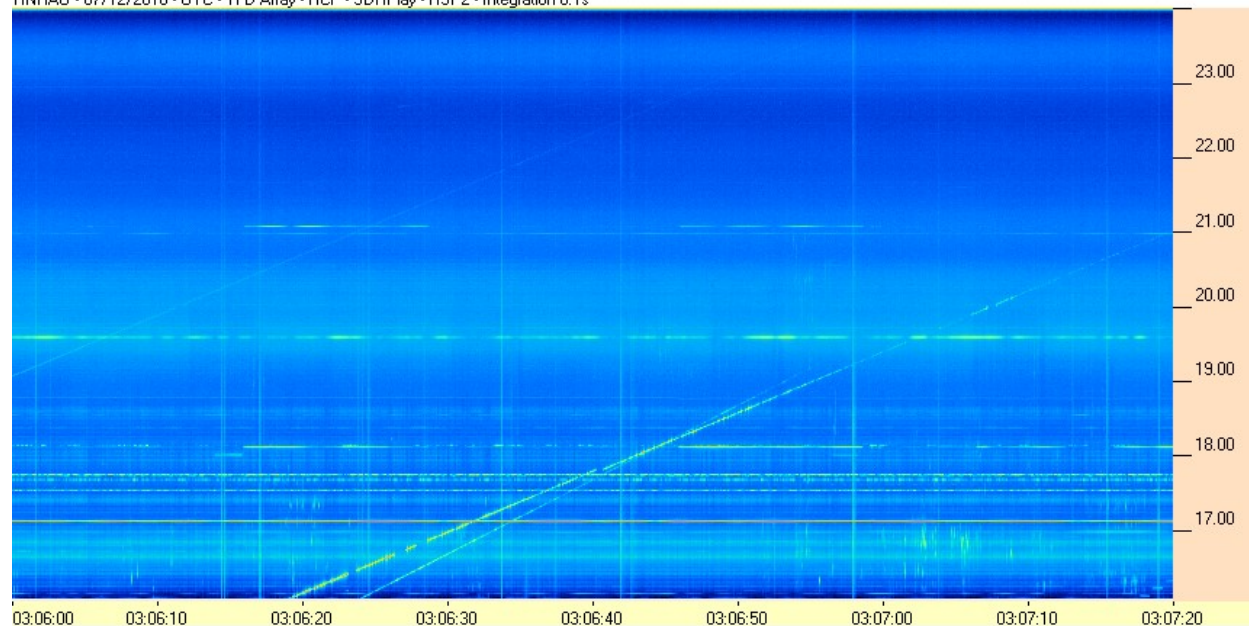
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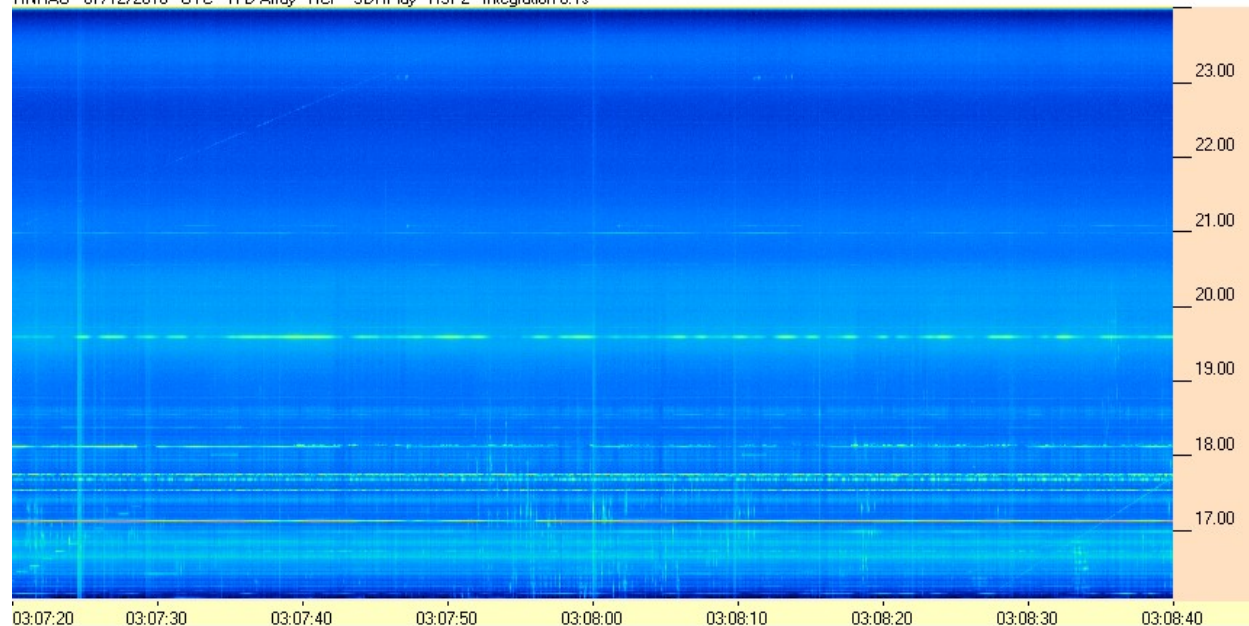
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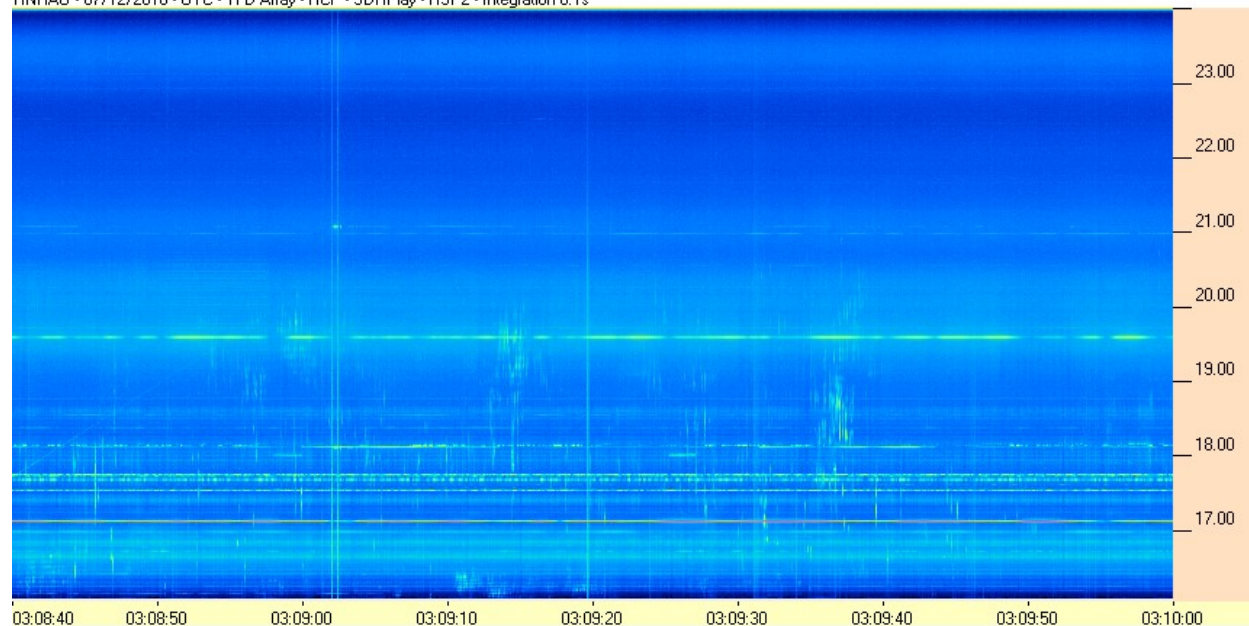
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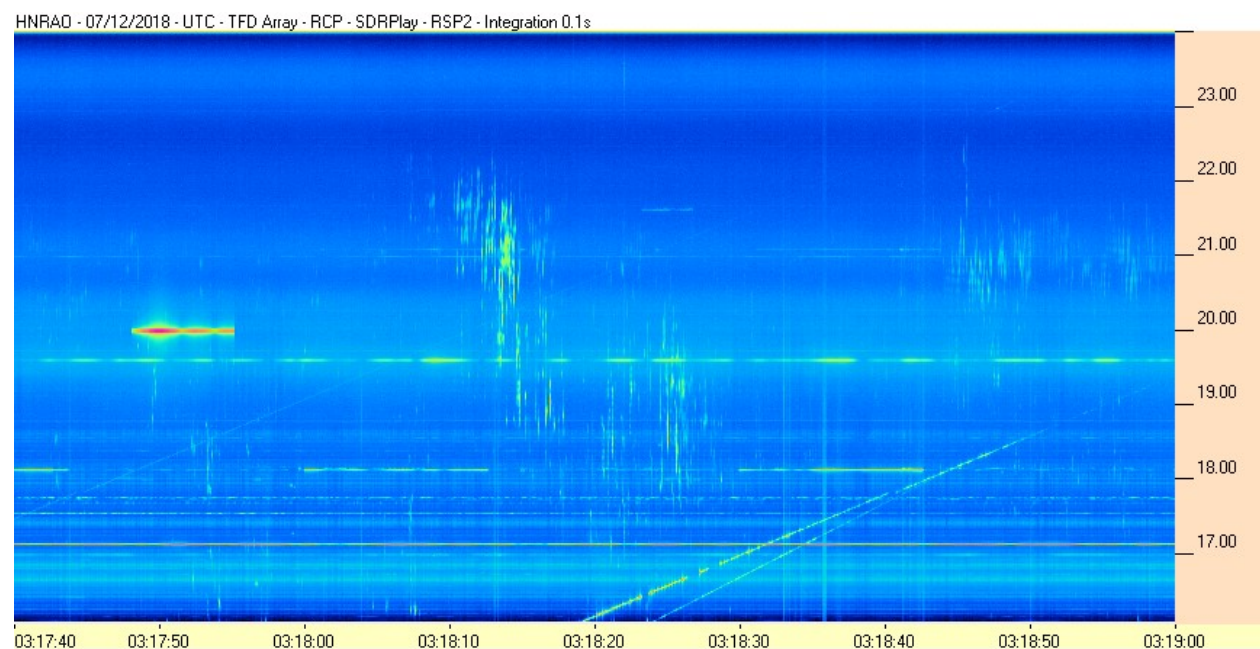
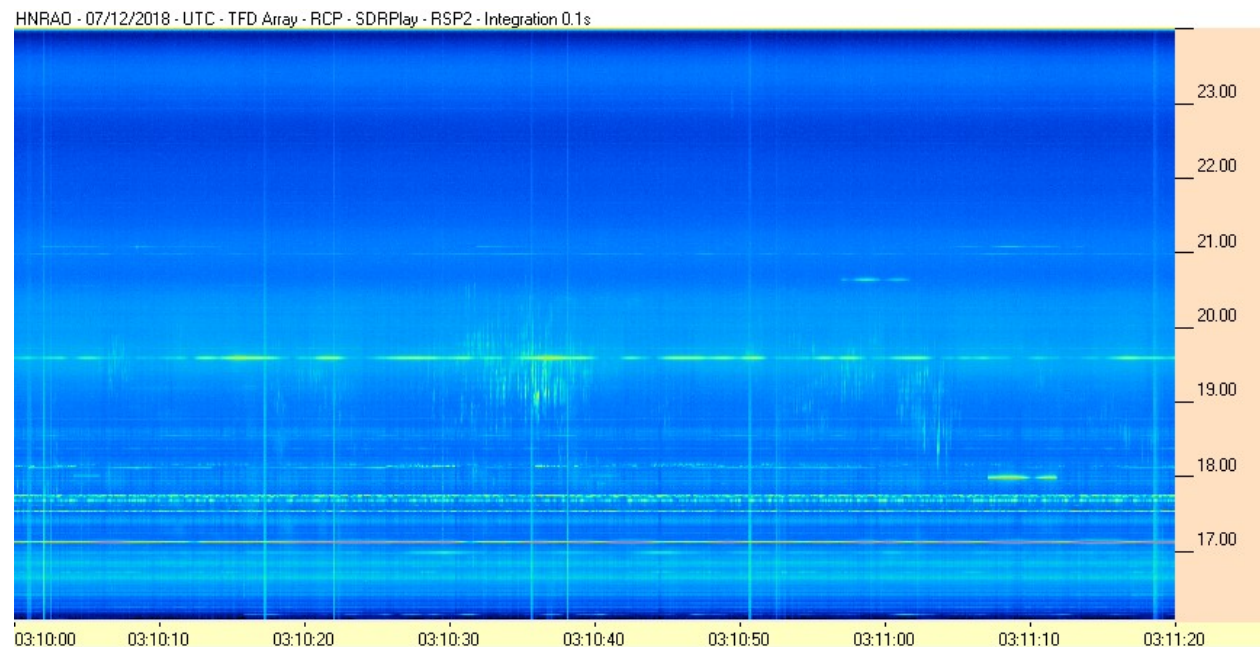
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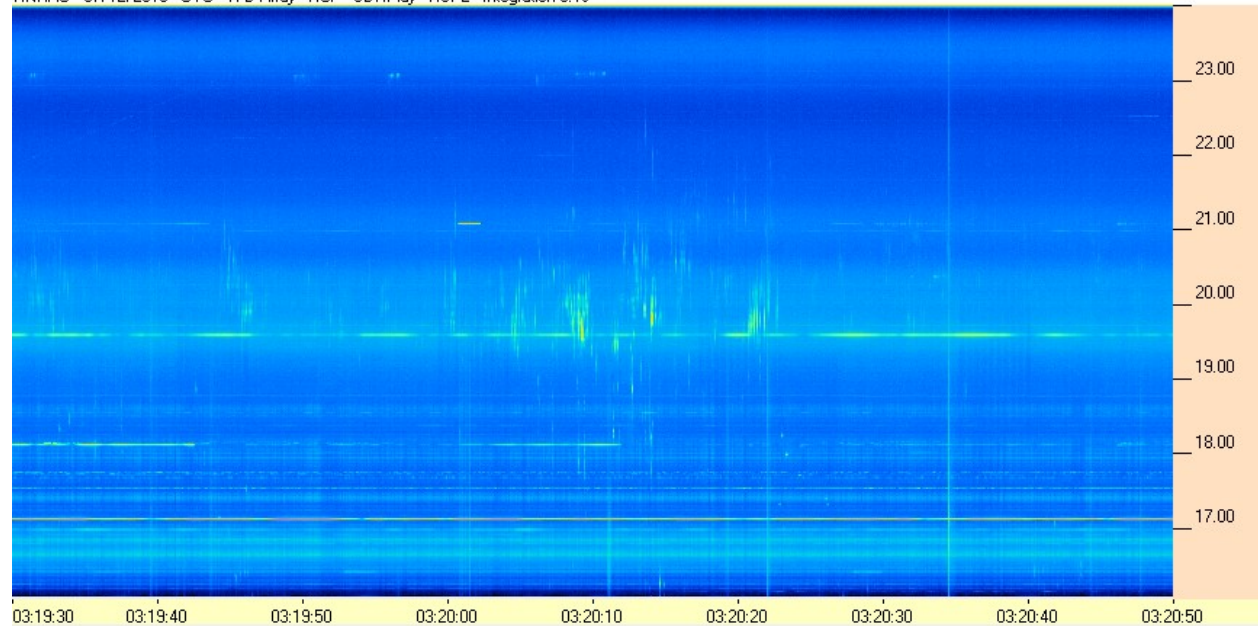
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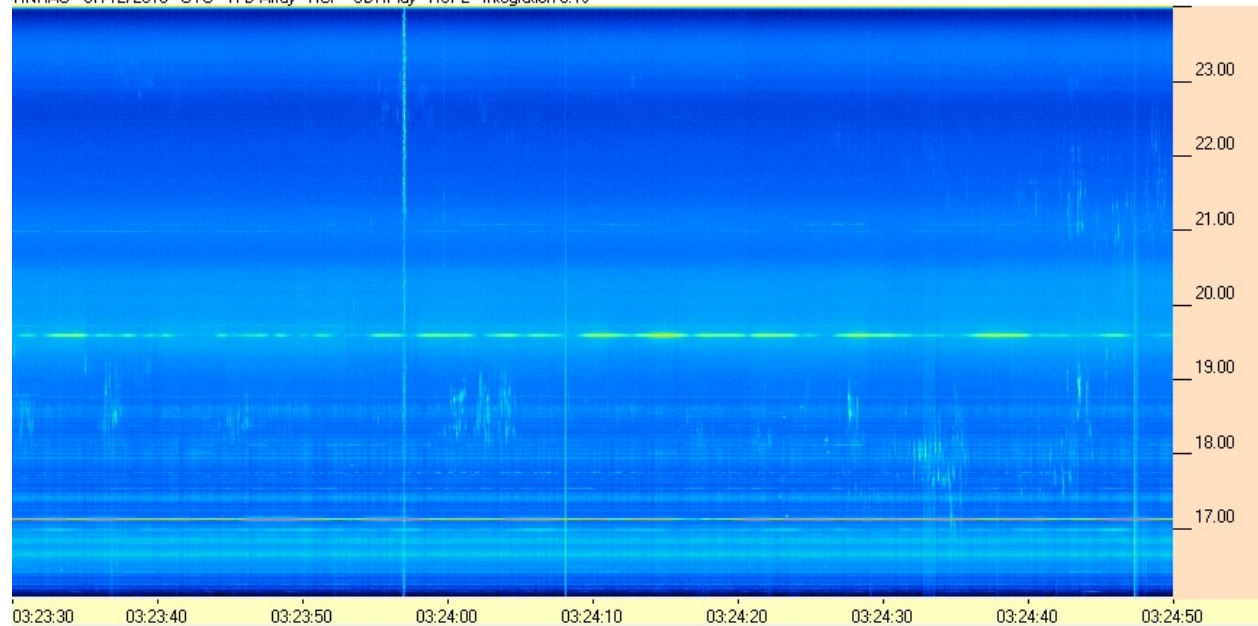
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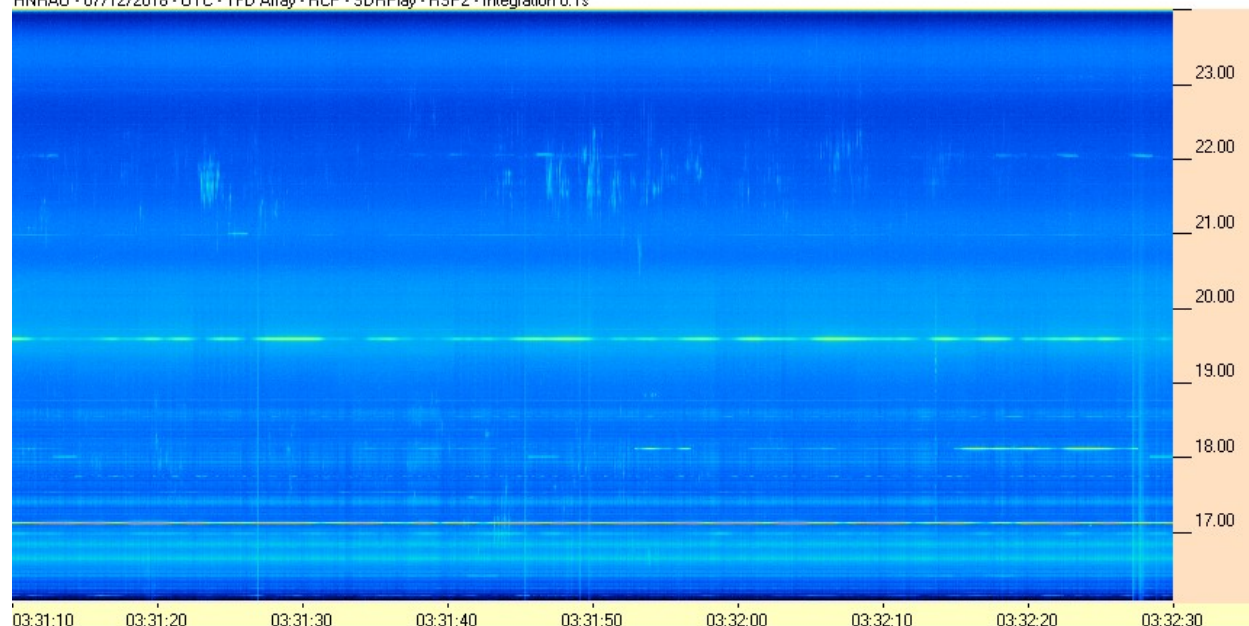
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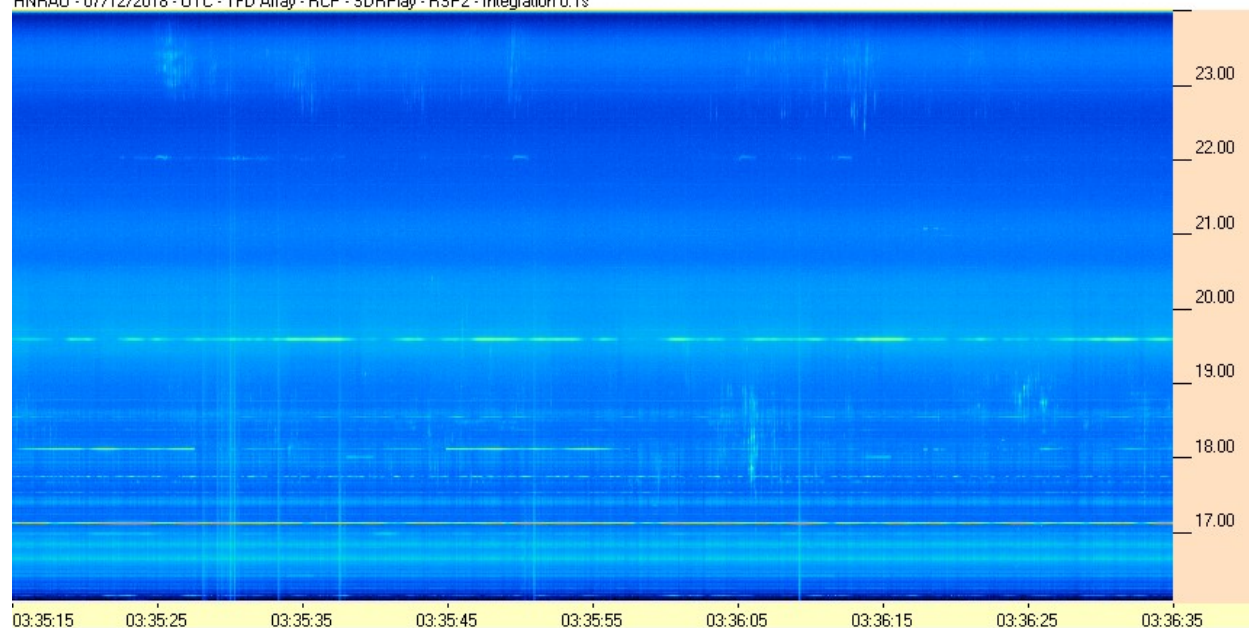
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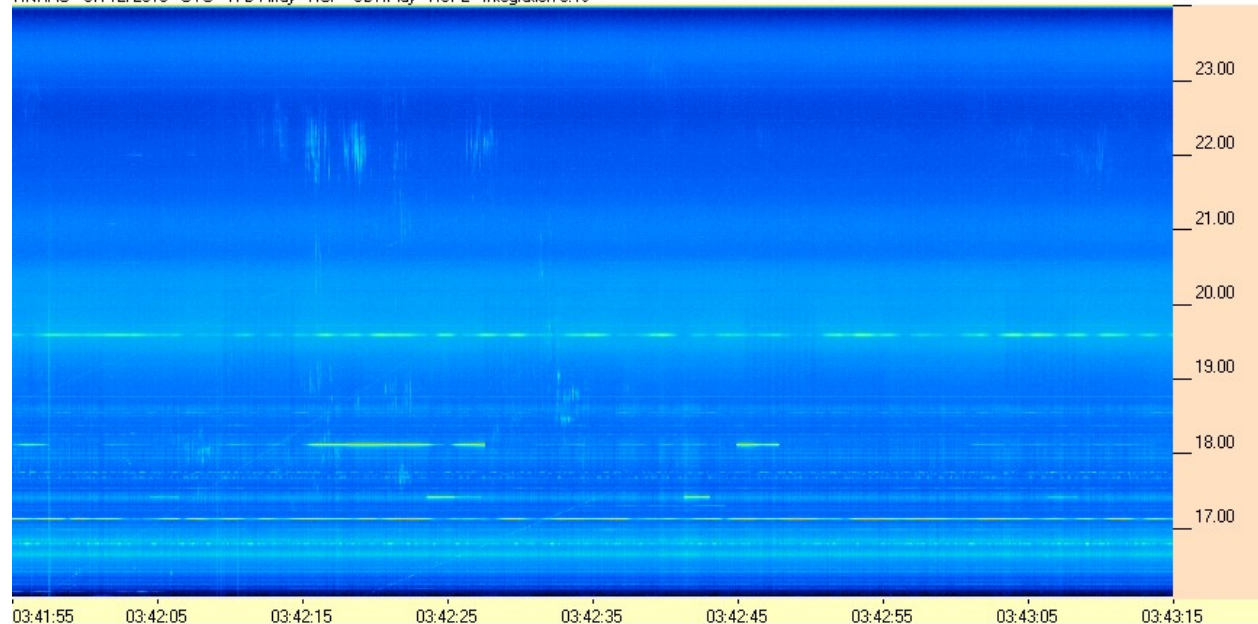
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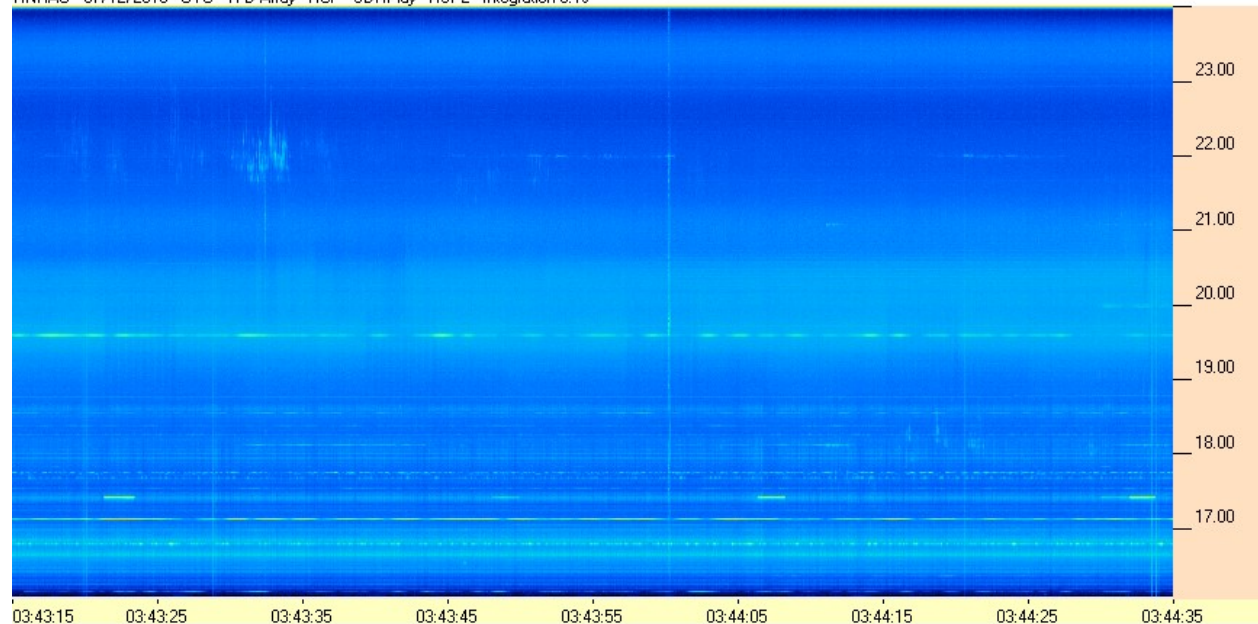
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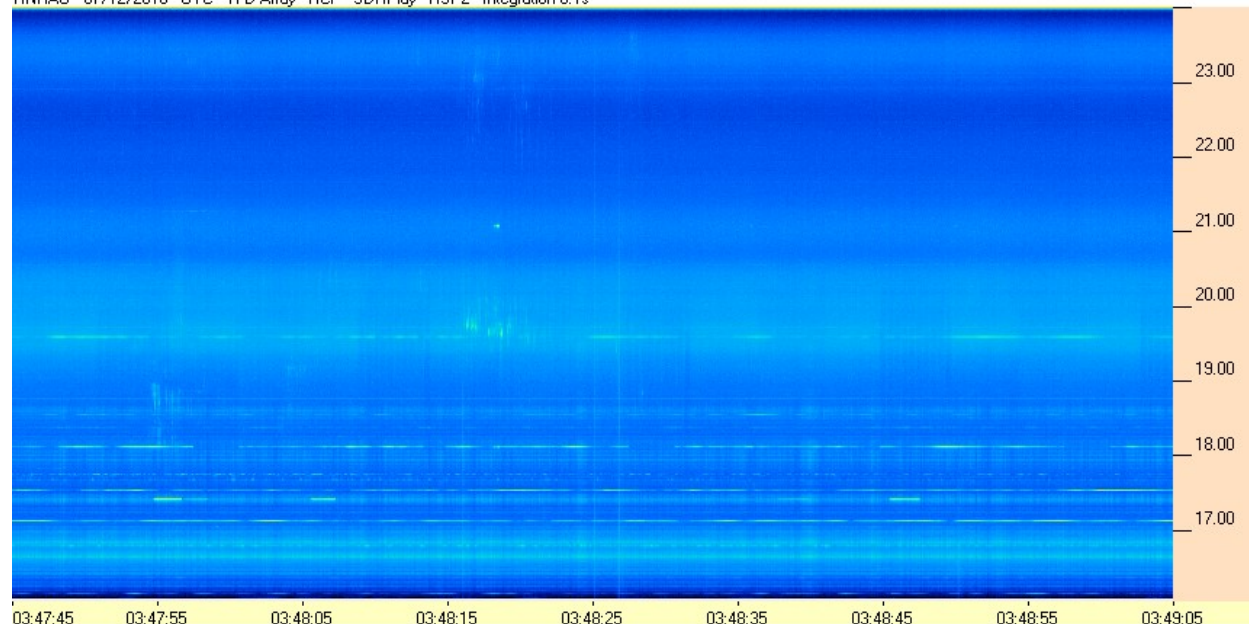
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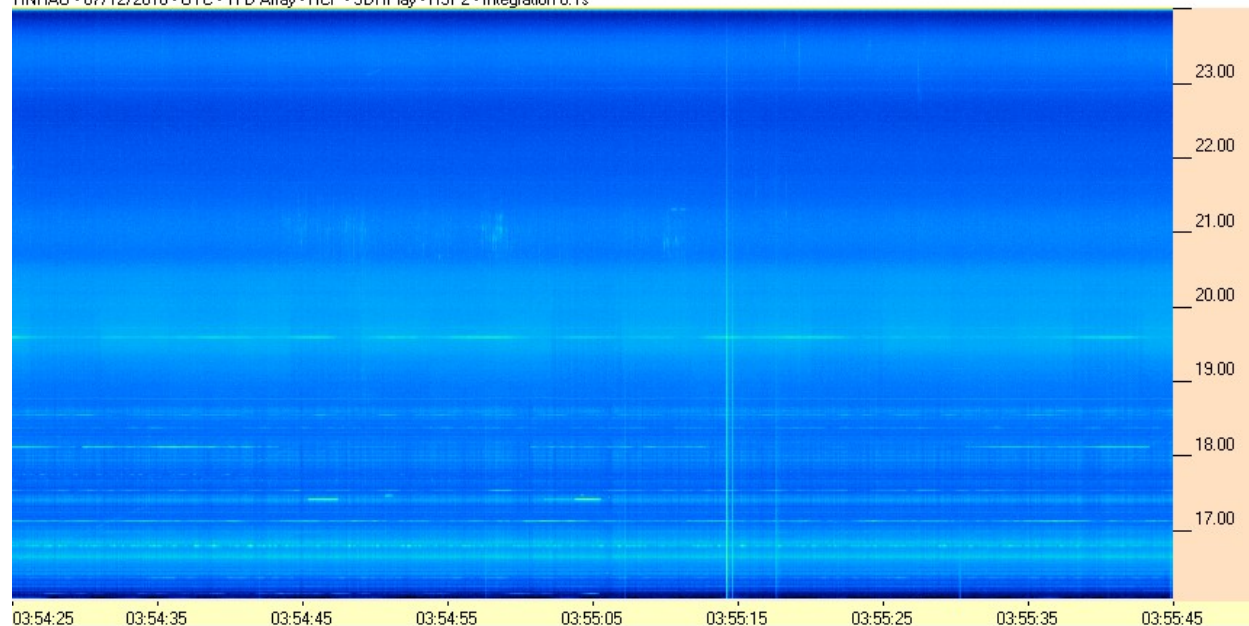
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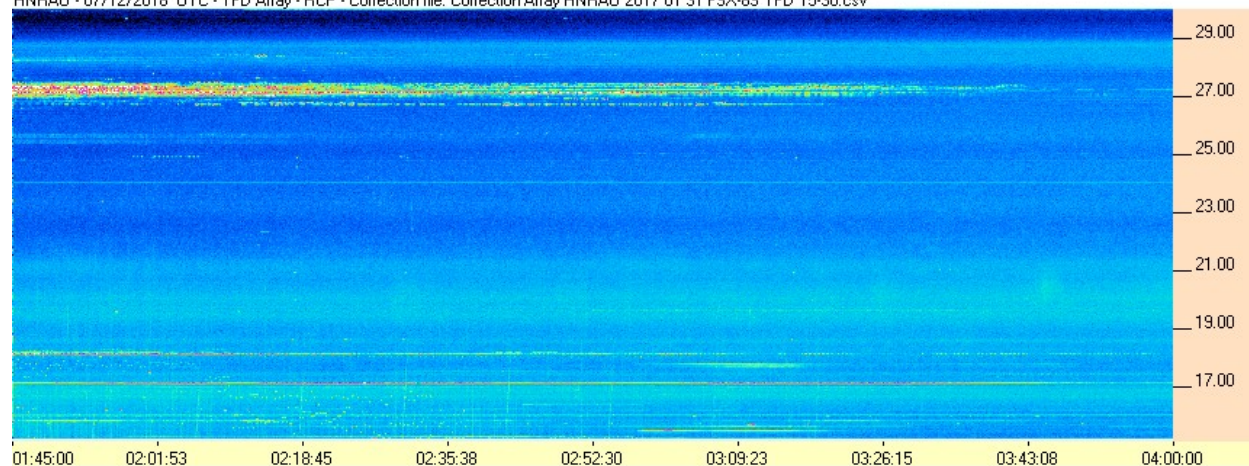


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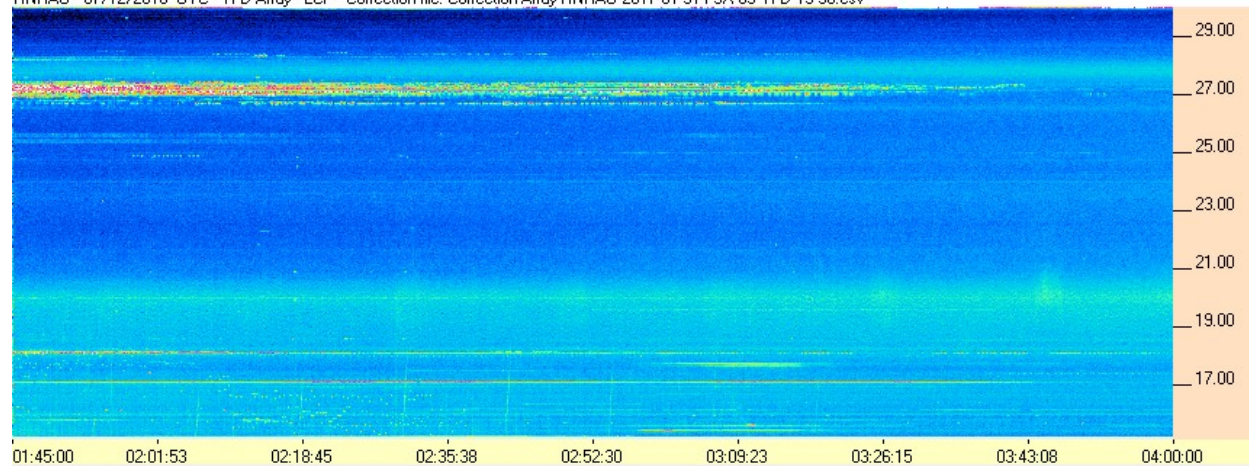


FSX-8S / TFD Array

HNRAO - 07/12/2018 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 07/12/2018 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv

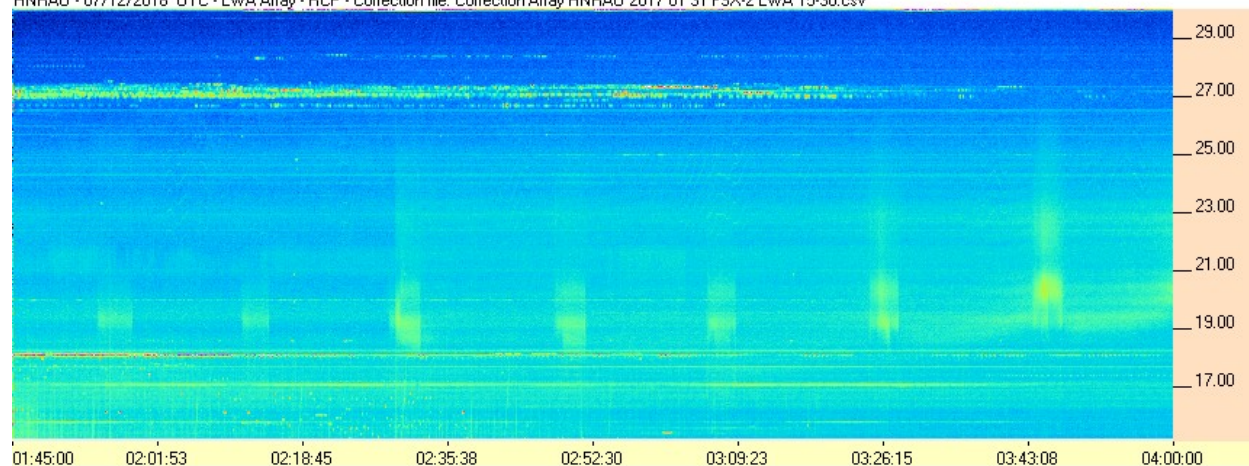


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FSX-2 / LWA Array

HNRAO - 07/12/2018 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



Jove 2 receiver / Jove Dipole Array

