

HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq



Date:30 May 2017

Object: Jupiter – Io-A

Observer: JB

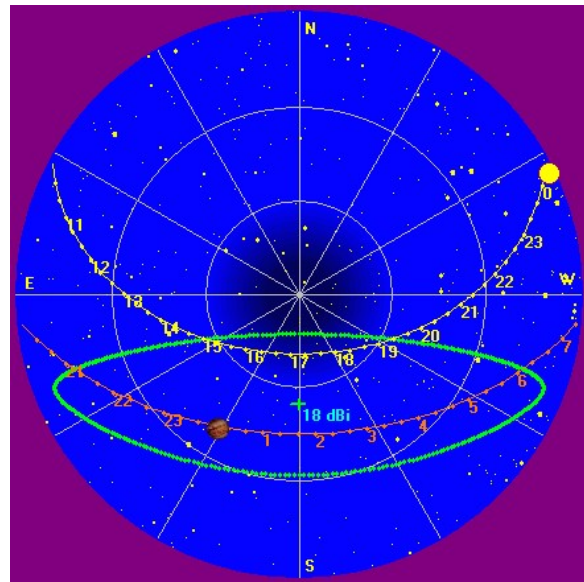
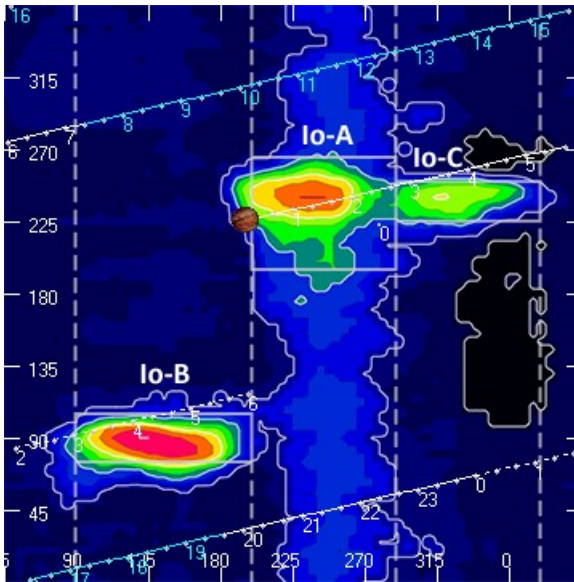
Start of pass:	0011UT	Planetary K-index:	2
Jupiter Altitude (deg):	40.9	Jupiter Azimuth (deg):	149.5
Jupiter CML:	195.63	Jupiter Io Phase:	225.59
Jupiter RA (hr/min):	12:51	Jupiter Dec (hr/min):	-03:51
Hour Angle (hr/min):	-01:31	Polarization	RCP
Sun Altitude (deg):	03.3	Sun Azimuth (deg):	295.7
Sun RA (hr/min):	04:20	Sun Dec (hr/min):	21.28

End of pass:	0220 UT		
Jupiter Altitude (deg):	44.6	Jupiter Azimuth (deg):	193.6
Jupiter CML:	273.62	Jupiter Io Phase	243.93
Hour Angle (hr/min):	00:39		
Sun Altitude (deg):	-16.2	Sun Azimuth (deg):	318.8

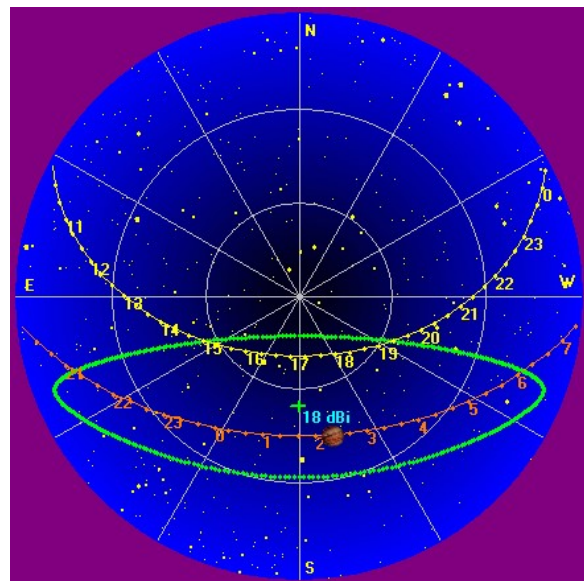
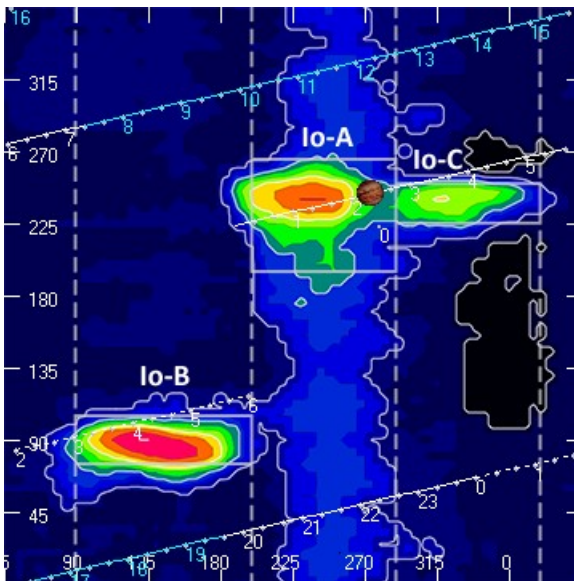
Observations made using:

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 19 April 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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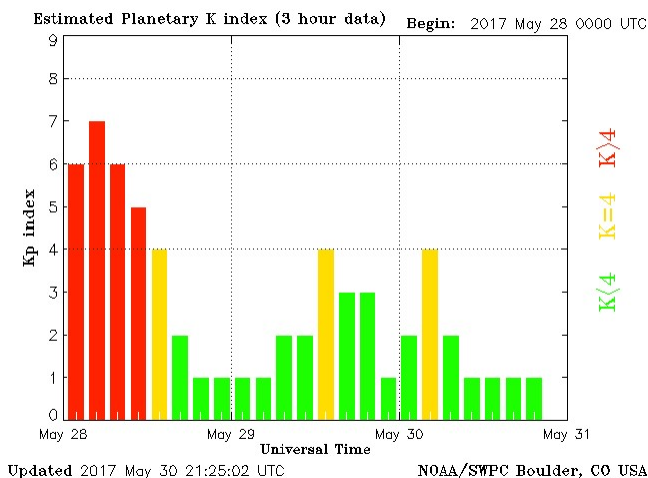


Beginning of Pass



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>

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After a few days without any Jupiter activity, this Io-A storm was a welcome sight. The Planetary K-index has been very low prior to this storm. On May 28th, it rose sharply and then fell off. There was some speculation at one time that Jupiter emissions are possibly tied to the K-index. To my knowledge, no definitive study has been done regarding this. While not particularly strong as Io-A storms can be, this still provided a range of L-bursts and measurable modulation lanes.

Observation conditions were surprisingly quiet given the proximity to sunset. A heavy rainstorm prior to the emission period passed in time so as not to interfere with the observations.

Negative drift L-bursts from 15 MHz to 27 MHz. Negative drift modulation lanes. Measurements were made and are listed in a chart at the end of this report. As noted in previous modulation lane measurements, the higher in frequency measured, the higher the drift rate.

This storm was observed with the SDRPlay RSP2, the FSX-2/LWA pair and the FSX-8S/TFD pair. The FSX-2/LWA pair recorded the emissions stronger than the FSX-8S/TFD pair.

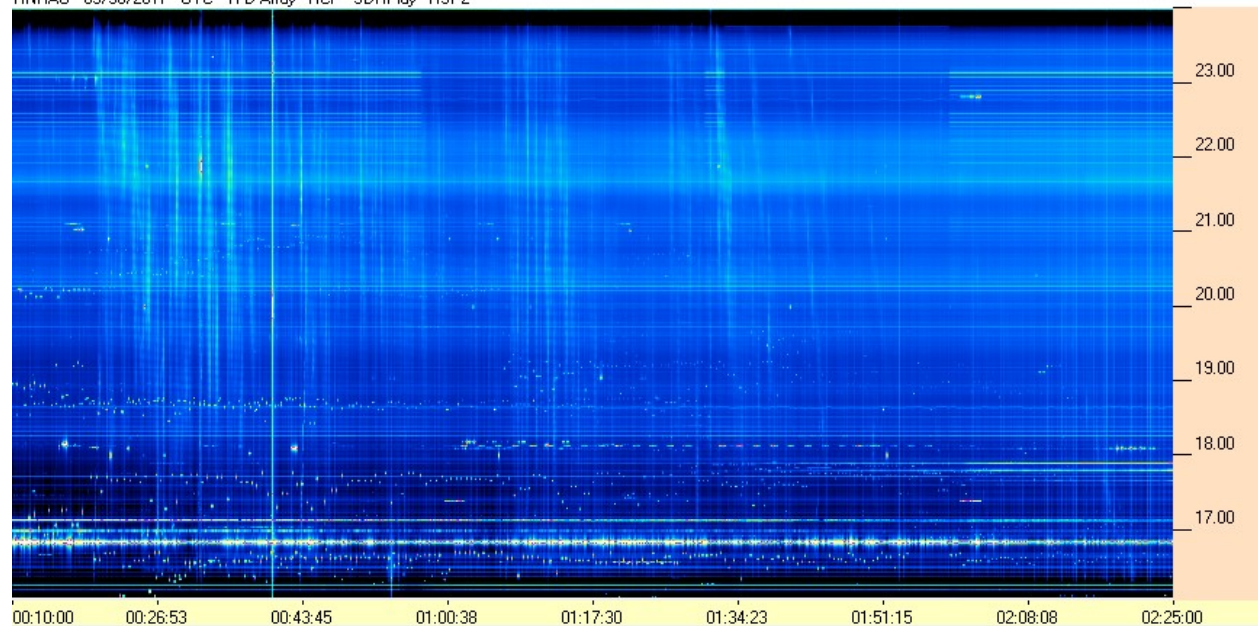
An attempt was made, utilizing an SDRPlay RSP1 spectrograph, to make high data rate recordings of some of the L-bursts in this storm. Those images are marked so and can be found near the end of this report. At the data rate used, the modulation lanes in these images are skewed and approach horizontal. The strongest burst recorded at this high data rate is at 0137:55 UT. It's difficult to tell if it is composed of a series of fast bright bursts or if it's an artifact of the scan rate. This will be explored in future storms if the situation presents itself.

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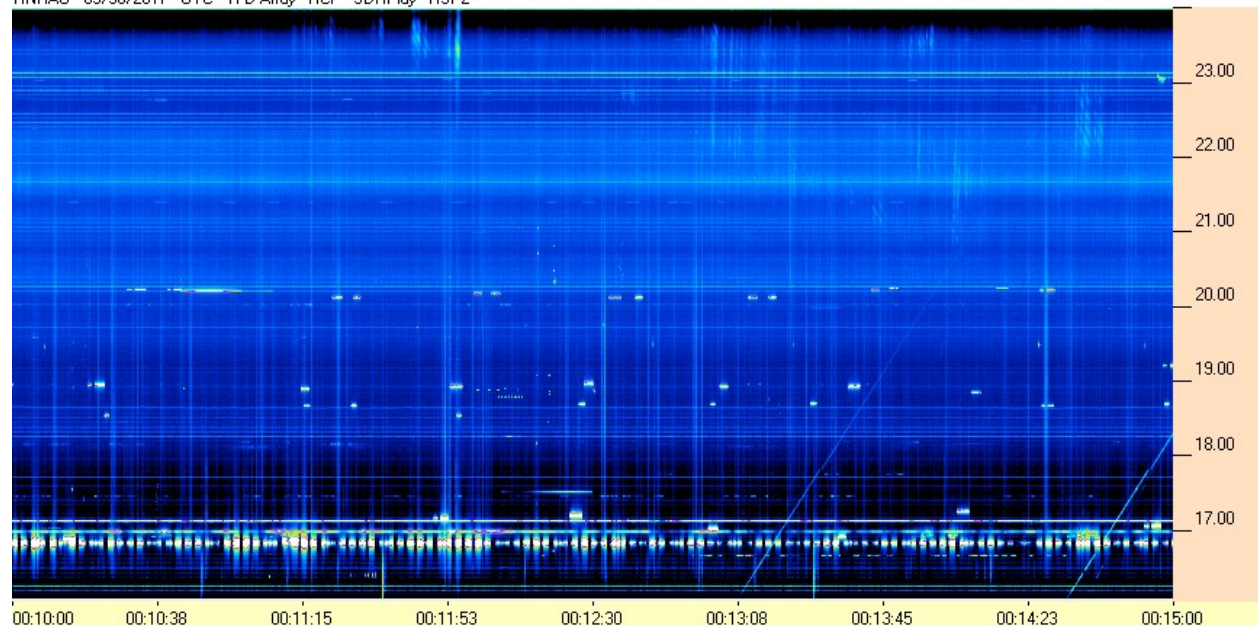


SDRPlay RSP2/TFD Pair

HNRAO - 05/30/2017 - UTC - TFD Array - RCP - SDRPlay - RSP2



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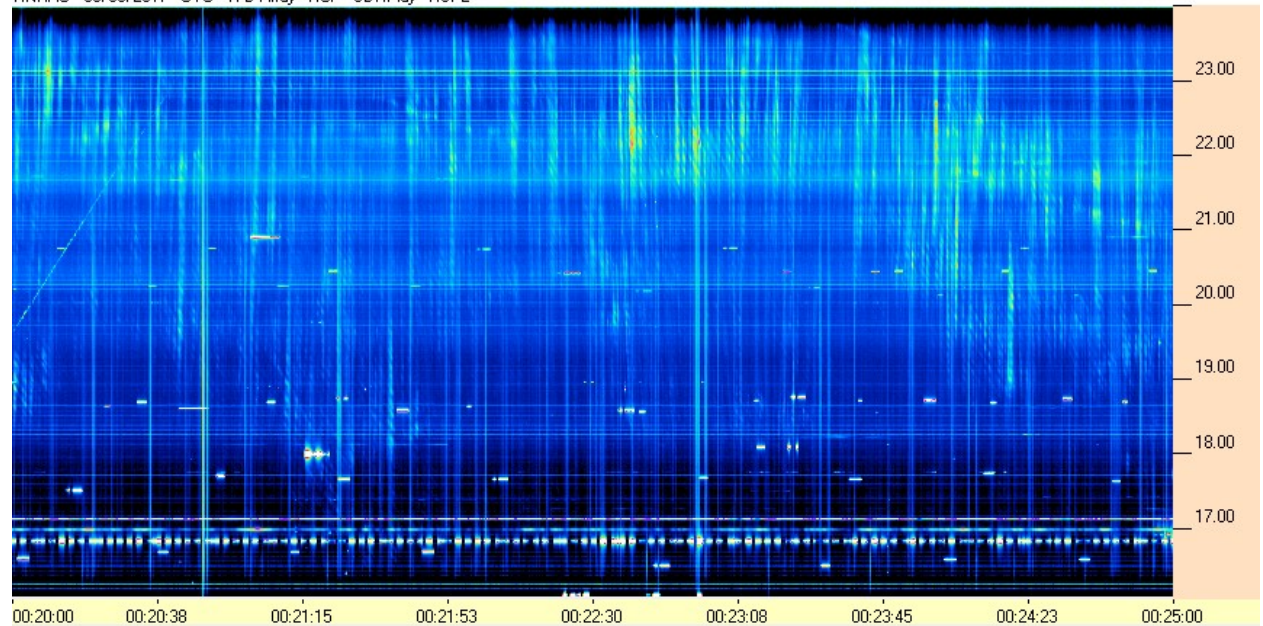


HNRAO Observing Log

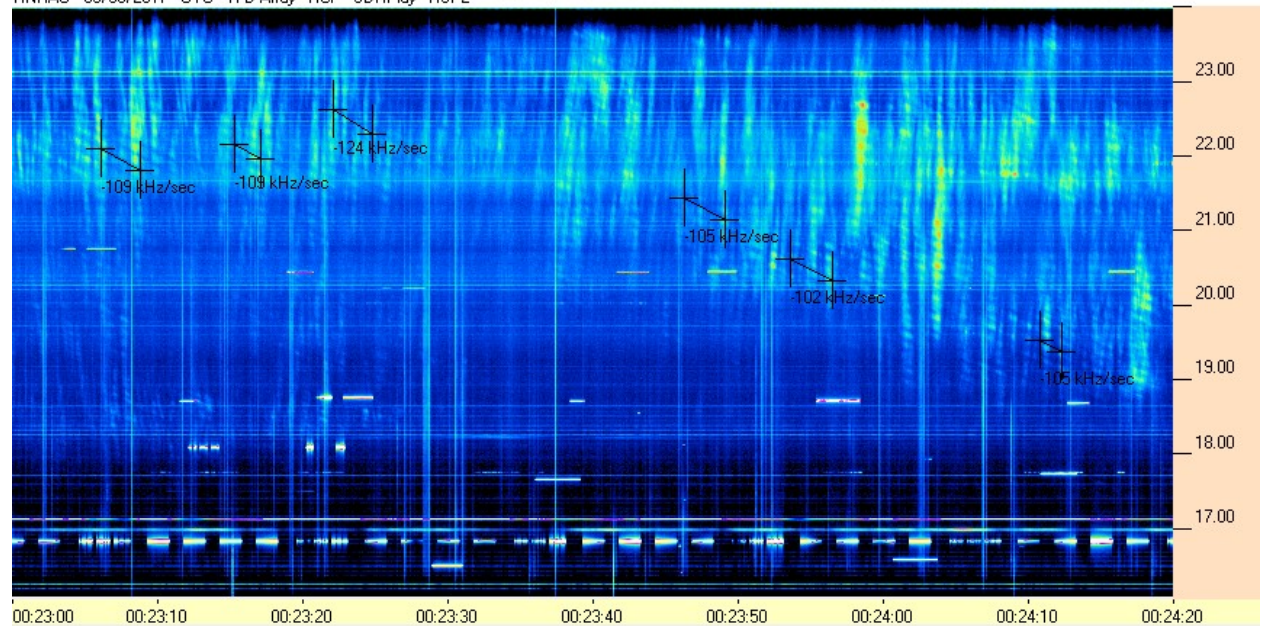
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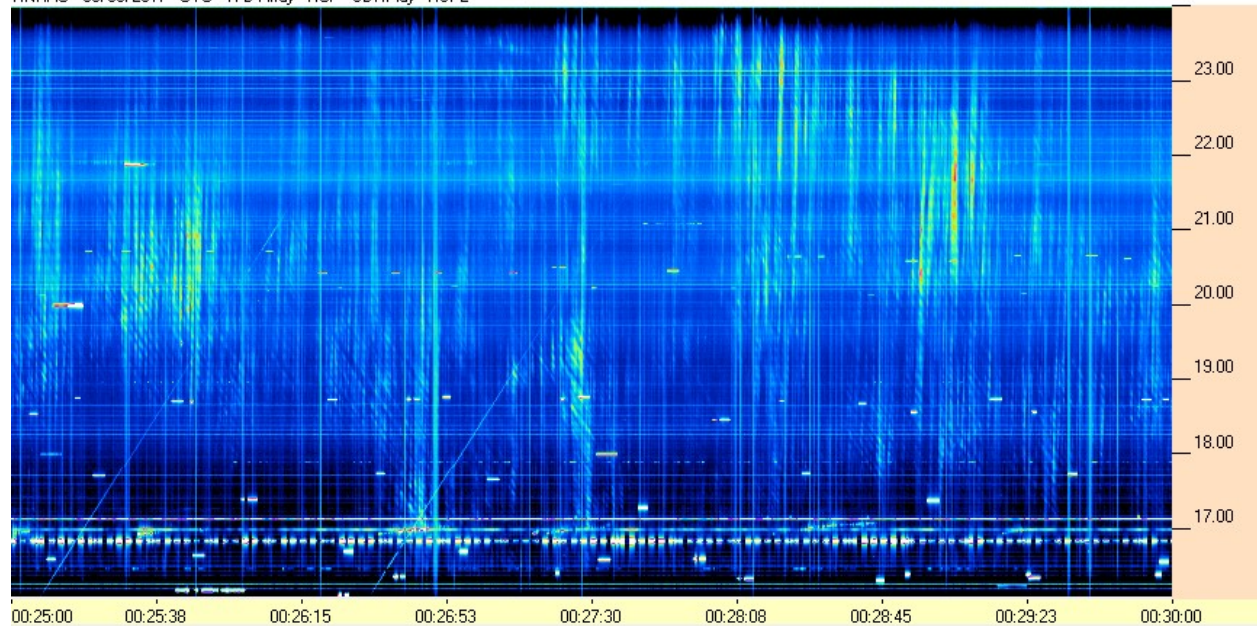
HNRAO - 05/30/2017 - UTC - TFD Array - RCP - SDRPlay - RSP2



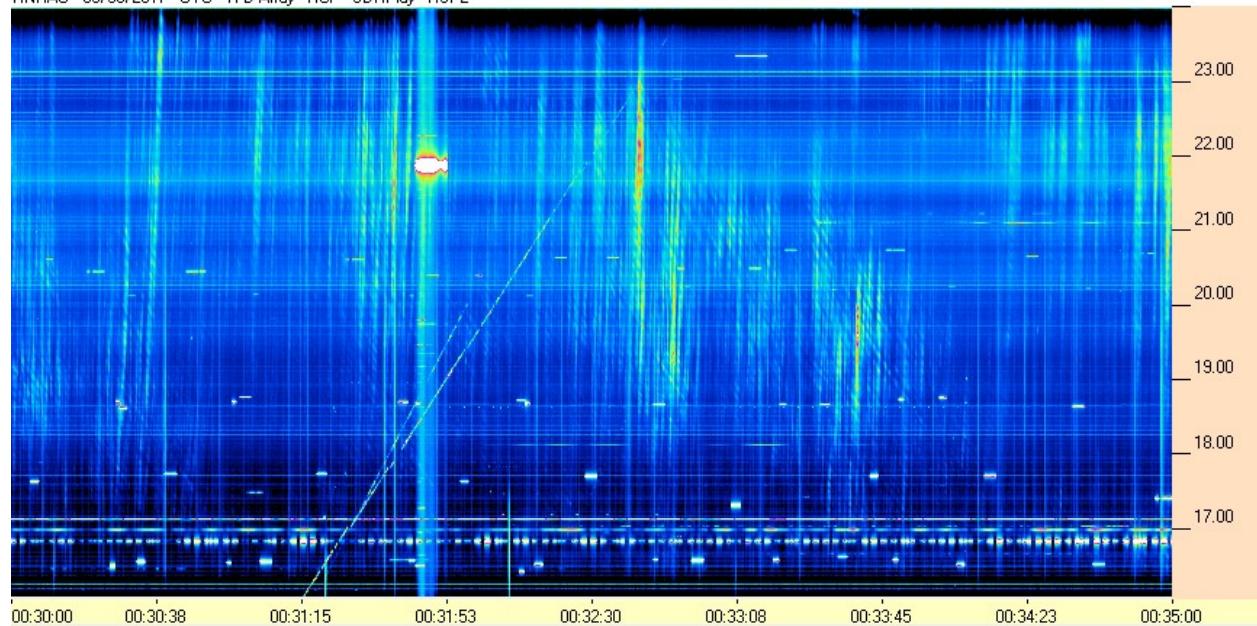
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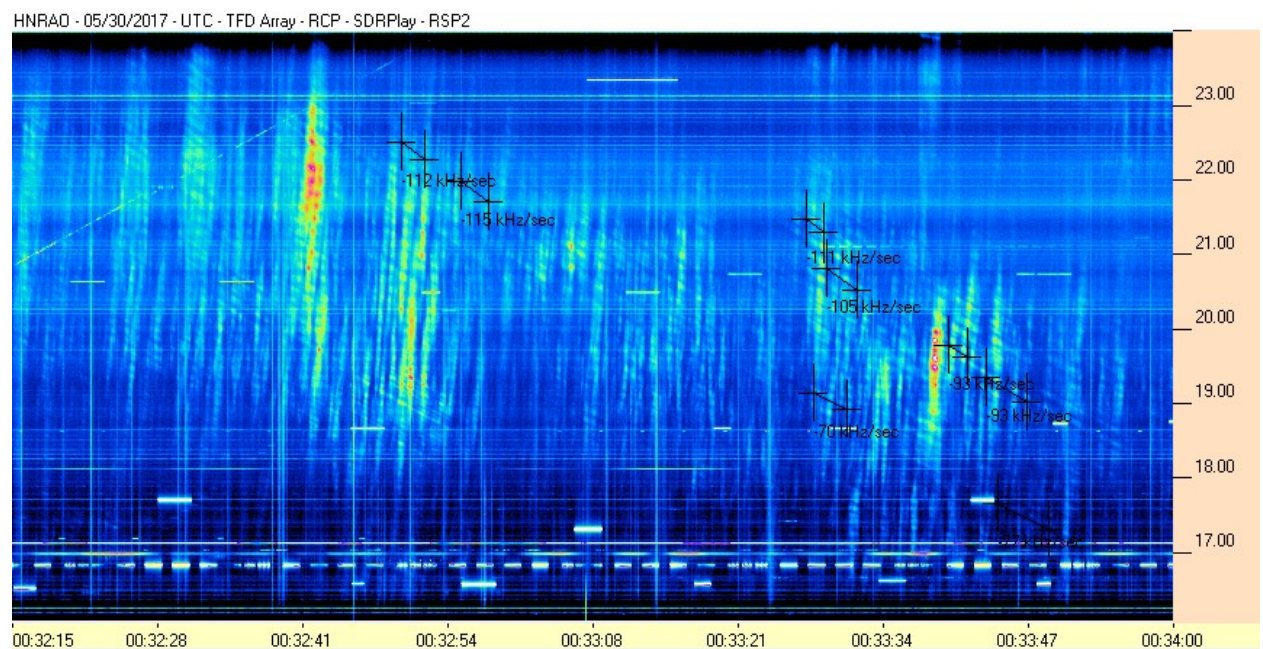
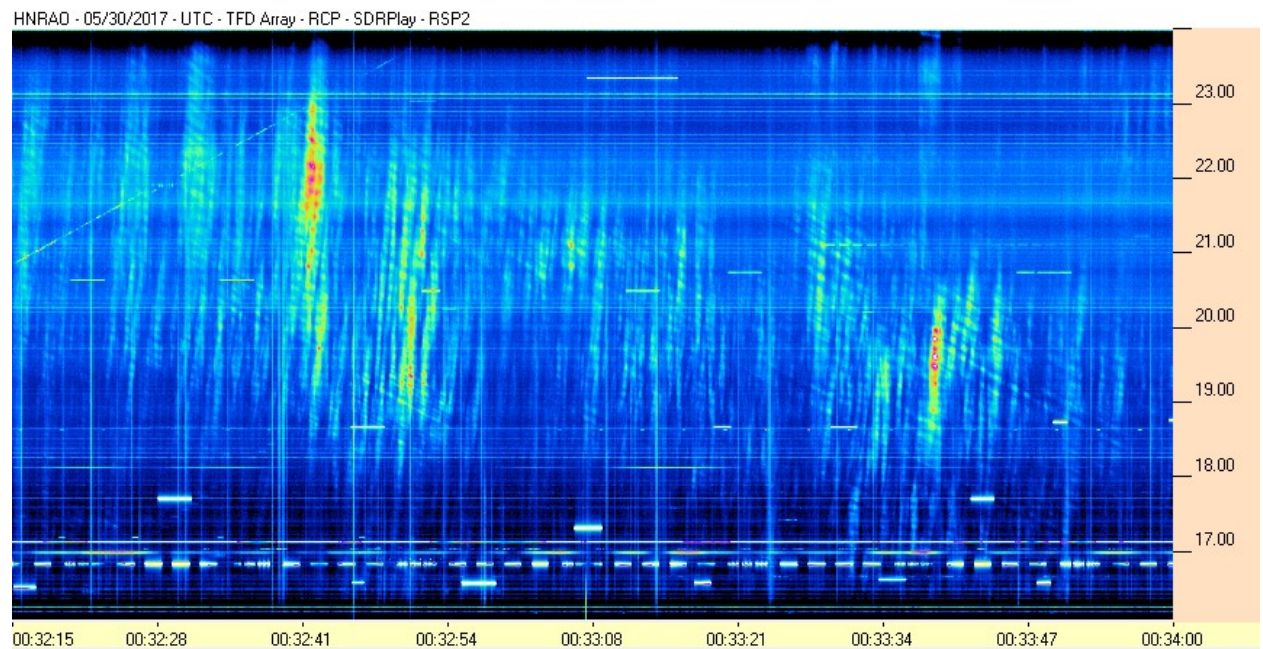
HNRAO - 05/30/2017 - UTC - TFD Array - RCP - SDRPlay - RSP2



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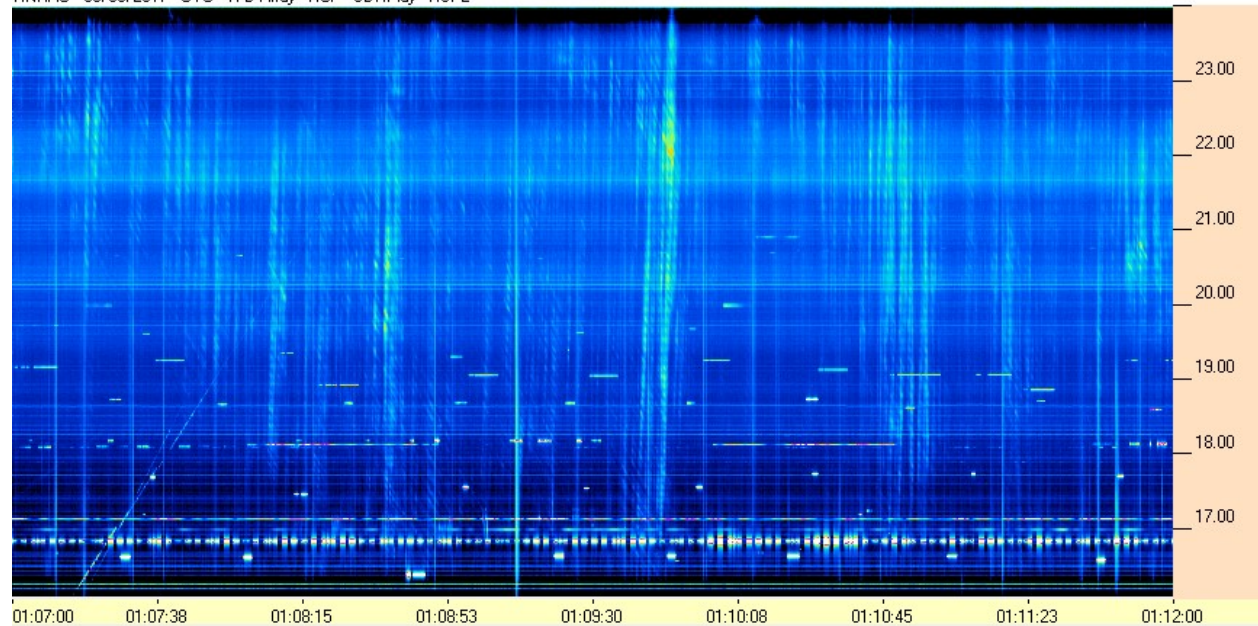
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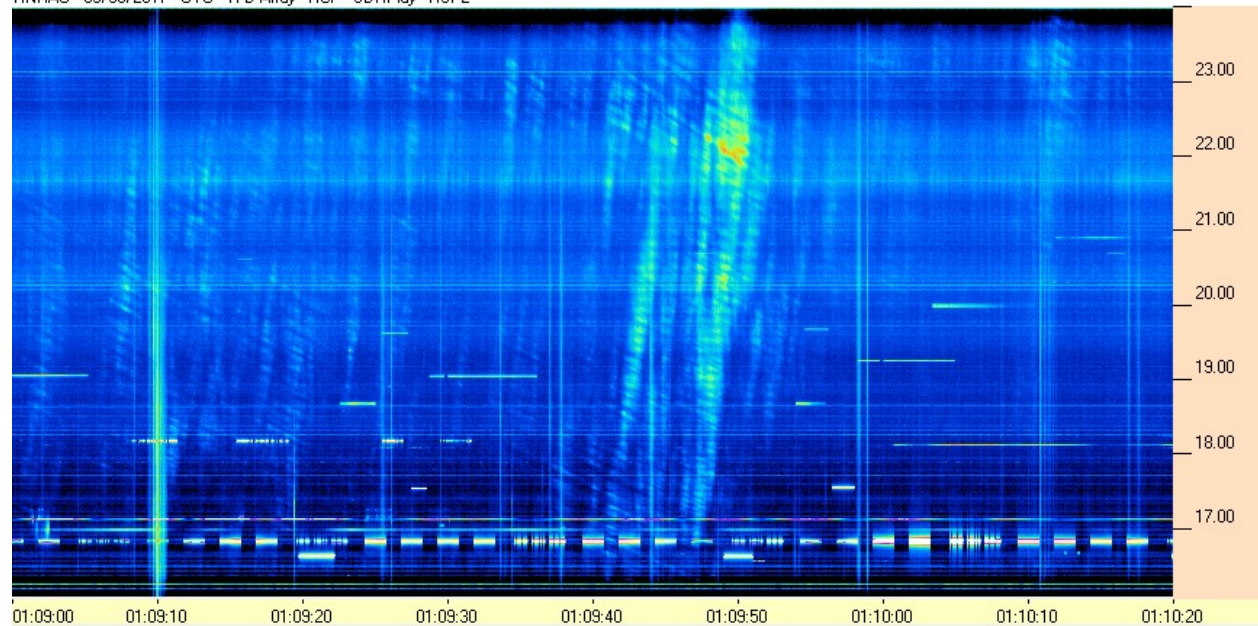
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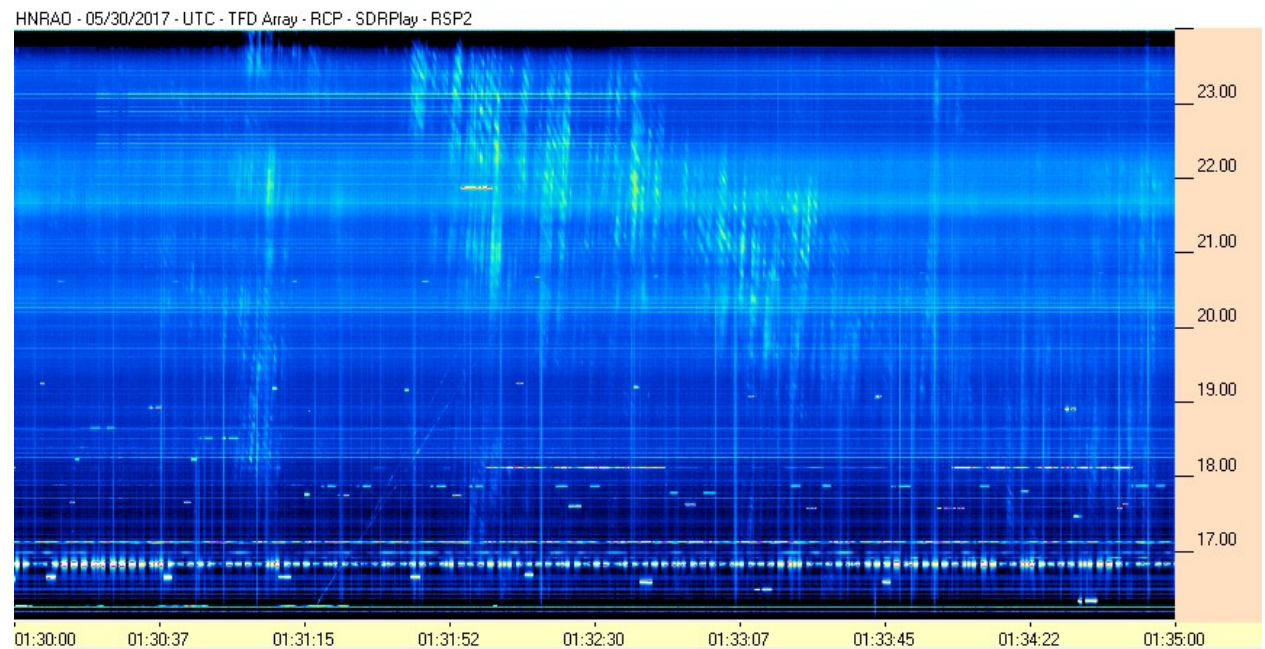
HNRAO - 05/30/2017 - UTC - TFD Array - RCP - SDRPlay - RSP2



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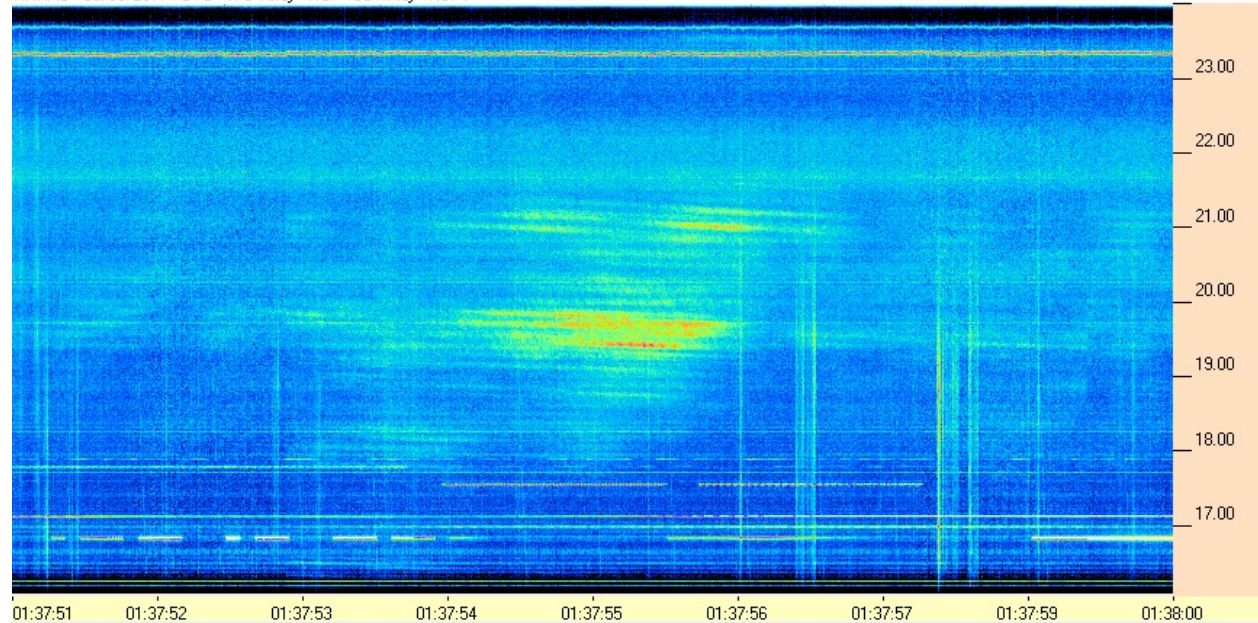
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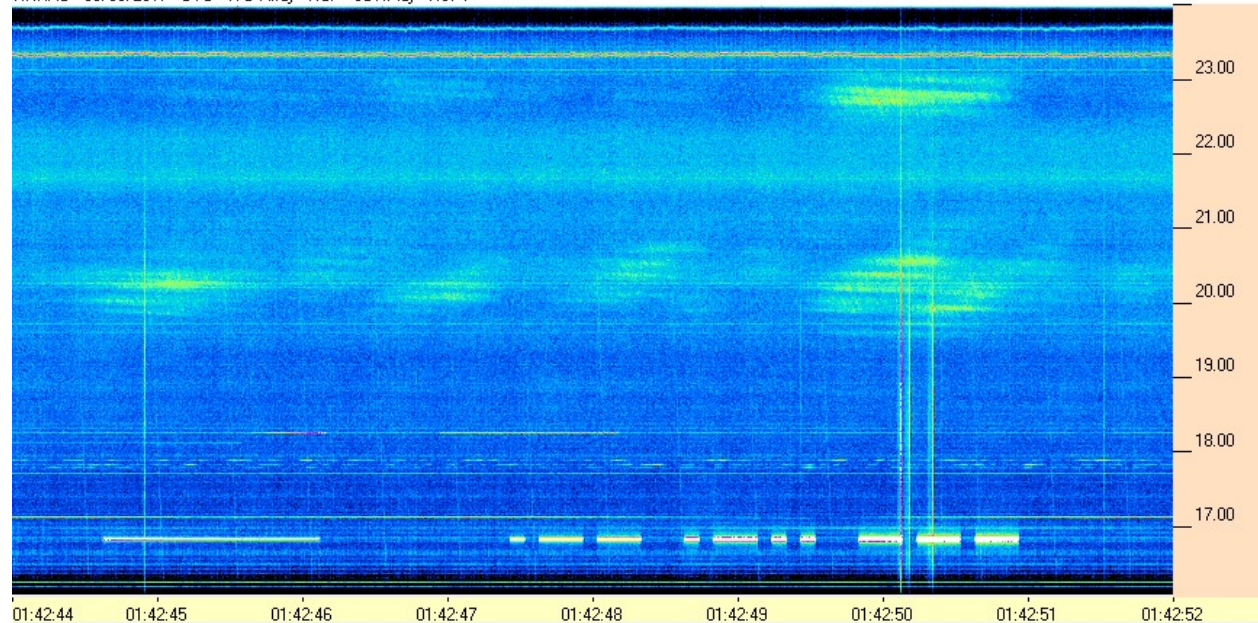
High scan rate images

SDRPlay RSP1/TFD Pair

HNRAO - 05/30/2017 - UTC - TFD Array - RCP - SDRPlay - RSP1



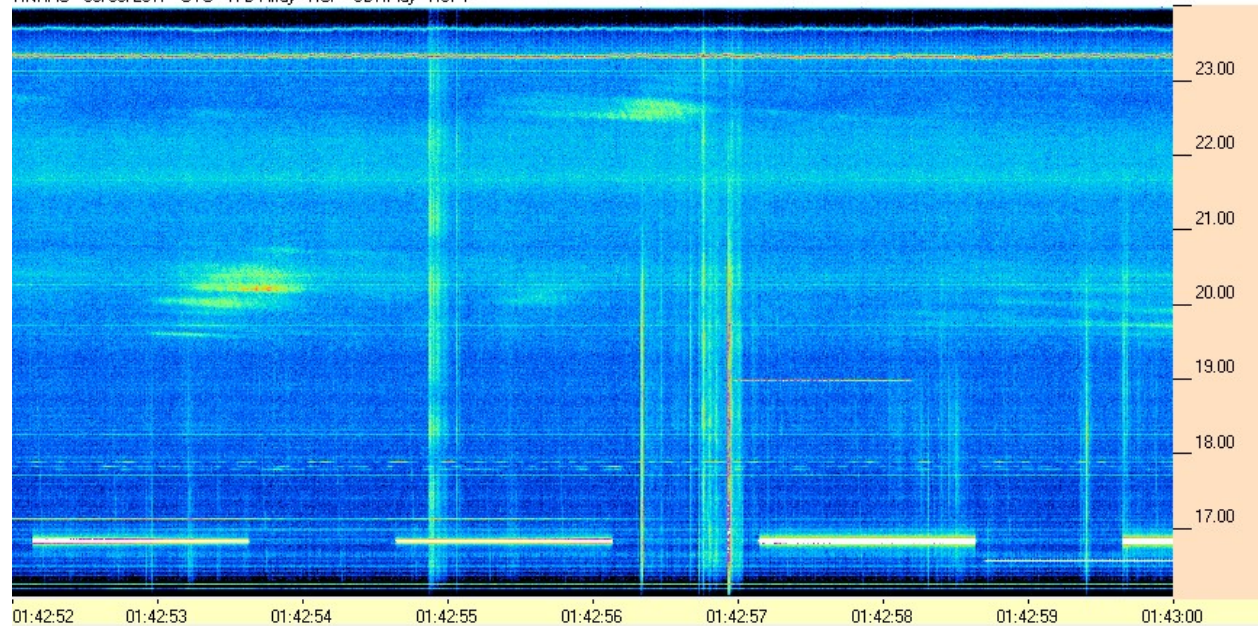
HNRAO - 05/30/2017 - UTC - TFD Array - RCP - SDRPlay - RSP1



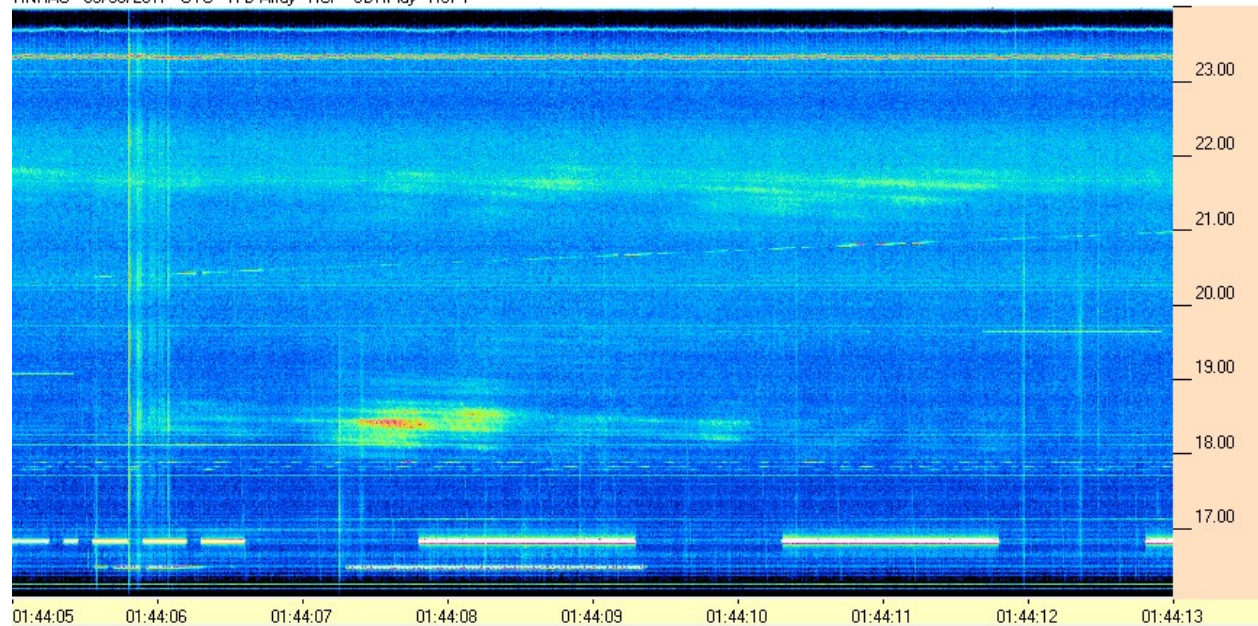
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HNRAO - 05/30/2017 - UTC - TFD Array - RCP - SDRPlay - RSP1



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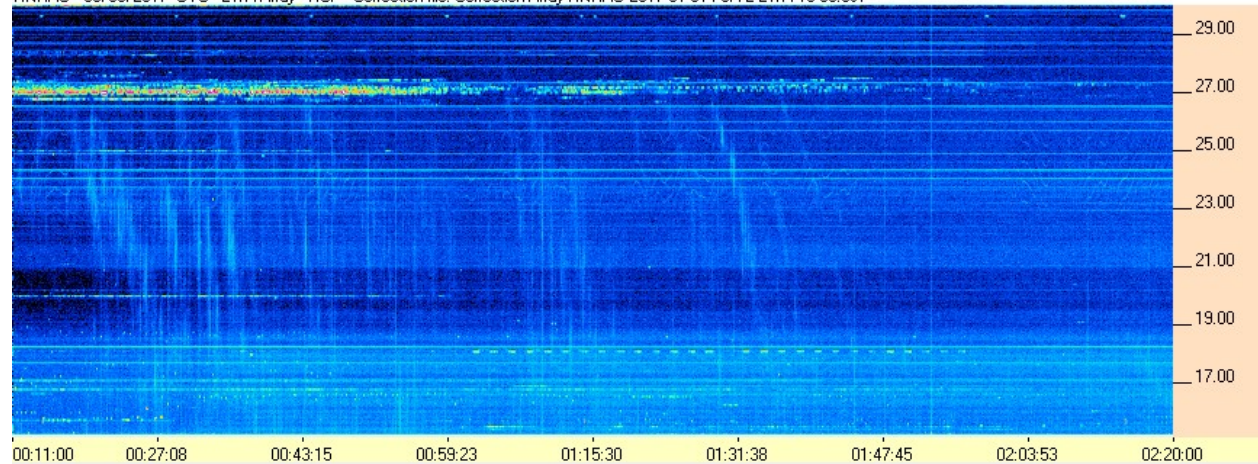


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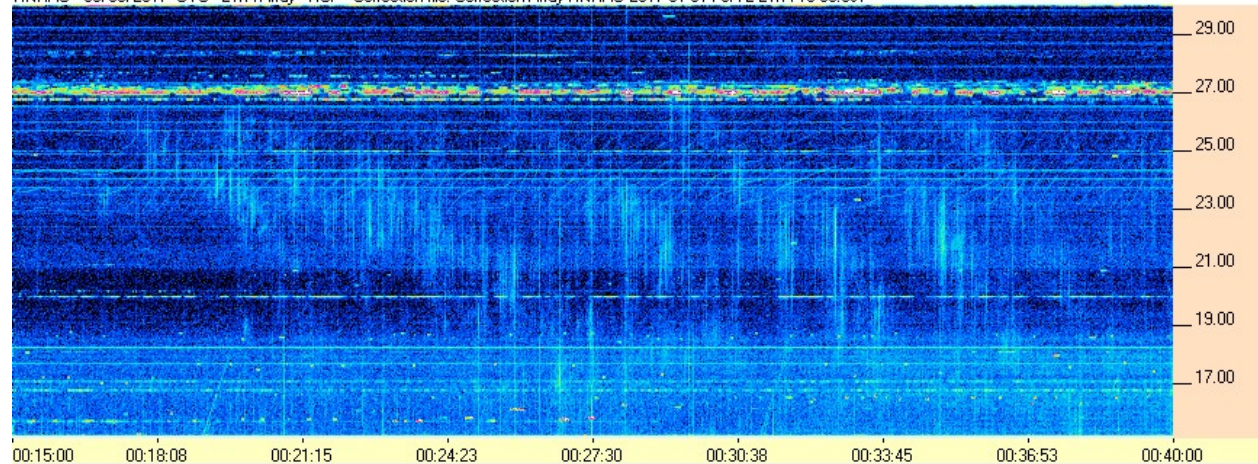


FSX-2/LWA Pair

HNRAO - 05/30/2017 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv



HNRAO - 05/30/2017 UTC - LWA Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-2 LWA 15-30.csv

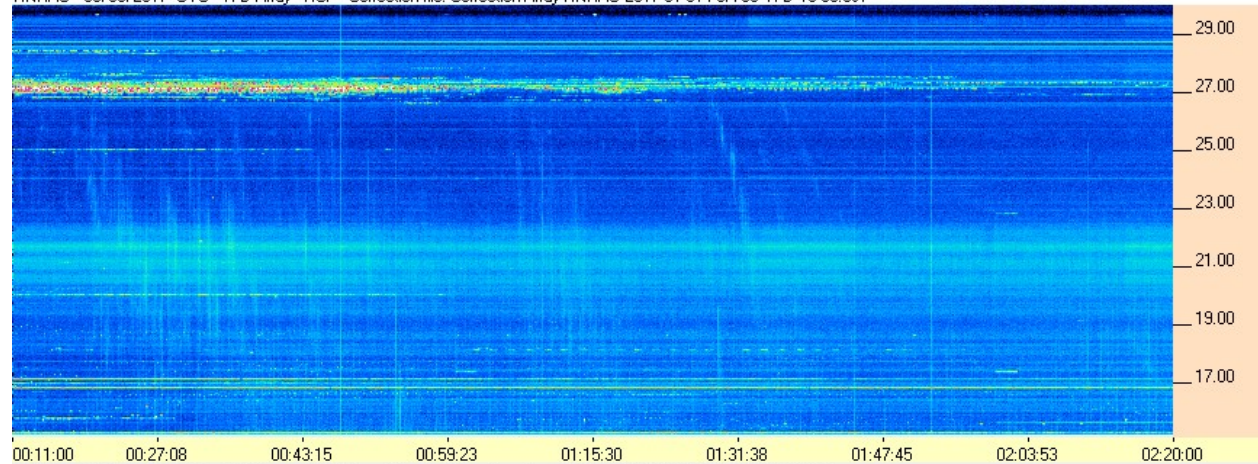


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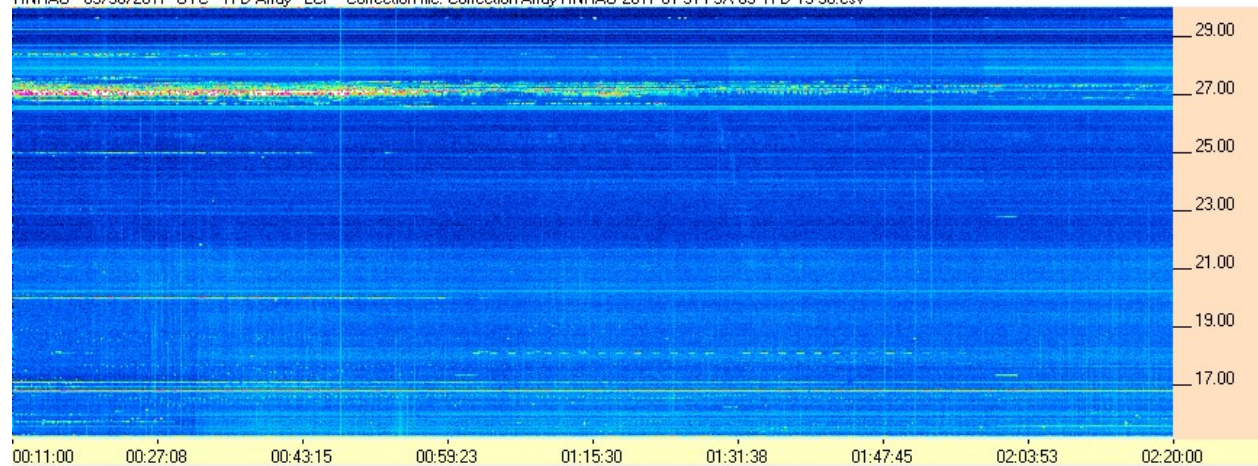


FSX-8S/TFD Pair

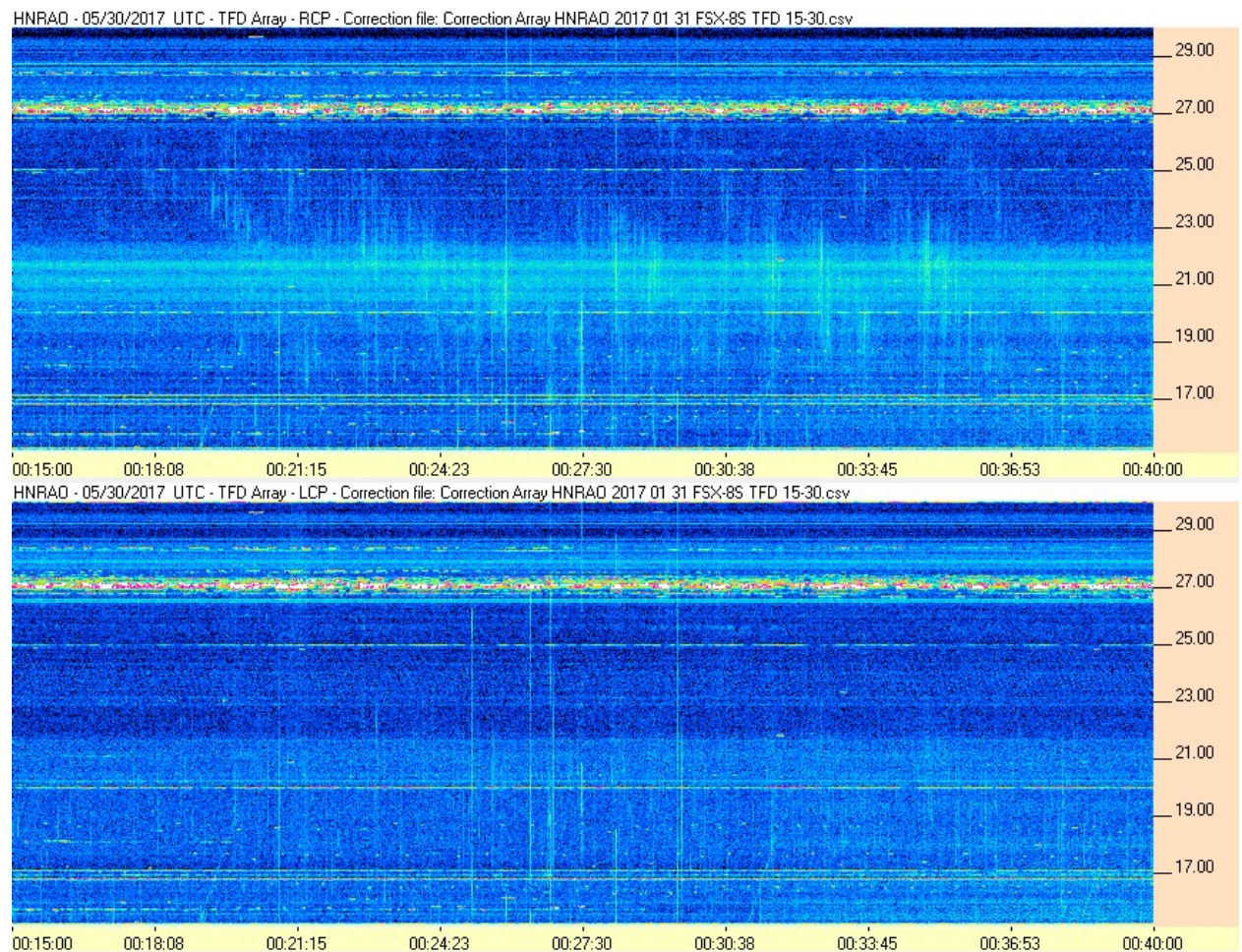
HNRAO - 05/30/2017 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



HNRAO - 05/30/2017 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv



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Drift rates measurements

Mid	Freq 1	Freq 2	Mid Freq	Slope
5/30/2017 00:23	22273	22607	22.4	-123.9
5/30/2017 00:23	21938	22135	22.0	-109.3
5/30/2017 00:23	21781	22076	21.9	-109.3
5/30/2017 00:23	21112	21407	21.3	-105.4
5/30/2017 00:23	20285	20580	20.4	-101.8

Mid	Freq 1	Freq 2	Mid Freq	Slope
5/30/2017 00:33	17236	17590	17.4	-77
5/30/2017 00:33	18869	19085	19.0	-69.8
5/30/2017 00:33	18967	19302	19.1	-92.9
5/30/2017 00:33	19577	19734	19.7	-92.6
5/30/2017 00:33	20482	20777	20.6	-105.4
5/30/2017 00:33	21269	21446	21.4	-110.7
5/30/2017 00:32	21682	21958	21.8	-114.8