HNRAO Observing Log
40.673181 N – 80.437885 W
EN90sq

Date: 22 March 2017

Object: Jupiter – Io-C

Observer: JB

Start of pass:	**0334 UT**	**Planetary K-index:**	**4**
Jupiter Altitude:	**26.5 degrees**	**Jupiter Azimuth:**	**126.5 degrees**
Jupiter CML:	**6**	**Jupiter Io Phase:**	**246.79**
Jupiter RA:	**13:17**	**Jupiter Dec:**	**-06:27**
Hour Angle:	**-03:06**	**Polarization**	**LCP**
Sun Altitude:	**-42.6 degrees**	**Sun Azimuth:**	**322.0 degrees**
Sun RA:	**23:59**	**Sun Dec:**	**00:04**

End of pass:	**0410 UT**		
Jupiter Altitude:	**31.7 degrees**	**Jupiter Azimuth:**	**134.9 degrees**
Jupiter CML:	**27.77**	**Jupiter Io Phase**	**251.93**
Hour Angle:	**-02:29**		
Sun Altitude:	**-46.2 degrees**	**Sun Azimuth:**	**333.6 degrees**

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 @ 10’
    a. 12’ phase cable – phased for 2016-17 season
    b. Calibrated 6 March 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 6 March 2017
5. SDRPlay
    a. RSP1 (2) and RSP2 (1)

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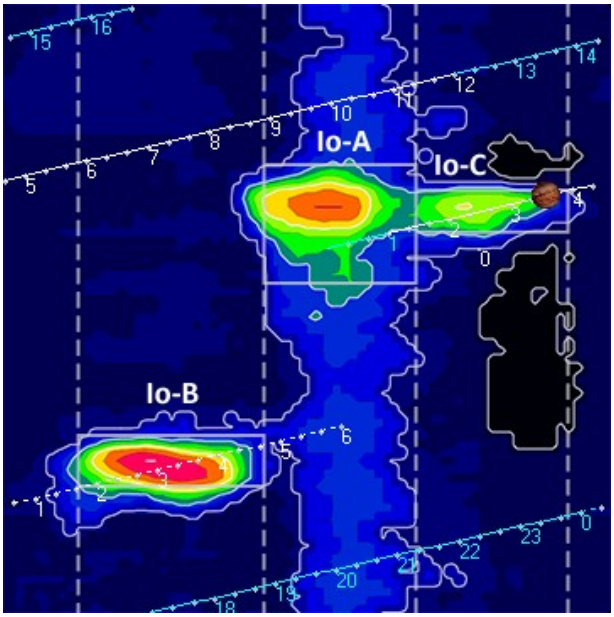
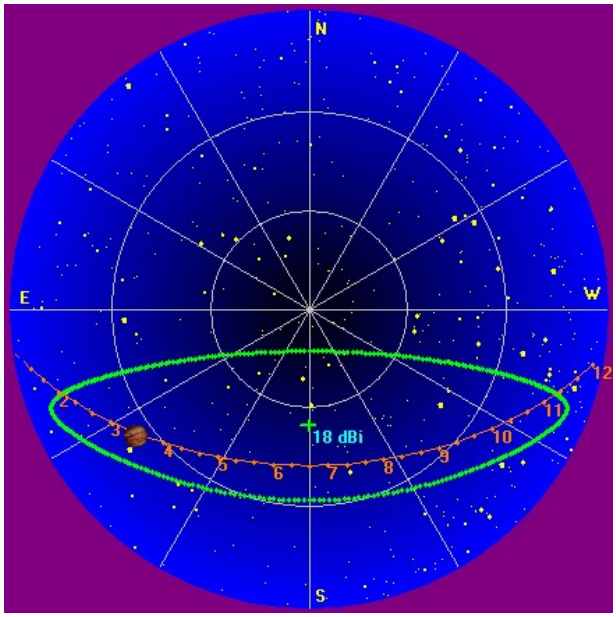
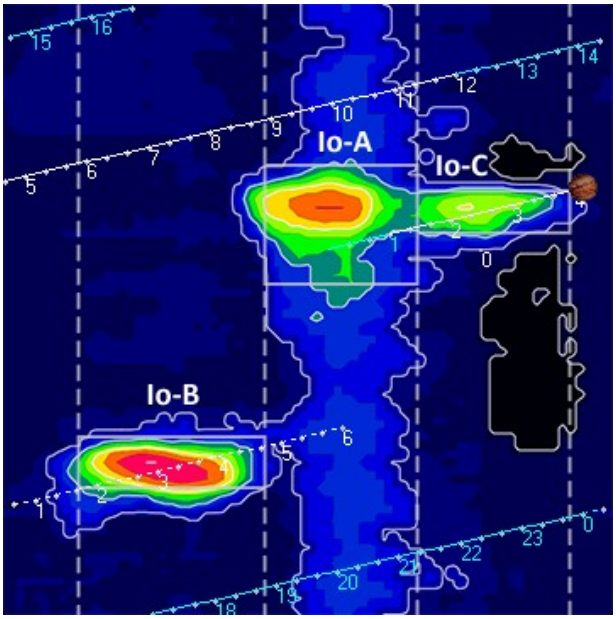
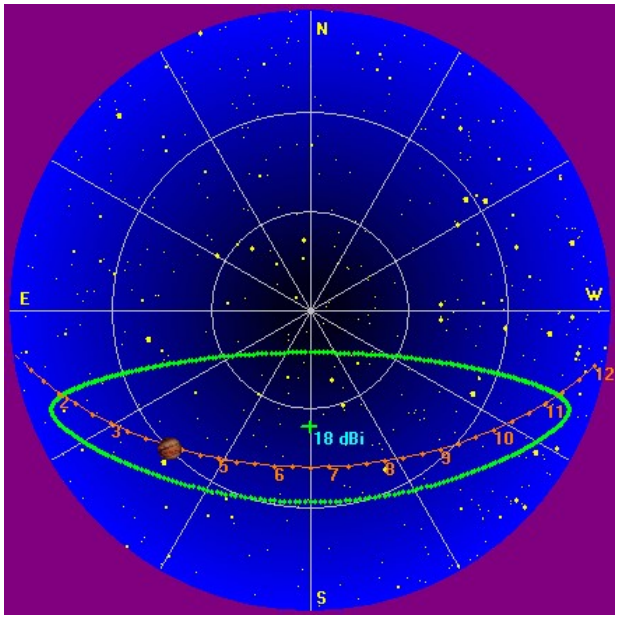




Beginning of Pass





End of Pass

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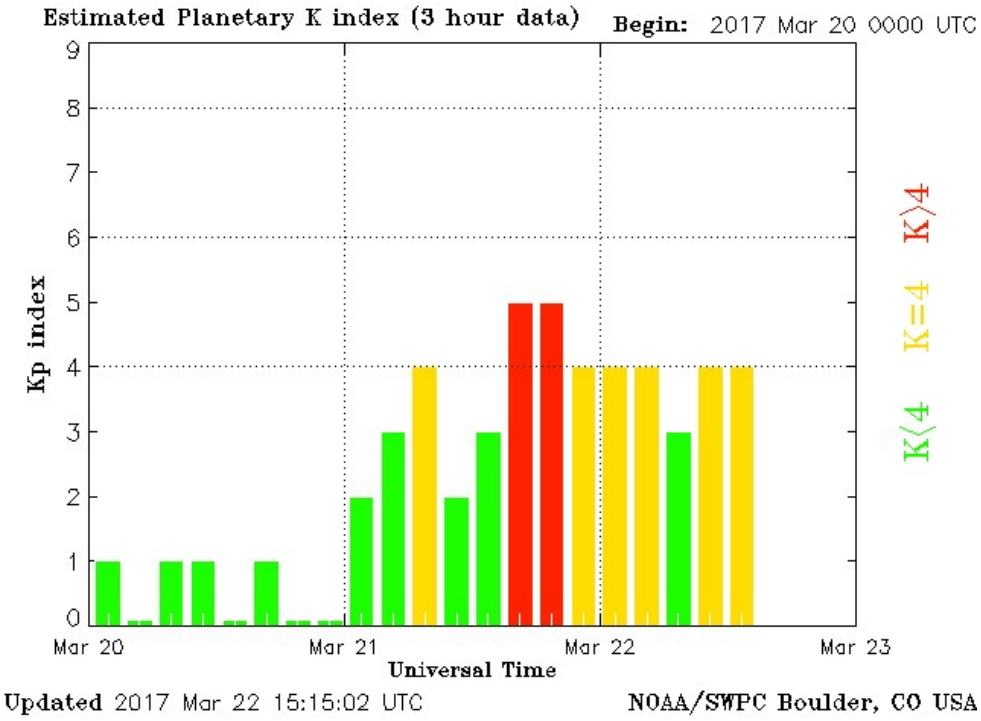

An Io-C storm, late in the CML high probability region. Beginning in the 30% probability region and ending in the 8% probability region. Jupiter was 3 hours before transit at the beginning, and 2 ½ hours from transit at the end.

All emissions were LCP. Emissions observed here began below 15 MHz and reached as high as approximately 20 MHz. The higher frequency emissions were L-bursts.

A N-event dominated the observed period. The N-event undulated between 17 MHz and 18 MHz, looking much like a sine wave between 0341 UT and 0348 UT. A closer look at the overall emissions suggests that the N-event was made up of L-bursts with several periods of strong S-bursts.

Between 0347 UT an 0348 UT, there were two distinct lines of emission, separated by approximately 1 MHz. The upper emissions appear to be L-bursts, while the lower appear to be comprised of mostly S-bursts.

Negative slope modulation lanes were present in the later part of the storm. Measurements ranged from a low of -29 kHz/sec to a high of -109 kHz/sec, with an average of -67 kHz/sec.

Among the features, one hook-like group stands out at 0345:15 UT.

Since all emissions were LCP, only the RSP1 fed by the LCP portion of the TFD, and the FSX-8S captured the event.

No recordable emissions at the Radio JOVE frequency (20.1 MHz).

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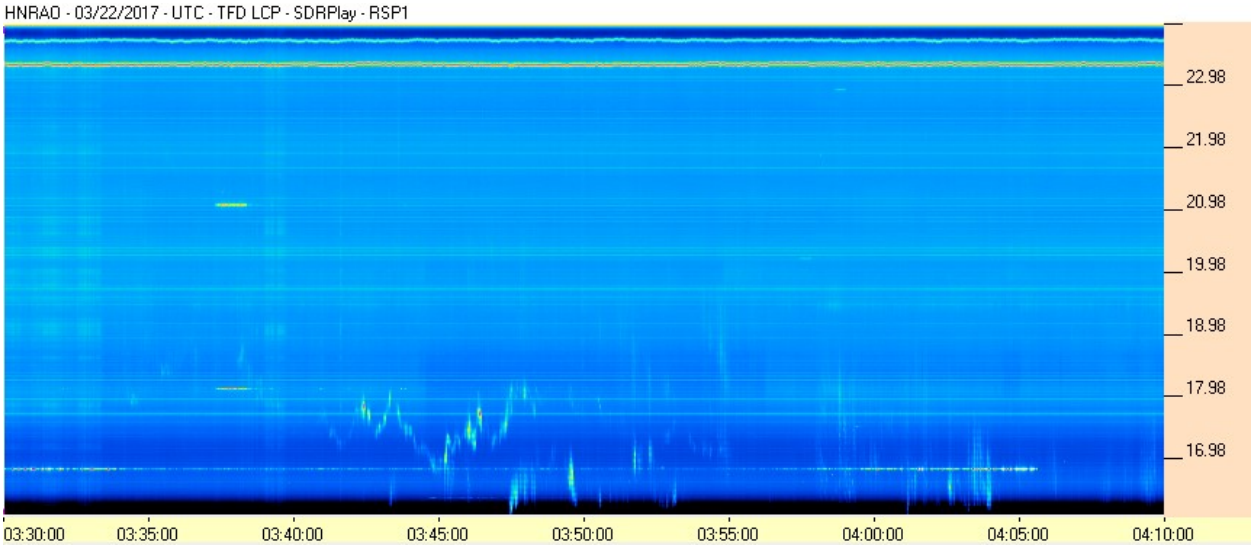
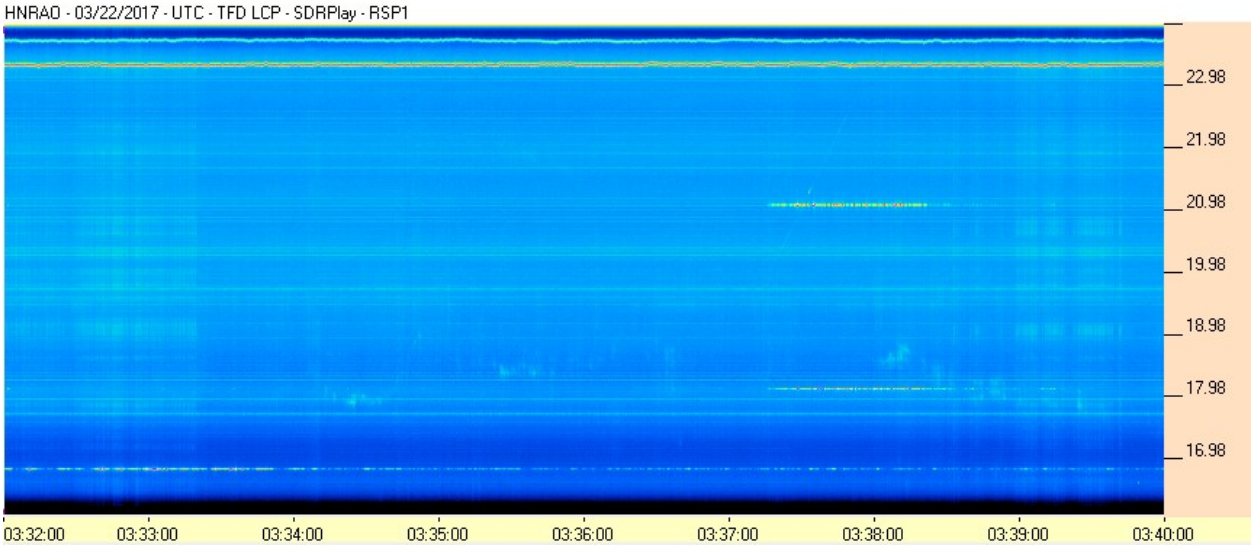
RSP1/TFD Pair





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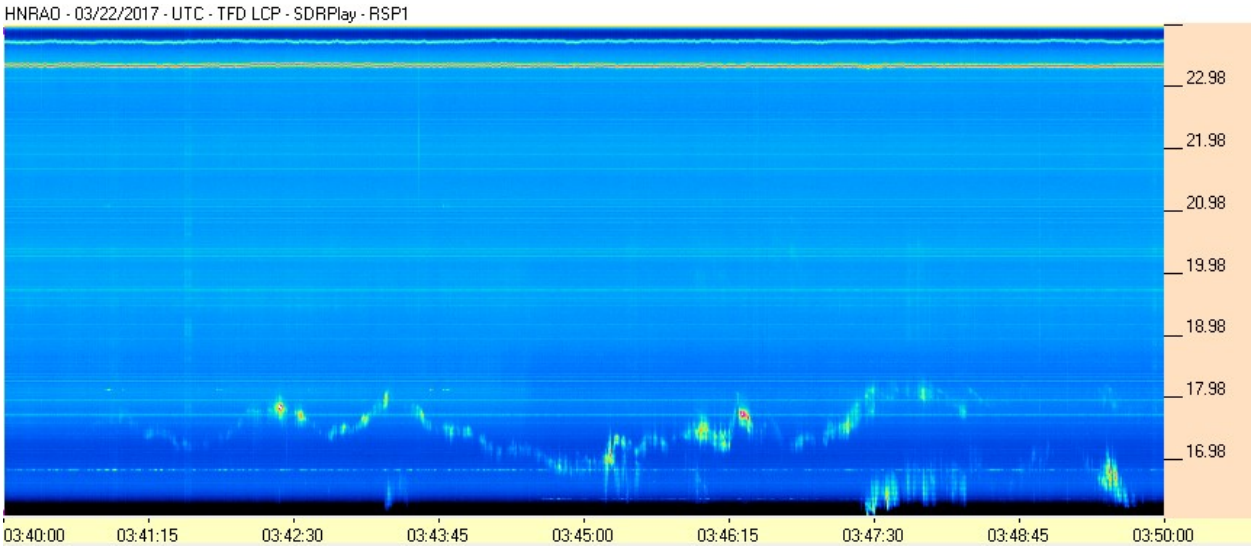

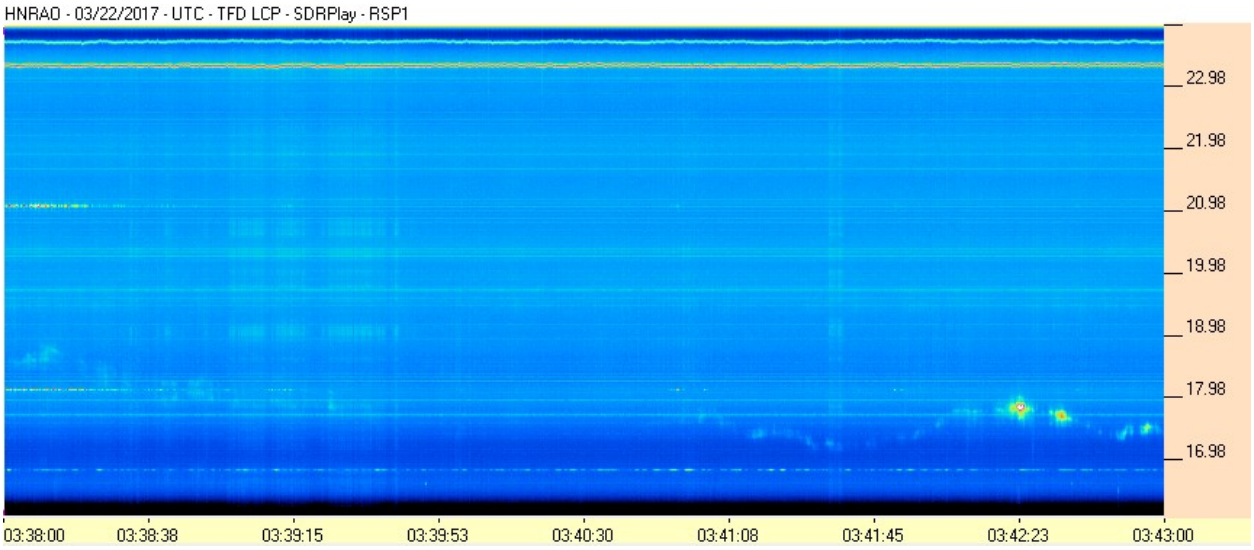

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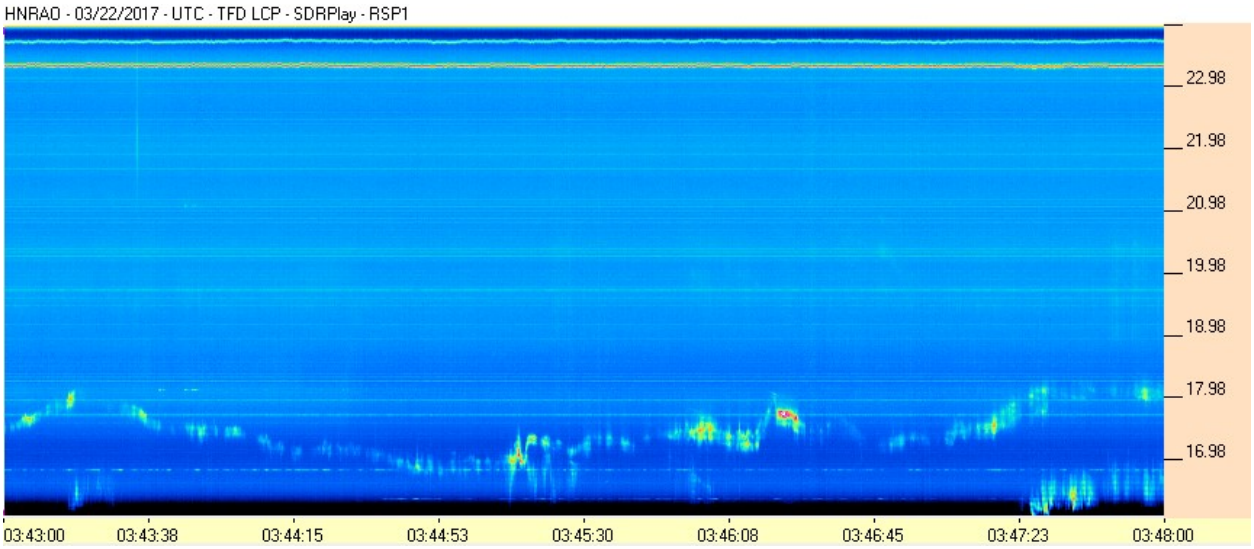

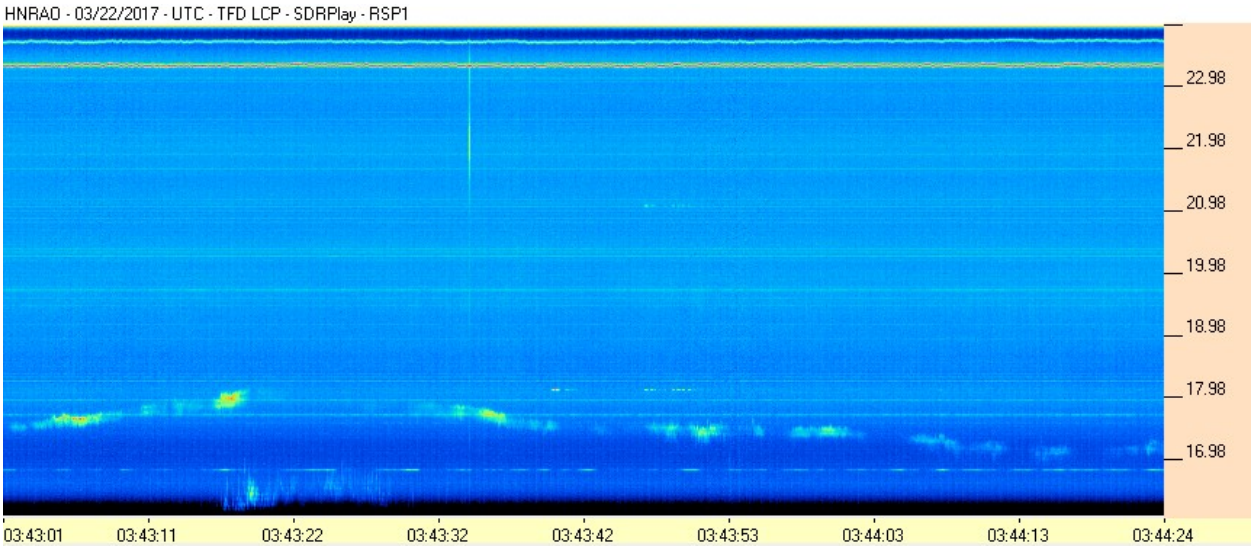

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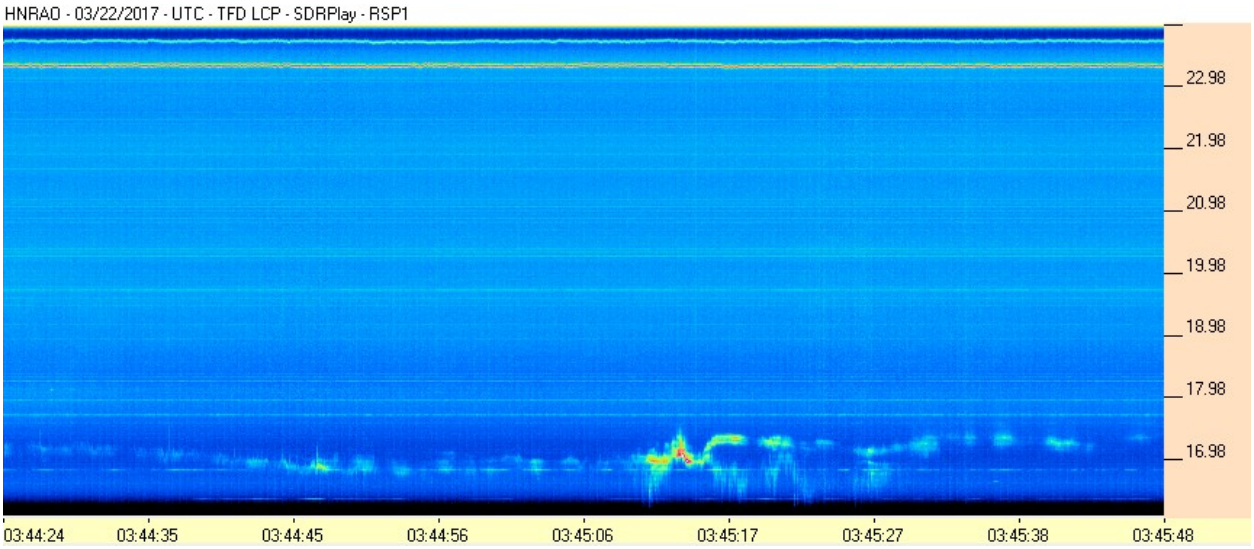

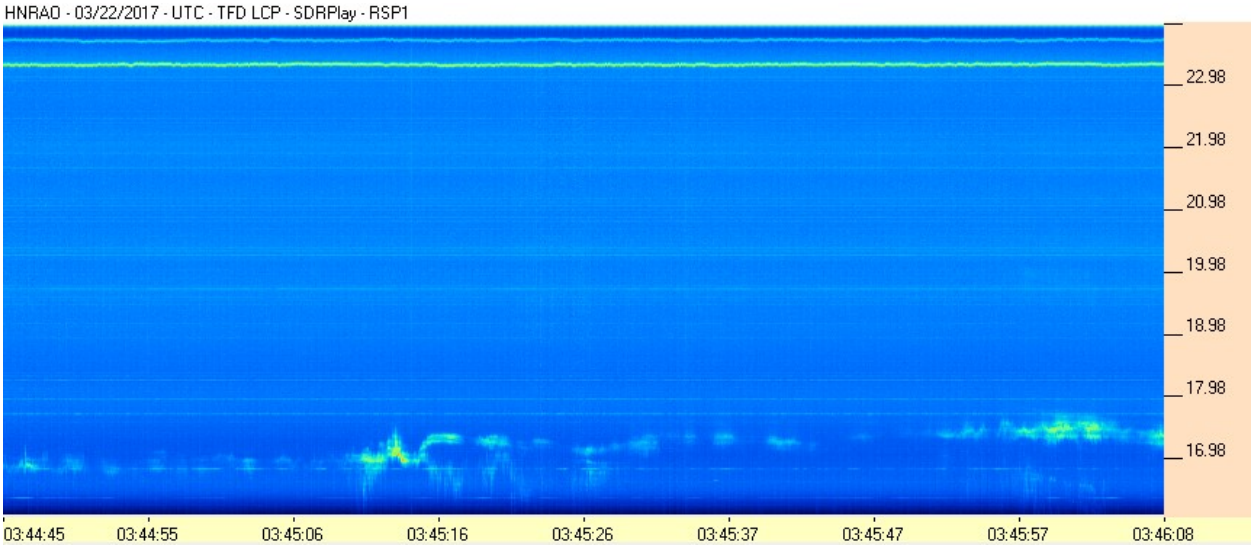

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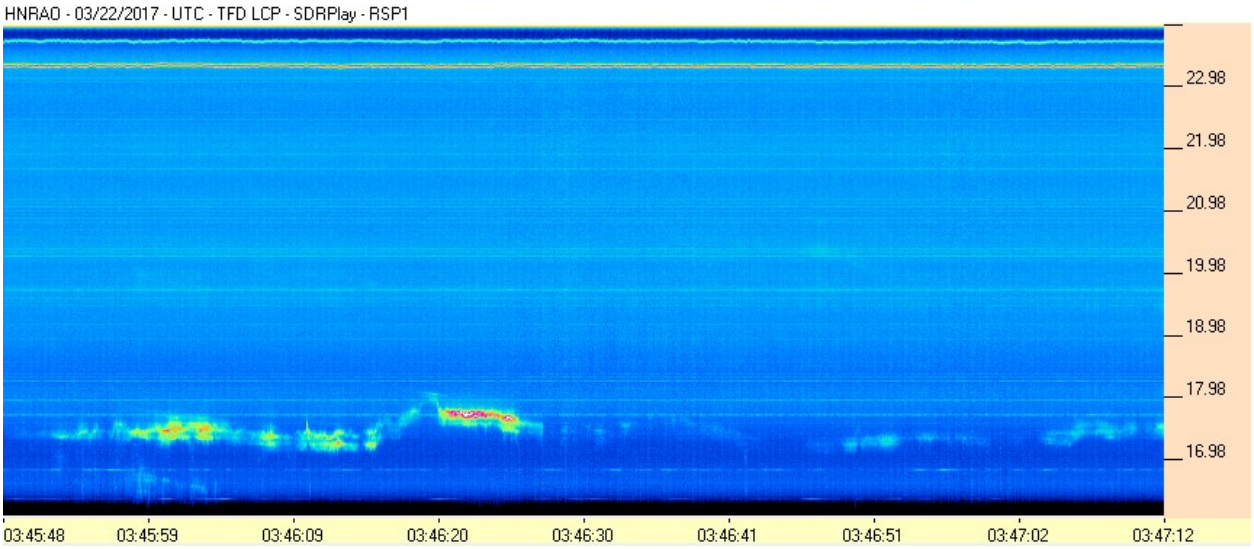
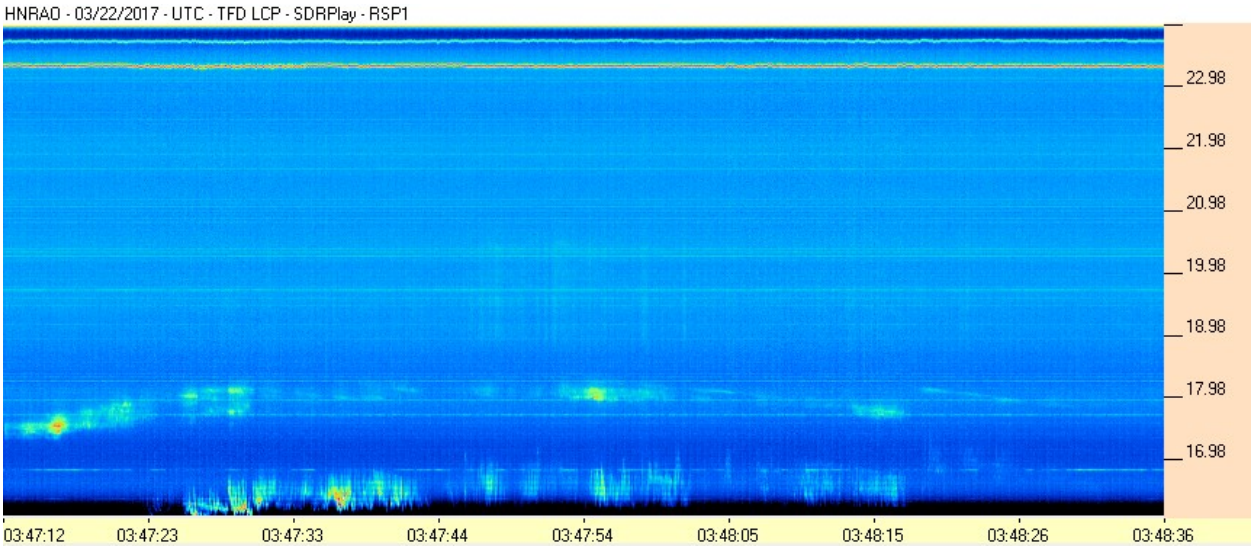
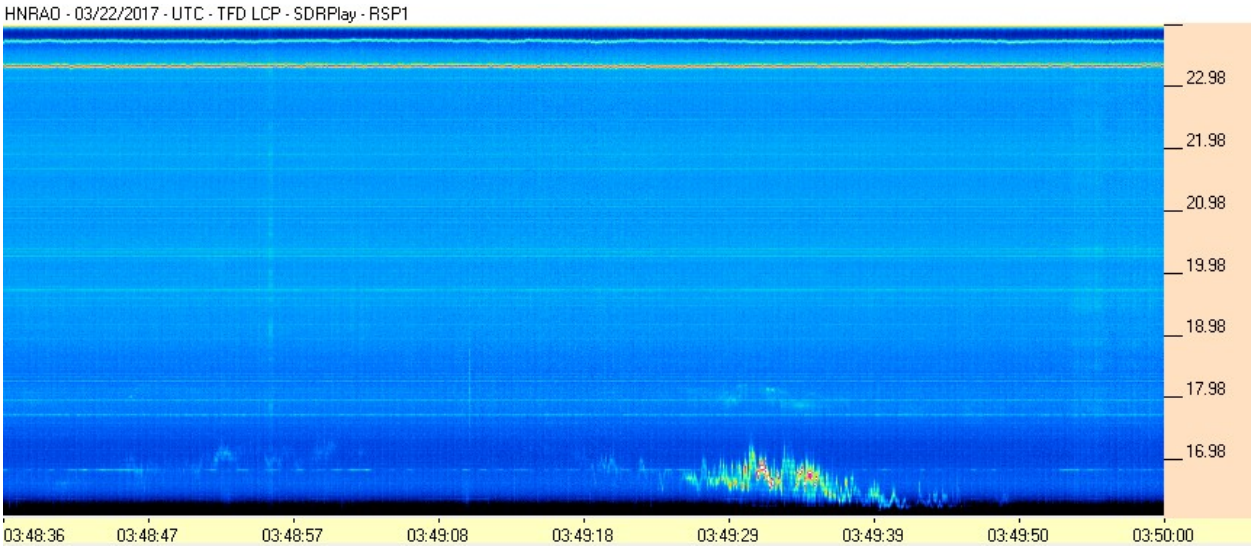
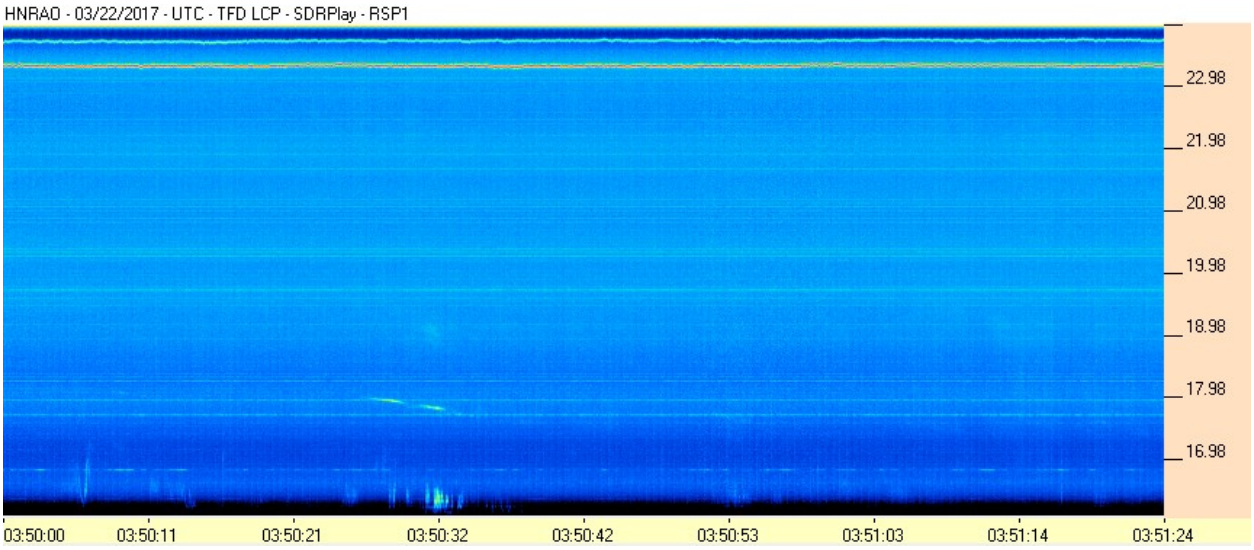
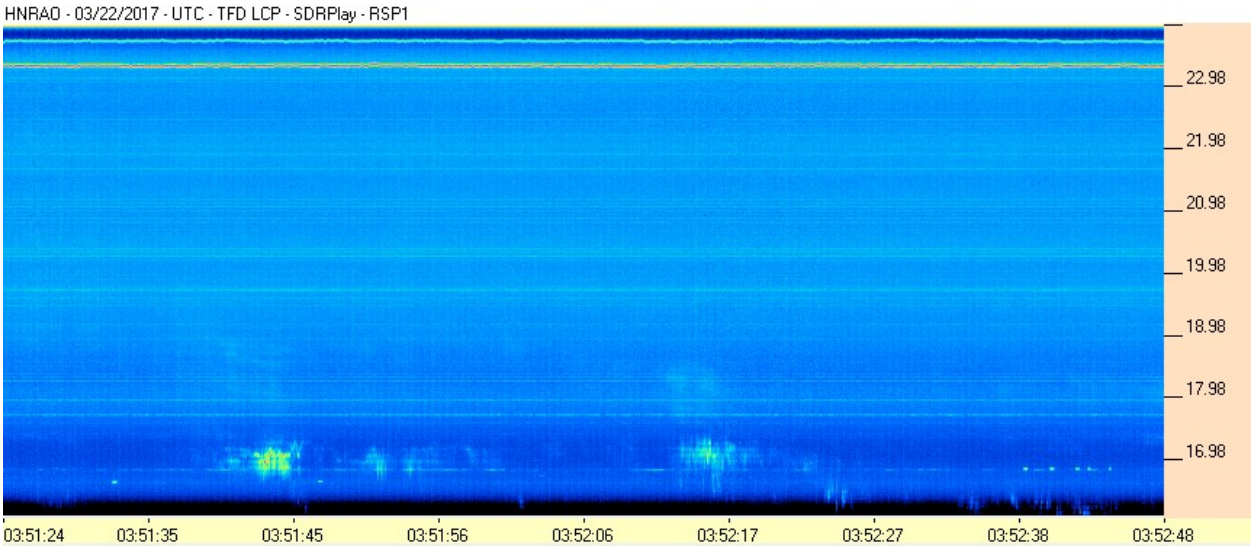





HNRAO - 03/22/2017 - UTC - TFD LCP - SDRPlay - RSP1
22.98
21.98
20.98
19.98
18.98
17.98
16.98
03:48:36
03:48:47
03:48:57
03:49:08
03:49:18
03:49:29
03:49:39
03:49:50
03:50:00


HNRAO - 03/22/2017 - UTC - TFD LCP - SDRPlay - RSP1
22.98
21.98
20.98
19.98
18.98
17.98
16.98
03:50:00
03:50:11
03:50:21
03:50:32
03:50:42
03:50:53
03:51:03
03:51:14
03:51:24


HNRAO - 03/22/2017 - UTC - TFD LCP - SDRPlay - RSP1
22.98
21.98
20.98
19.98
18.98
17.98
16.98
03:51:24
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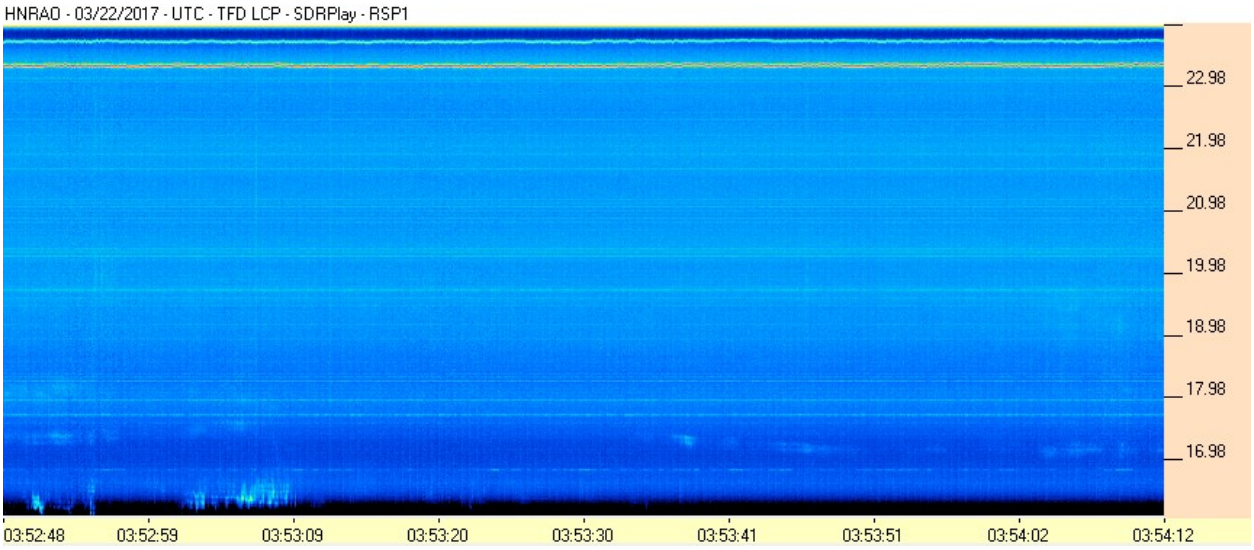
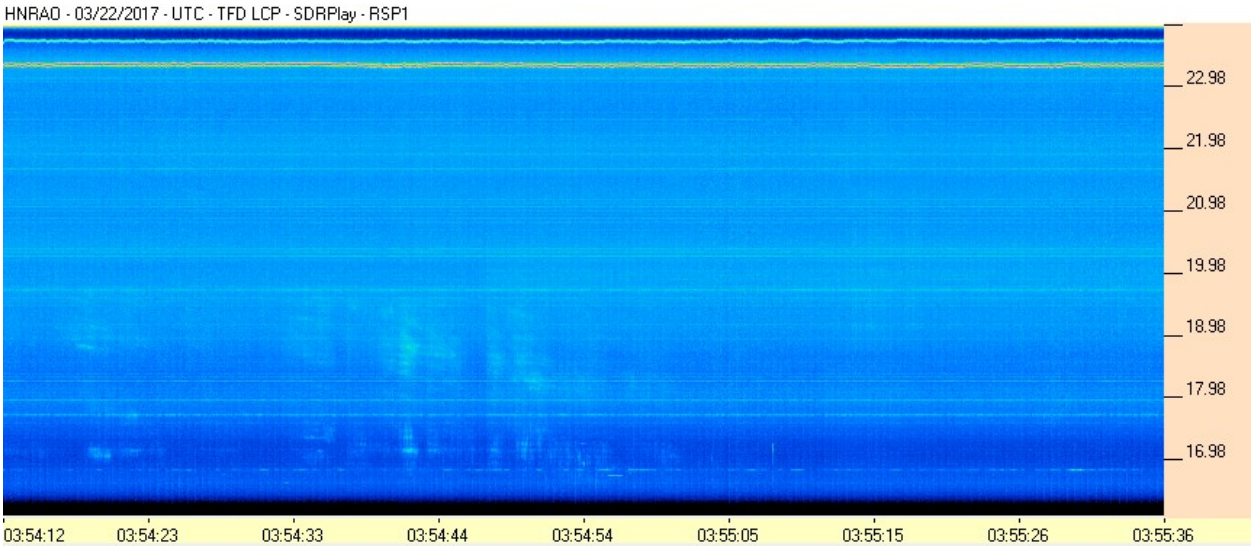
03:52:38
03:52:48


HNRAO - 03/22/2017 - UTC - TFD LCP - SDRPlay - RSP1
22.98
21.98
20.98
19.98
18.98
17.98
16.98
03:52:48
03:52:59
03:53:09
03:53:20
03:53:30
03:53:41
03:53:51
03:54:02
03:54:12


HNRAO - 03/22/2017 - UTC - TFD LCP - SDRPlay - RSP1
22.98
21.98
20.98
19.98
18.98
17.98
16.98
03:54:12
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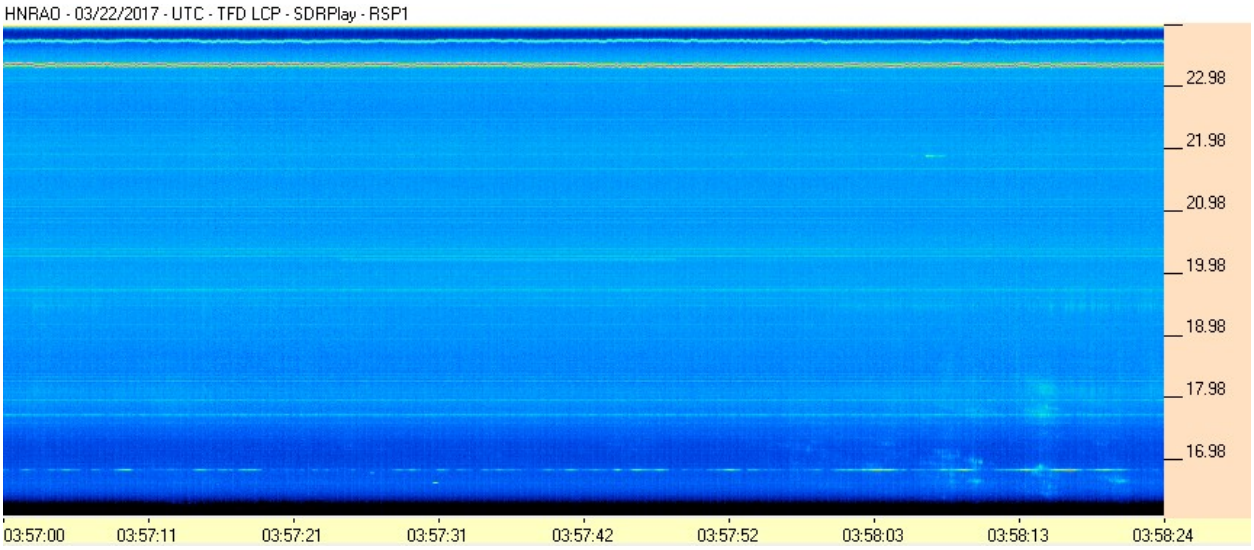
03:54:33
03:54:44
03:54:54
03:55:05
03:55:15
03:55:26
03:55:36


HNRAO - 03/22/2017 - UTC - TFD LCP - SDRPlay - RSP1
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18.98
17.98
16.98
03:57:00
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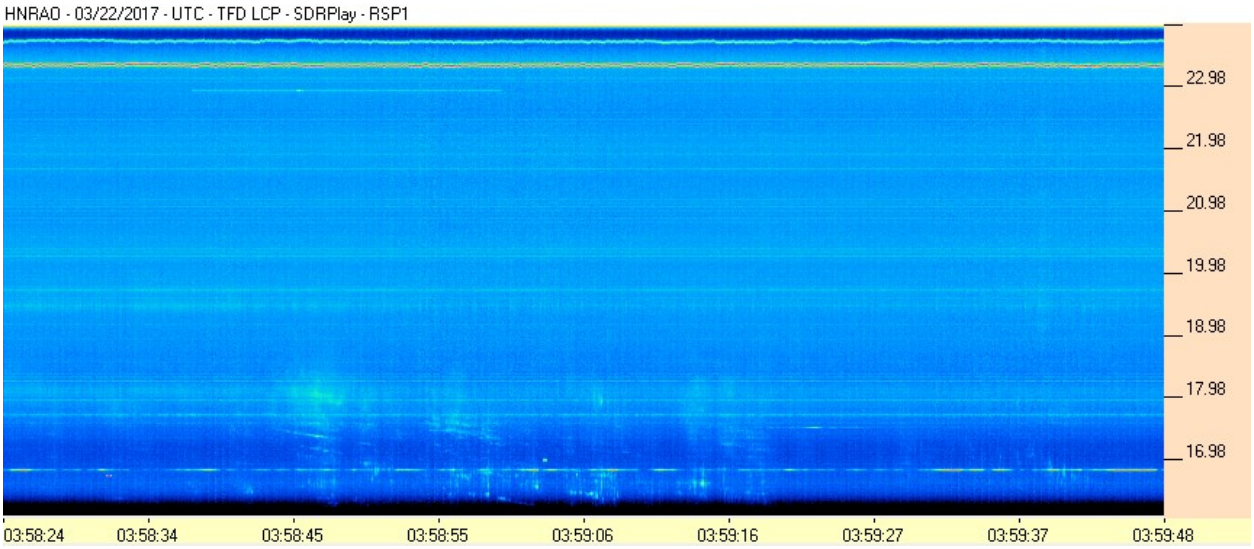
03:58:24


HNRAO - 03/22/2017 - UTC - TFD LCP - SDRPlay - RSP1
22.98
21.98
20.98
19.98
18.98
17.98
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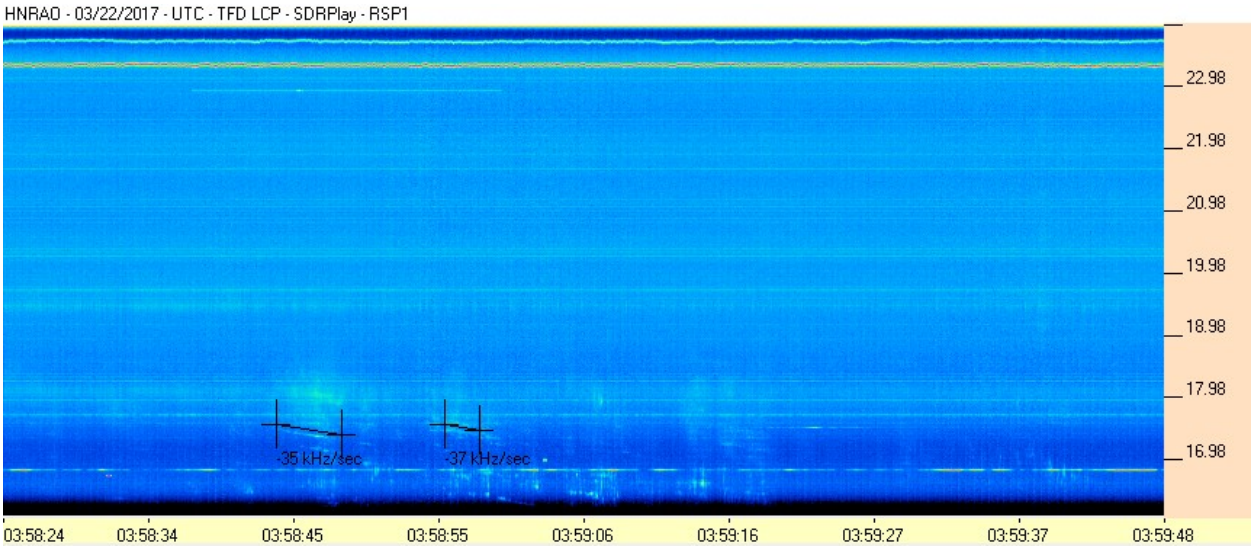
03:59:48


HNRAO - 03/22/2017 - UTC - TFD LCP - SDRPlay - RSP1
22.98
21.98
20.98
19.98
18.98
17.98
16.98
-35 kHz/sec
-37 kHz/sec
03:58:24
03:58:34
03:58:45
03:58:55
03:59:06
03:59:16
03:59:27
03:59:37
03:59:48

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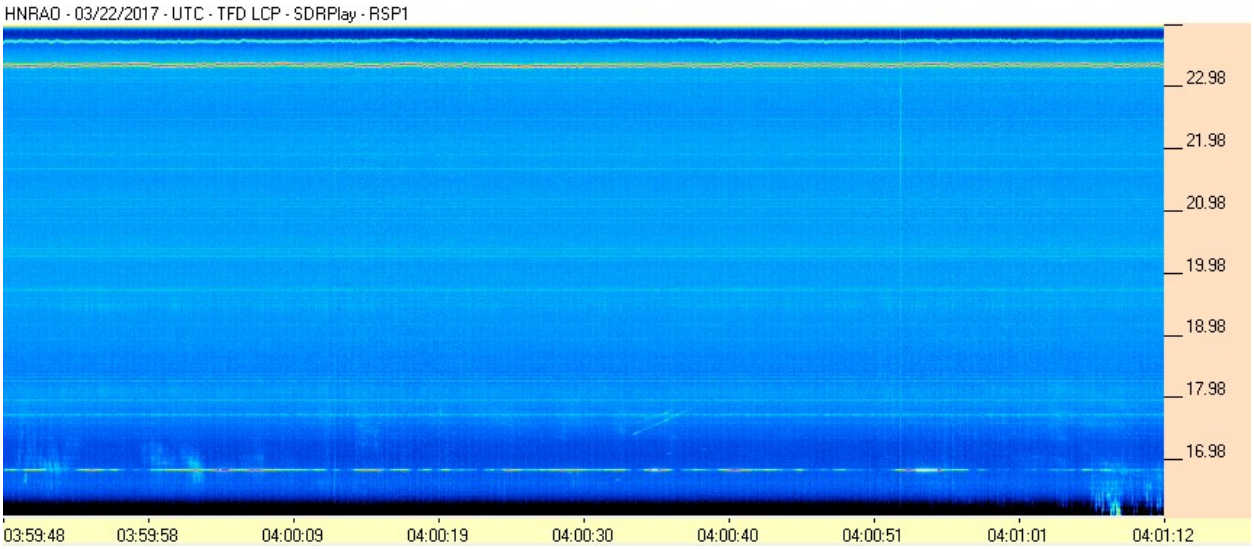
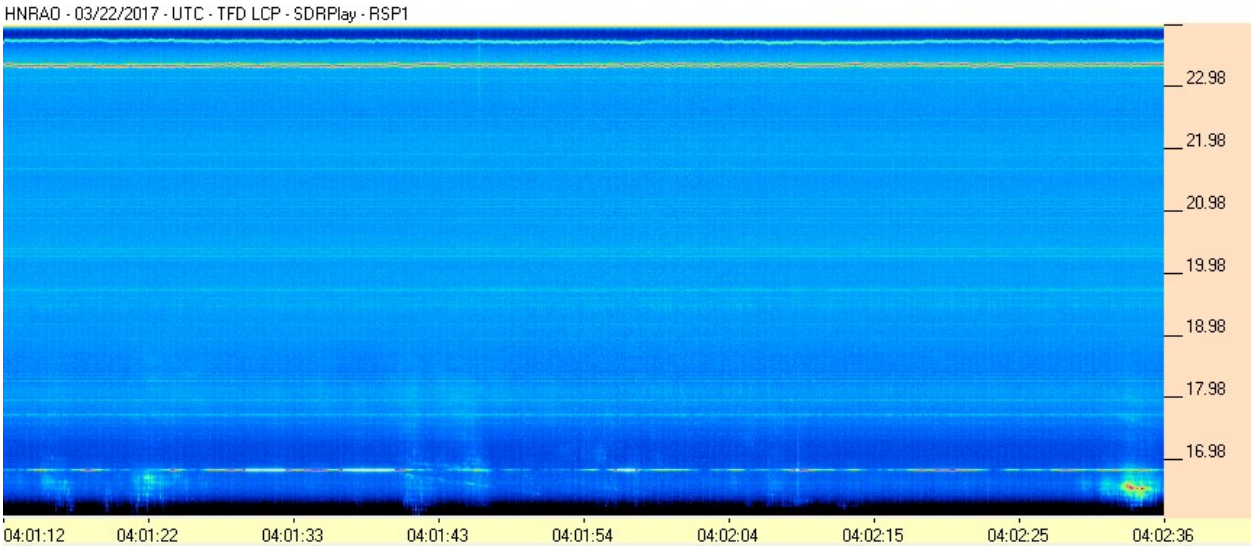
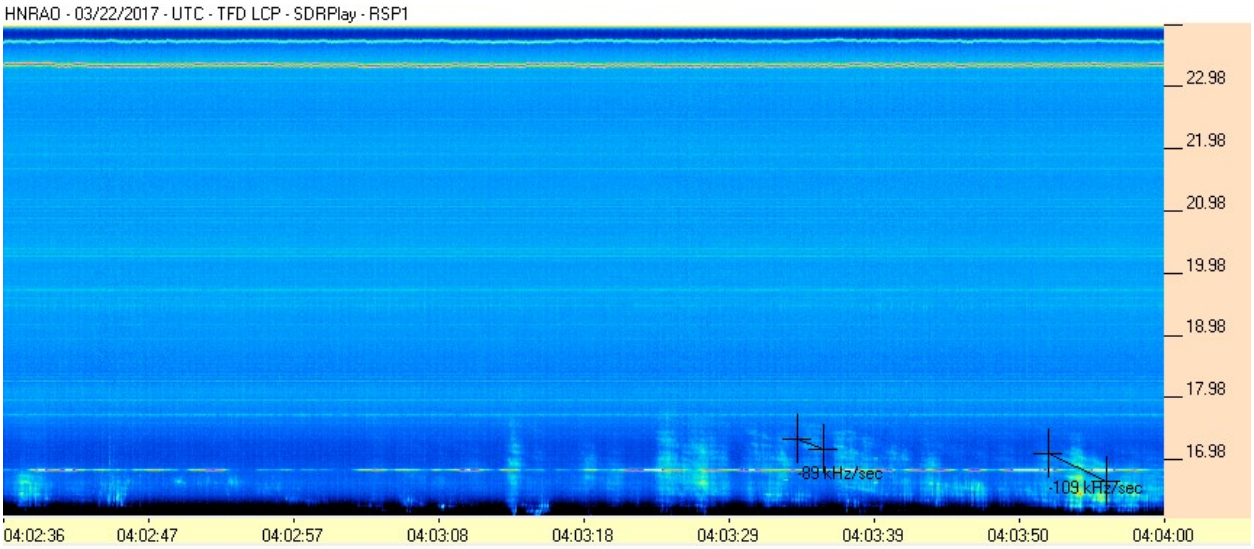
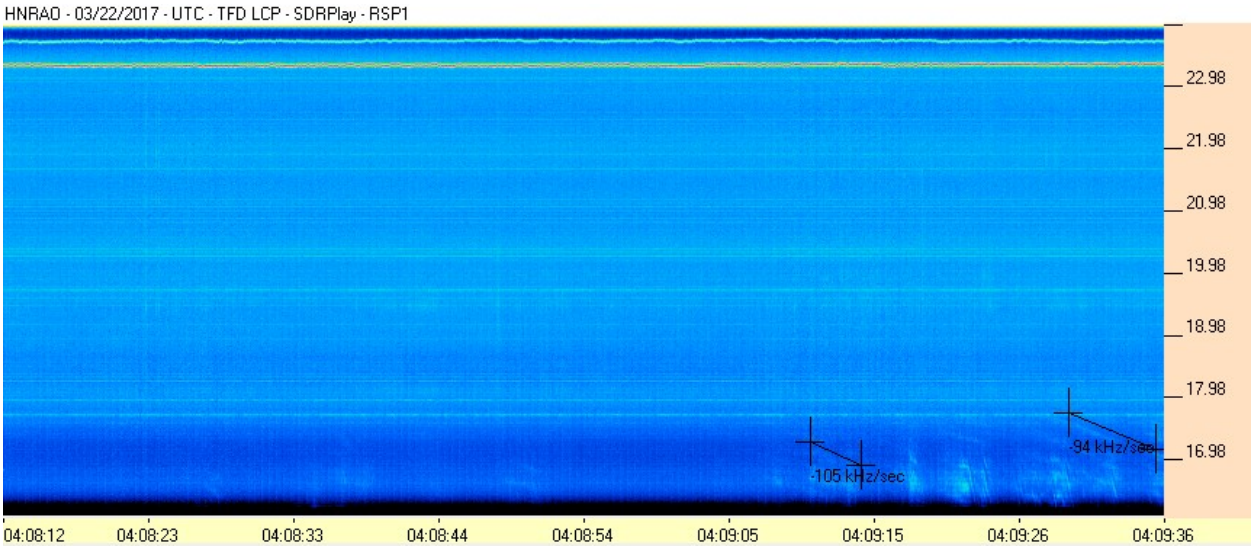
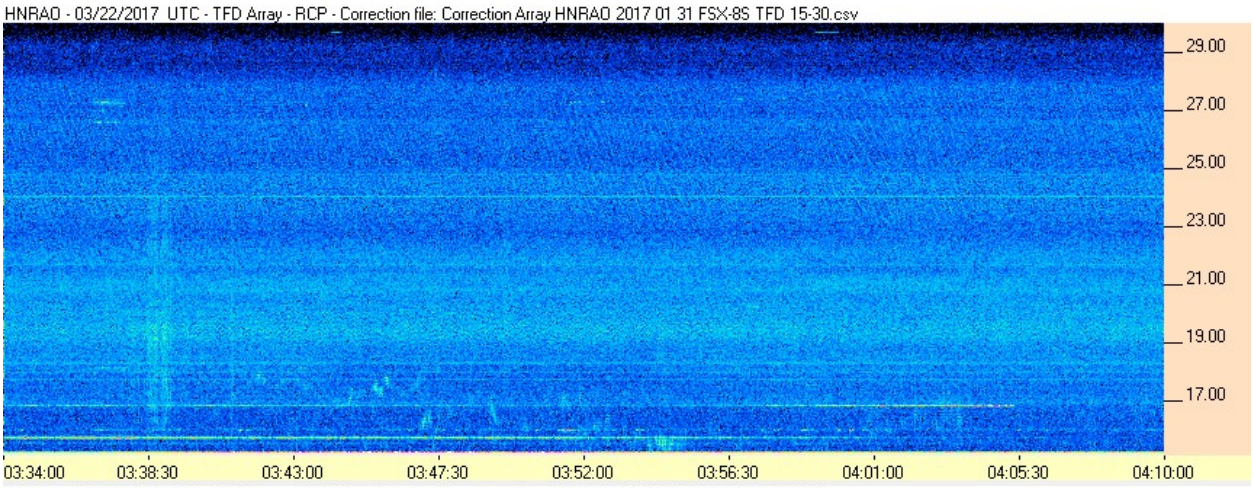








FSX-8S/TFD Pair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04:01:00
04:05:30
04:10:00
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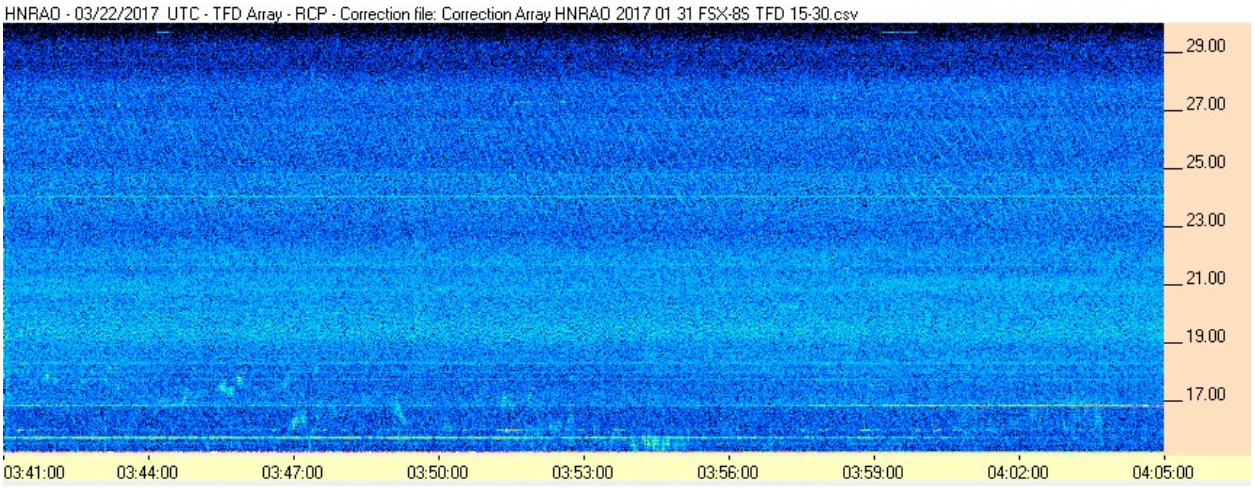
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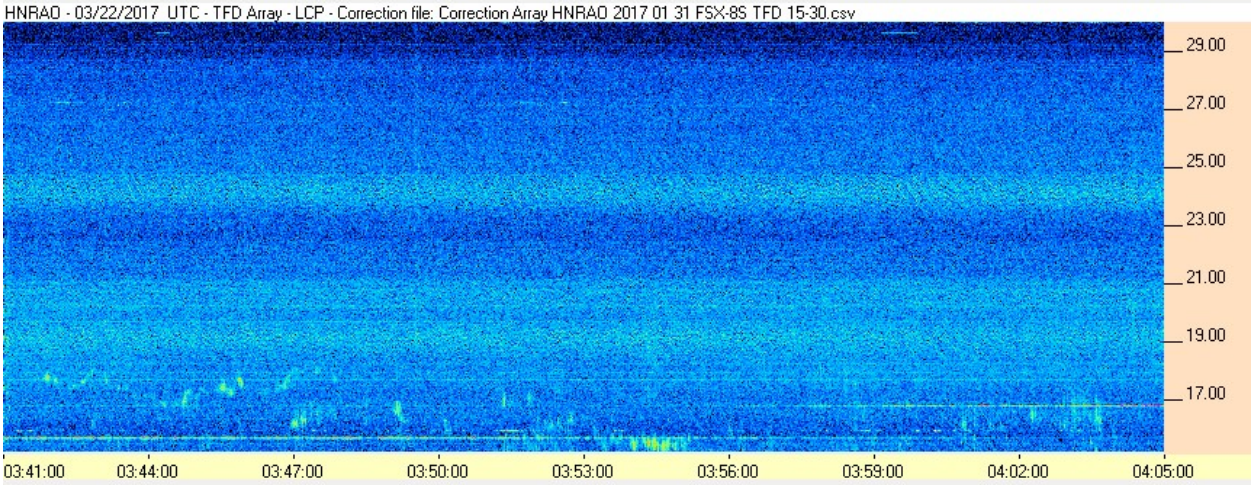
04:05:00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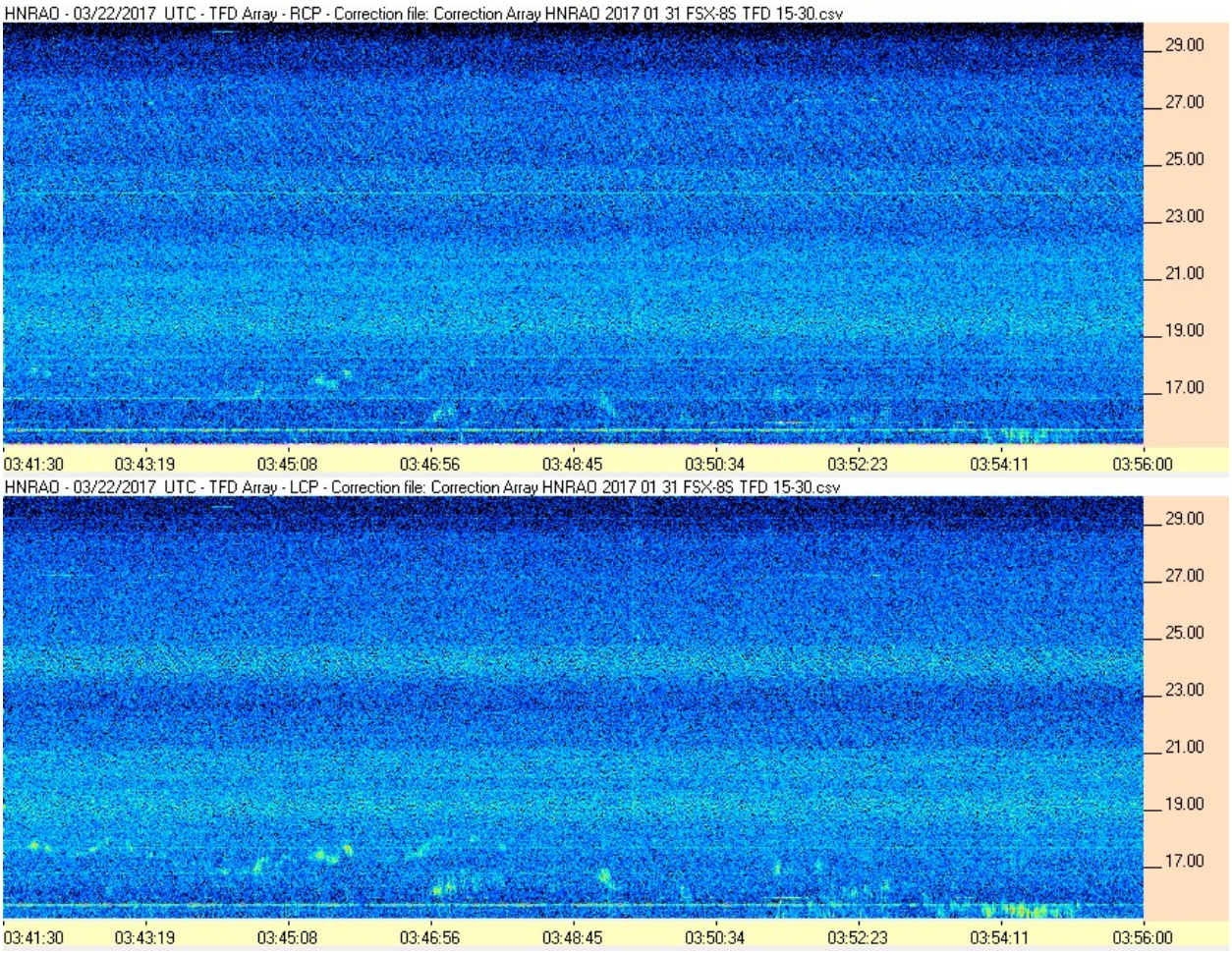
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03:41:30
03:43:19
03:45:08
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03:54:11
03:56:00
HNRAO - 03/22/2017 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
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17.00
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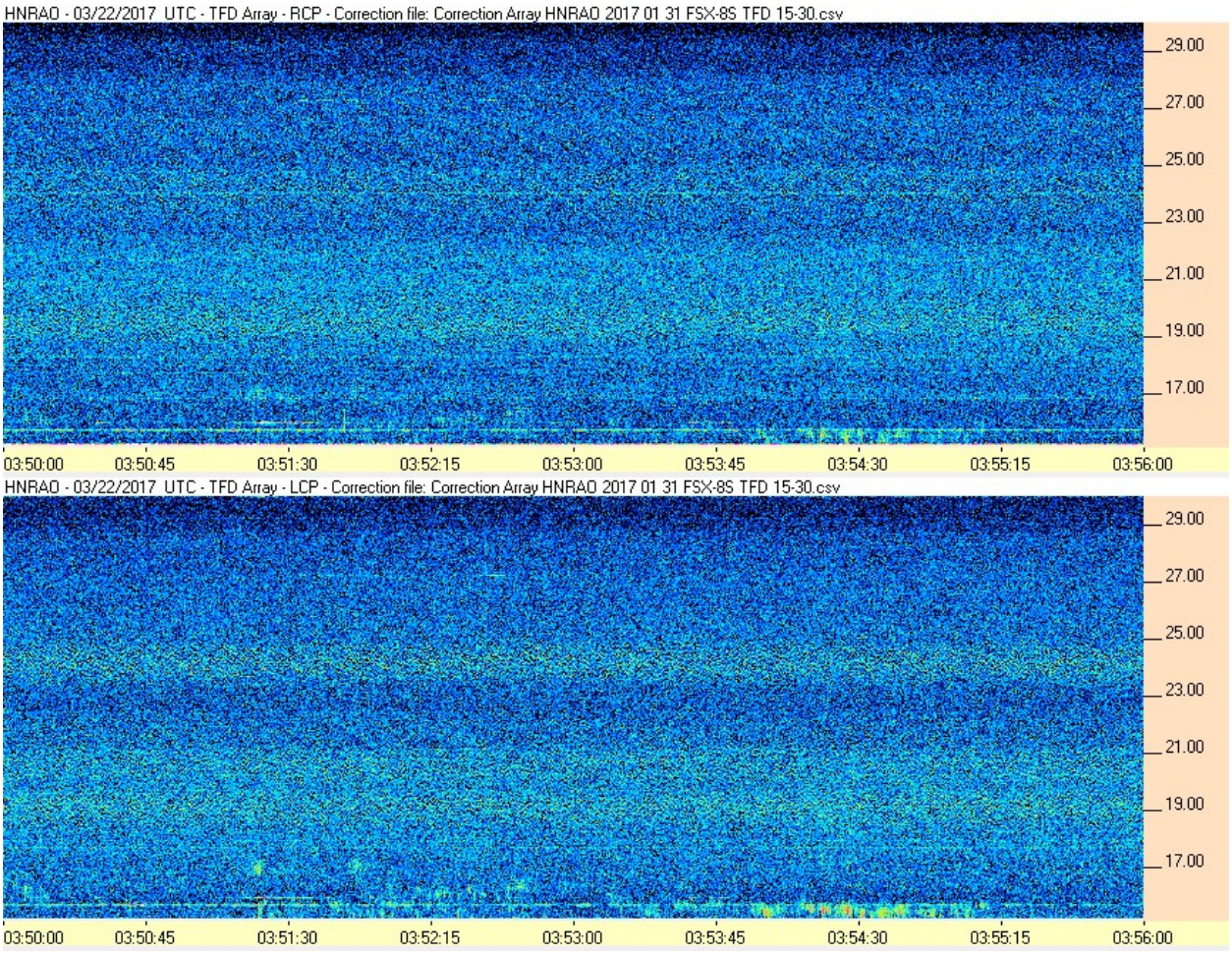
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03:51:30
03:52:15
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03:54:30
03:55:15
03:56:00
HNRAO - 03/22/2017 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
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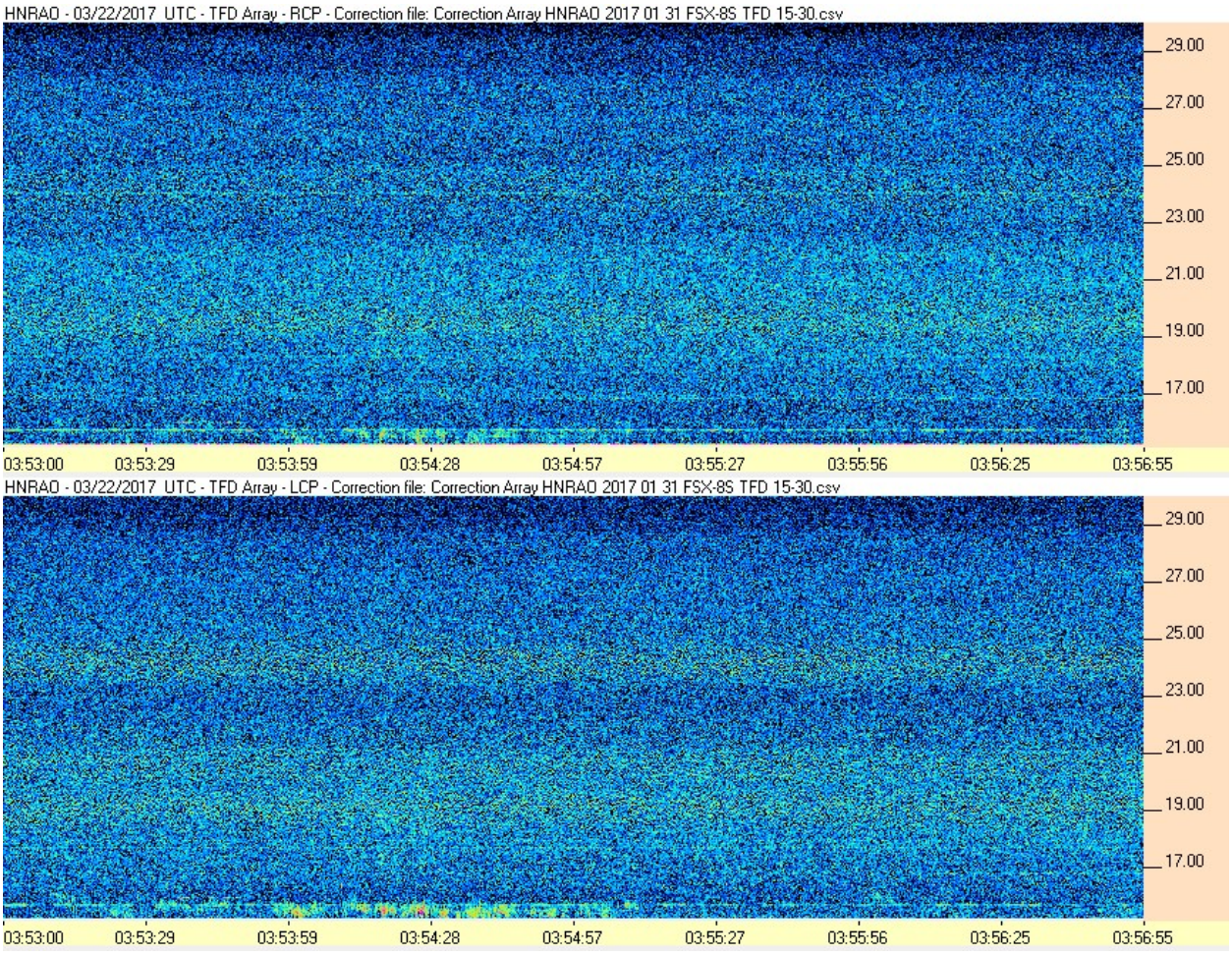
03:56:00


HNRAO - 03/22/2017 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
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27.00
25.00
23.00
21.00
19.00
17.00
03:53:00
03:53:29
03:53:59
03:54:28
03:54:57
03:55:27
03:55:56
03:56:25
03:56:55
HNRAO - 03/22/2017 UTC - TFD Array - LCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
29.00
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23.00
21.00
19.00
17.00
03:53:00
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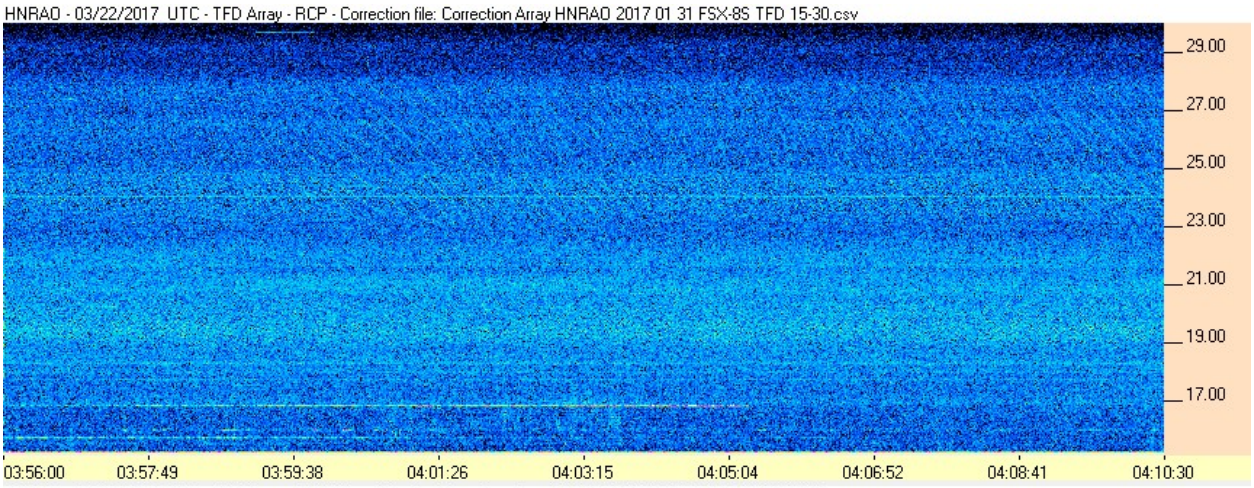
HNRAO - 03/22/2017 UTC - TFD Array - RCP - Correction file: Correction Array HNRAO 2017 01 31 FSX-8S TFD 15-30.csv
29.00
27.00
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17.00
03:56:00
03:57:49
03:59:38
04:01:26
04:03:15
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04:08:41
04:10:30
HNRAO - 03/22/2017 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
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