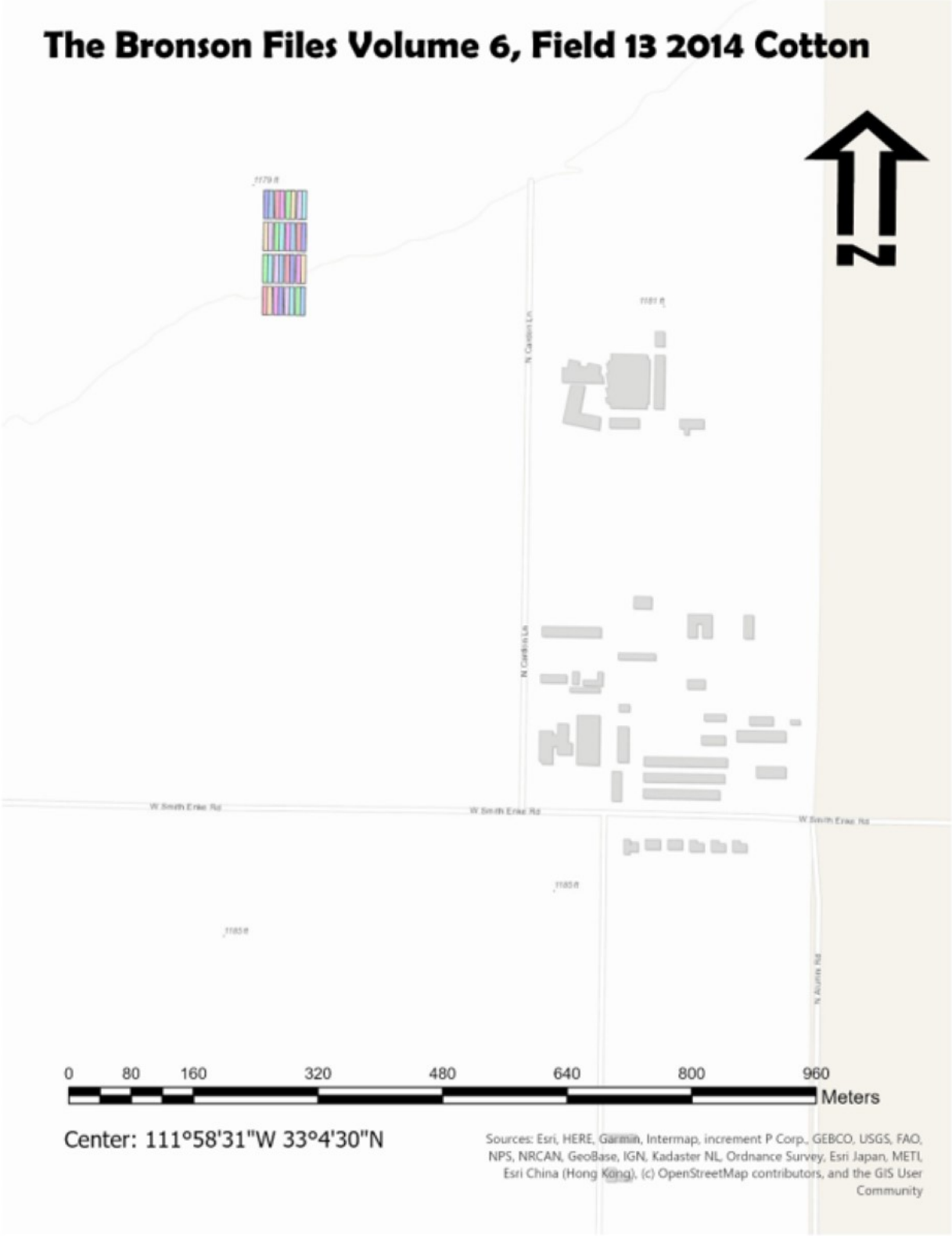
The Bronson Files Volume 6, Field 13 2014 Cotton

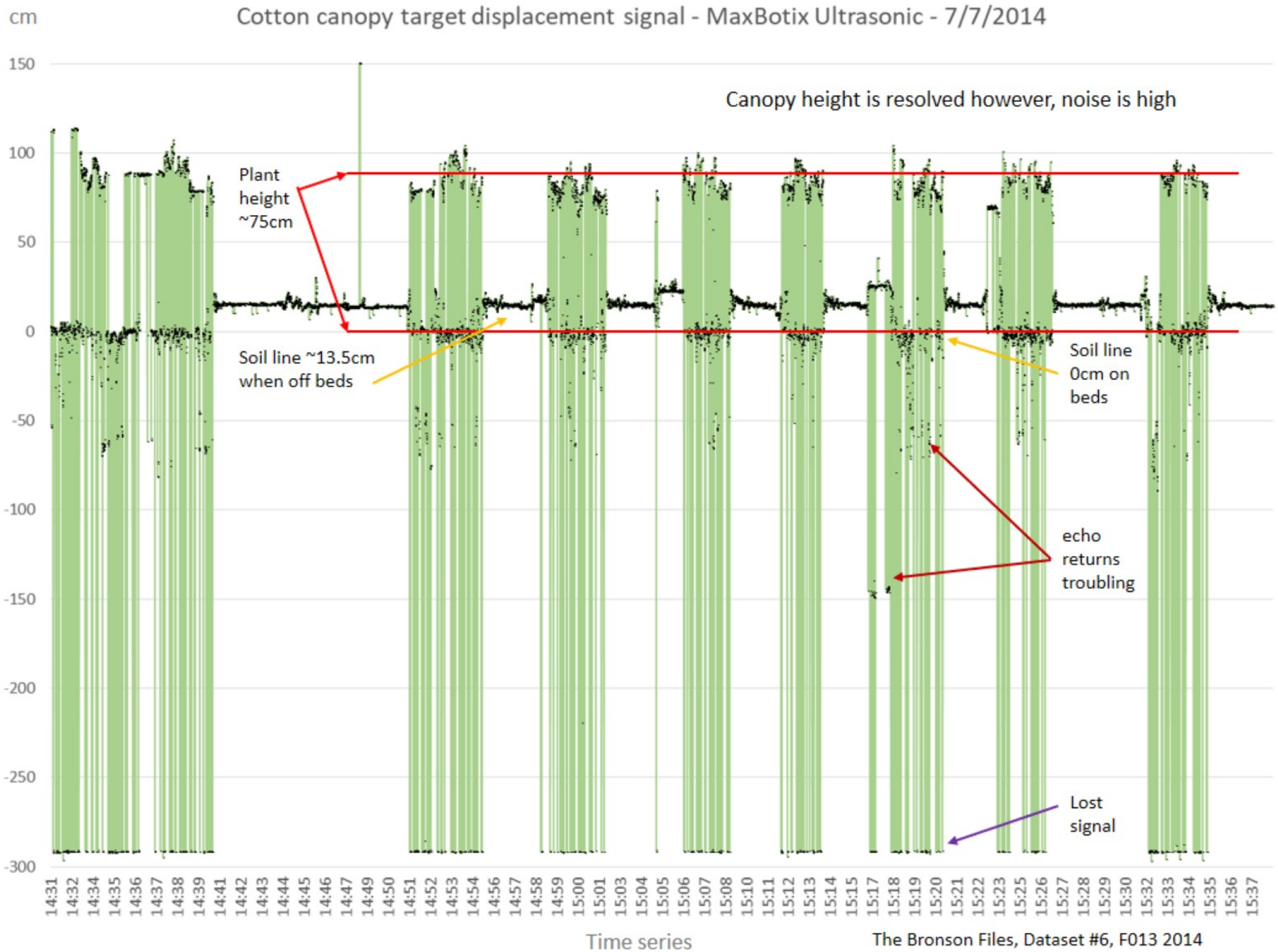


Ultrasonic displacement data report

An explanation of marginal ultrasonic displacement return signals as were used for in-field proximal phenotyping plant measurement is given. Examining data derived by the MaxBotix low-frequency (<75Khz) product technology.

Notation in the following time series charts annotates data elements, visible as ultrasonic proximal signal characteristics, some of which can be mitigated for improved quality by using a higher sonic frequency (>175Khz) to measure plant displacement within a 2m proximal range.

An Explanation of the low-frequency sonic height raw returns



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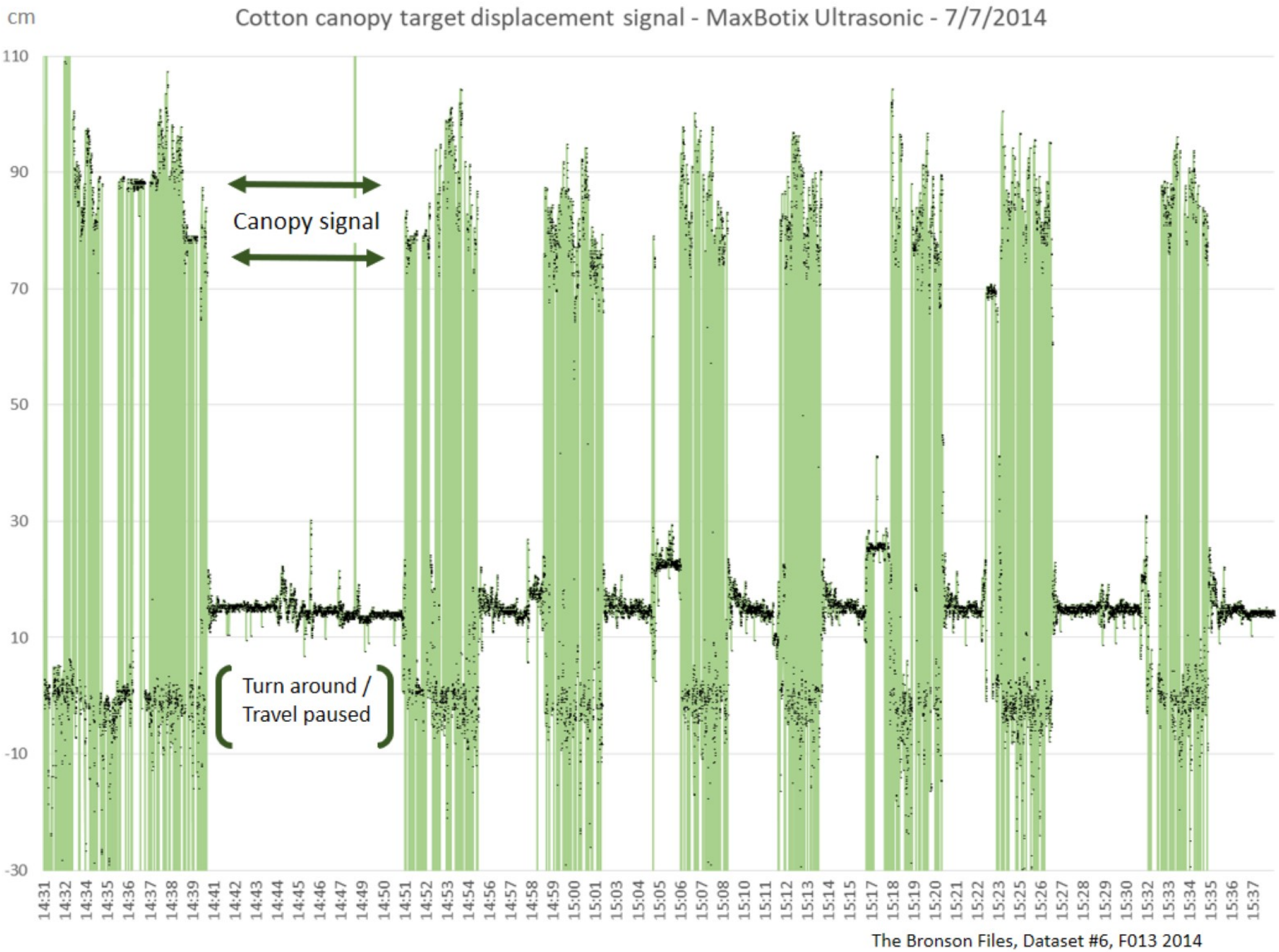
cm
Cotton canopy target displacement signal - MaxBotix Ultrasonic - 7/7/2014
110
90
70
50
30
10
-10
-30
Canopy signal
Turn around /
Travel paused
14:31
14:32
14:34
14:35
14:36
14:37
14:38
14:39
14:41
14:42
14:43
14:44
14:45
14:46
14:47
14:49
14:50
14:51
14:52
14:53
14:54
14:56
14:57
14:58
14:59
15:00
15:01
15:03
15:04
15:05
15:06
15:07
15:08
15:10
15:11
15:12
15:13
15:14
15:15
15:17
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15:21
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15:32
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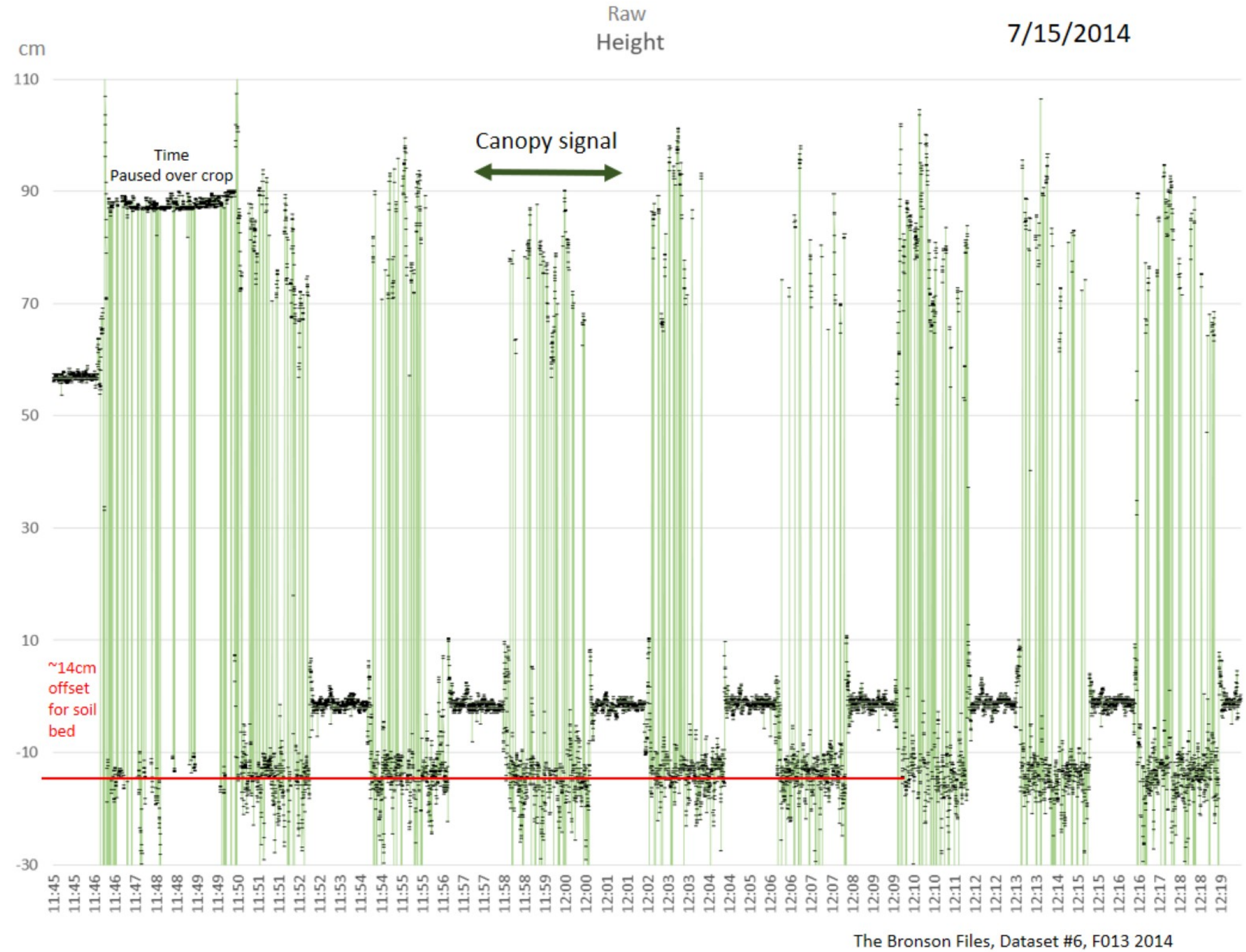
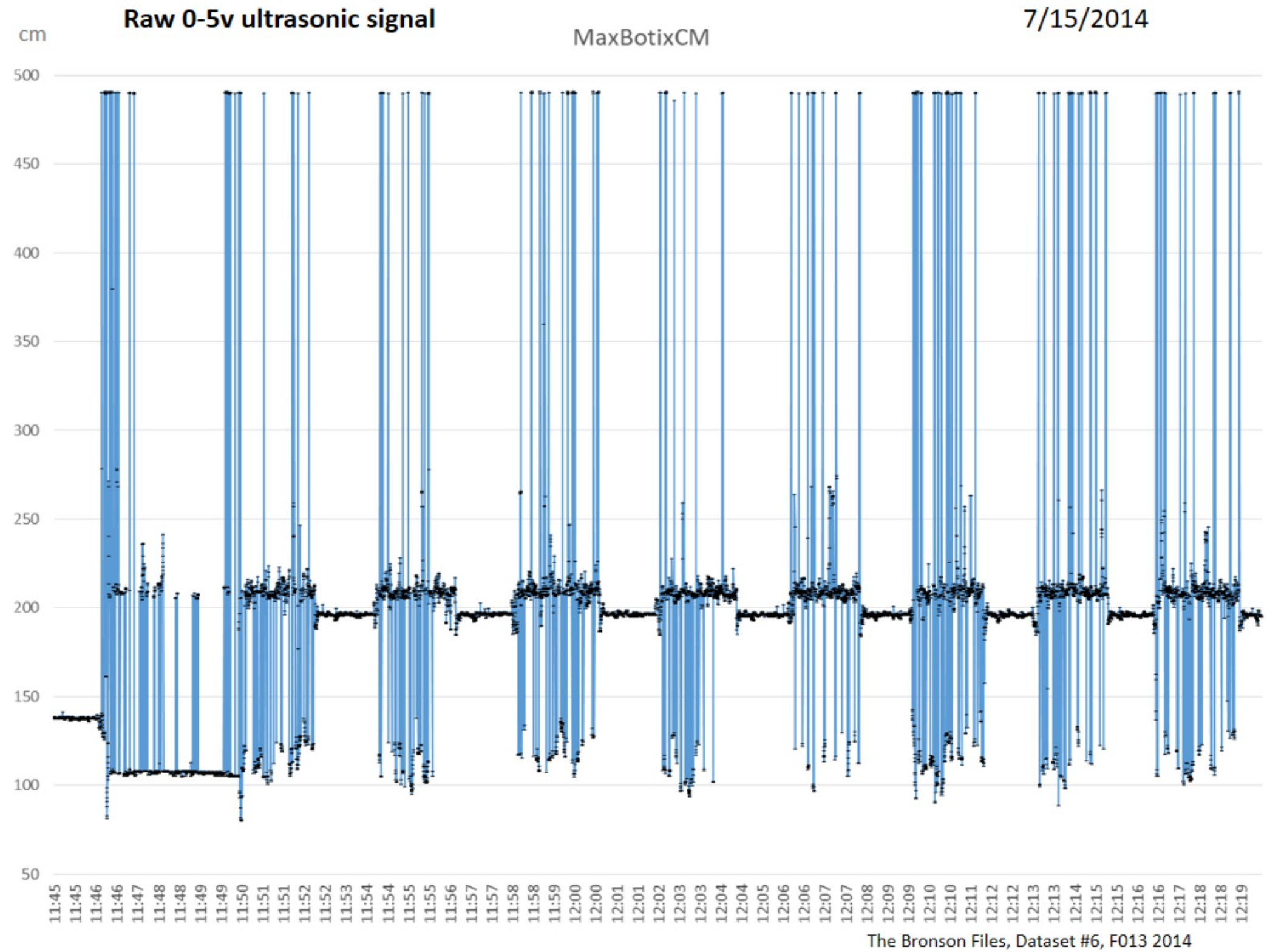
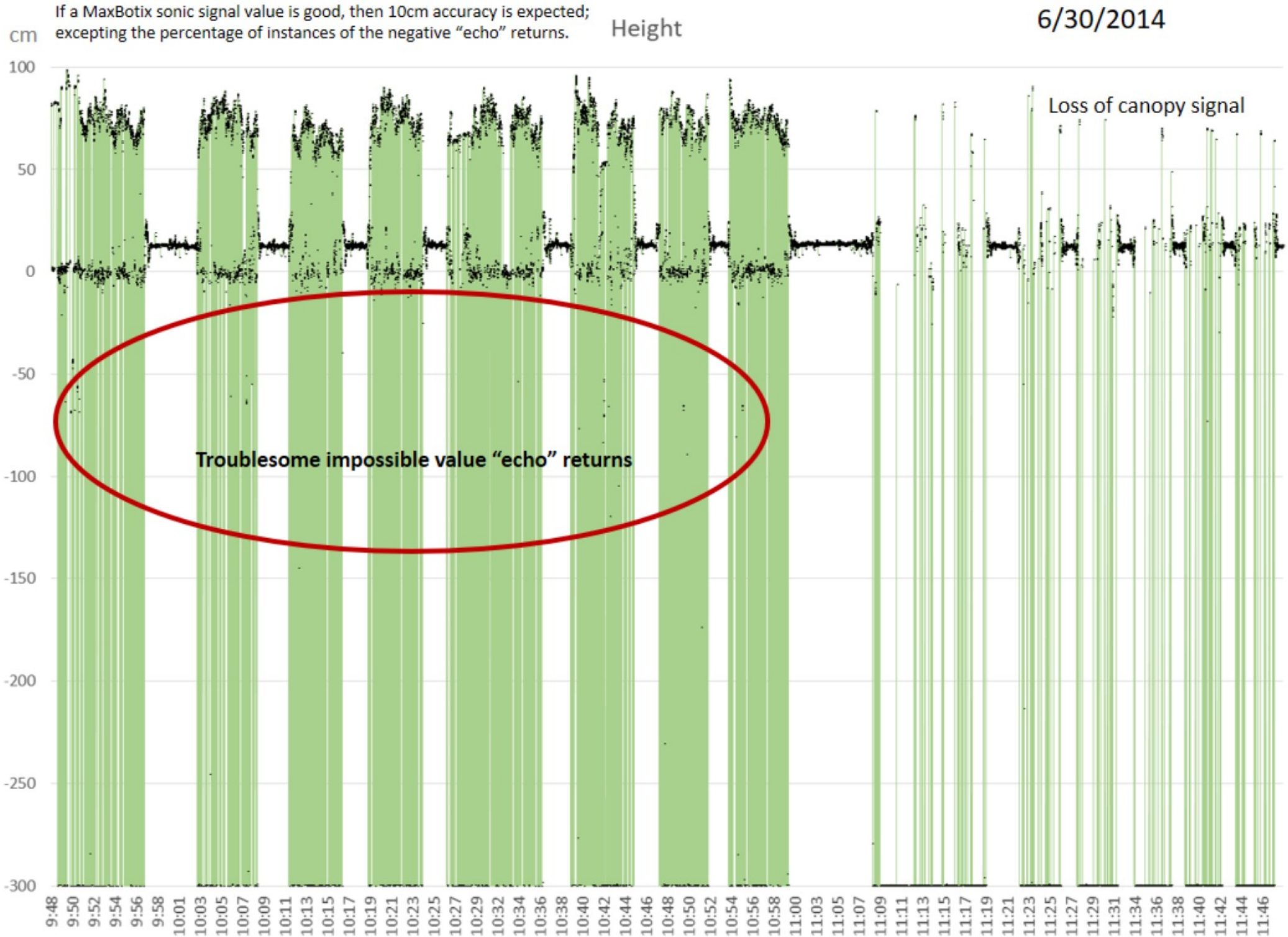
15:34
15:35
15:36
15:37
The Bronson Files, Dataset #6, F013 2014



The Bronson Files, Dataset #6, F013 2014


Raw 0-5v ultrasonic signal
7/15/2014
MaxBotixCM
cm
500
450
400
350
300
250
200
150
100
50
11:45 11:45 11:46 11:46 11:47 11:48 11:48 11:49 11:49 11:50 11:51 11:51 11:52 11:52 11:53 11:54 11:54 11:55 11:55 11:56 11:57 11:57 11:58 11:58 11:59 12:00 12:00 12:01 12:01 12:02 12:03 12:03 12:04 12:04 12:05 12:06 12:06 12:07 12:07 12:08 12:09 12:09 12:10 12:10 12:11 12:12 12:12 12:13 12:13 12:14 12:15 12:15 12:16 12:16 12:17 12:18 12:18 12:19
The Bronson Files, Dataset #6, F013 2014

If a MaxBotix sonic signal value is good, then 10cm accuracy is expected; excepting the percentage of instances of the negative "echo" returns.



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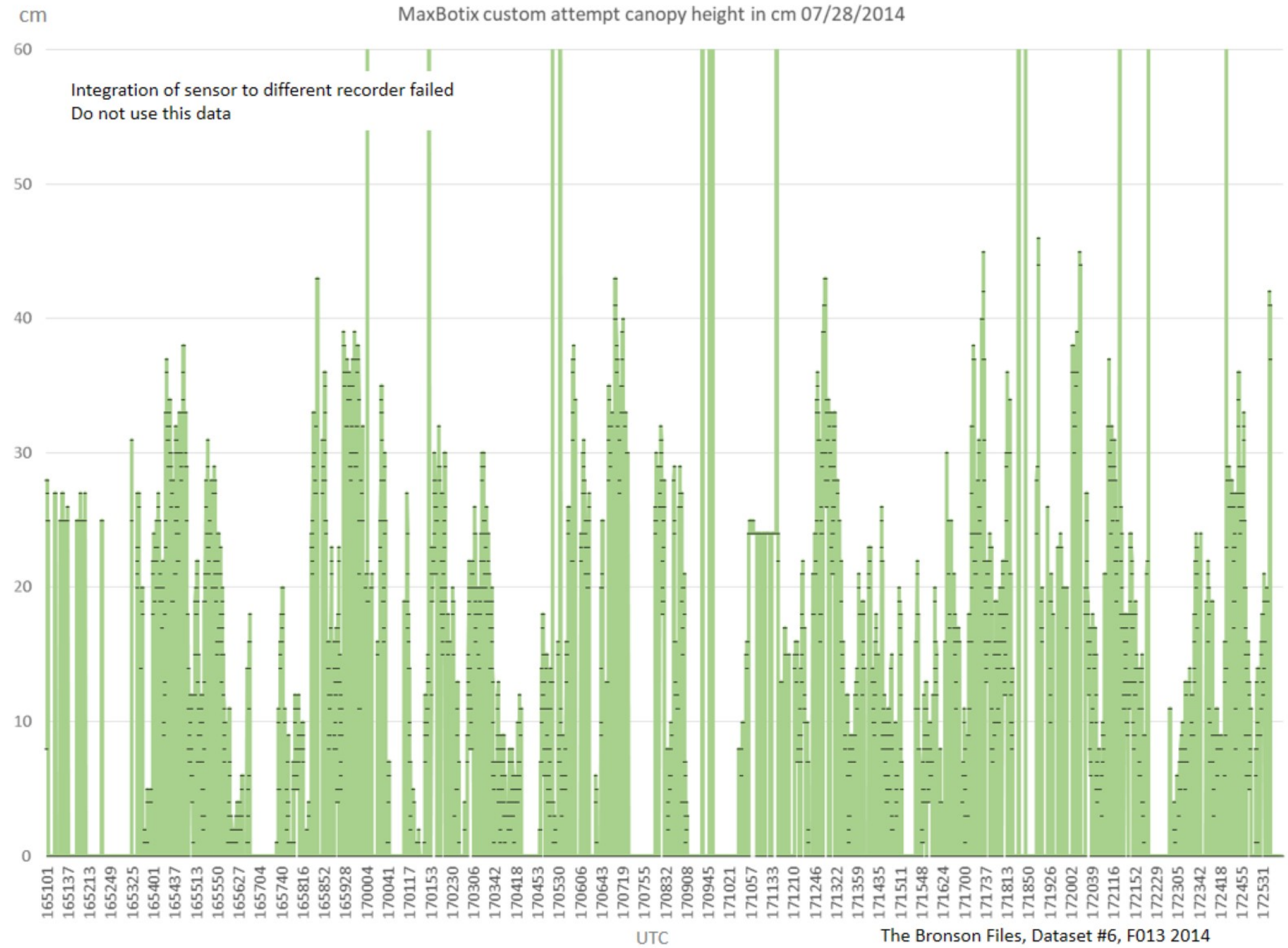
cm
MaxBotix custom attempt canopy height in cm 07/28/2014
Integration of sensor to different recorder failed
Do not use this data
60
50
40
30
20
10
0
165101
165137
165213
165249
165325
165401
165437
165513
165550
165627
165704
165740
165816
165852
165928
170004
170041
170117
170153
170230
170306
170342
170418
170453
170530
170606
170643
170719
170755
170832
170908
170945
171021
171057
171133
171210
171246
171322
171359
171435
171511
171548
171624
171700
171737
171813
171850
171926
172002
172039
172116
172152
172229
172305
172342
172418
172455
172531
UTC
The Bronson Files, Dataset #6, F013 2014