R O S E T T A

FLIGHT REPORTS
of RPC–MAG

RO–IGEP–TR–0010

Issue: 5 Revision: 0

February 8, 2019

Report of the

COMMISSIONING PART 3

Time period: September 06. - 10., 2004

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Contents

1 Summary

The third commissioning phase for RPC–MAG was executed in the time period September 06. – 10., 2004. All the performed steps were successful. MAG worked as expected.

The next sections give a brief description of the executed activities and show the obtained data. Housekeeping data (Temperature of the OB & IB sensor, Filter Stages A & B, Filter configuration register, Reference voltage, negative and positive 5V supply voltage, and the coarse HK sampled magnetic field data of the OB sensor) are presented as well as magnetic field science data of the OB and IB sensor in the activated modes. Magnetic field data are plotted in instrument coordinates if not otherwise stated. They are calibrated according to the results of the ground calibration and the results of the new created temperature model 009 using the flight data from the complete ROSETTA mission until September 2016. Sensitivity, Misalignment, and Temperature effects are taken into account. The s/c residual field is not subtracted.

The dynamic spectra show some clear lines which are varying with the time. A detailed investigation showed, that these lines have their origin in the reaction wheels of the ROSETTA S/C. As they are rotating with different speeds they generate different disturbance frequencies. The signatures of the reaction wheels are folded down in the measurement range of the magnetometers. A detailed investigation of this phenomenon is given in RO–IGEP–TR0012.

From time to time there are also horizontal lines in the dynamic spectrum to be seen. These lines represent constant frequencies and are caused by the LAP instrument. This behavior was investigated and proofed during the PC10 campaign in November 2010. See RO-IGEP-TR0030 for further details.

2 September 06, 2004:

2.1 Actions

MAG was switched on immediately after PIU and set to HK mode at 19:17. All commands passed smoothly and the instrument followed in the expected way.

Time	Stage A, Stage B,Filter cfg	Stage 1, Stage 2, Stage3	Mode
20:02 – 20:18	1 2 0	1 2 0	SID2
22:19 – 24:00	0 0 0	0 0 0	SID3

2.2 Plots of Calibrated Data using the new Temperature Model

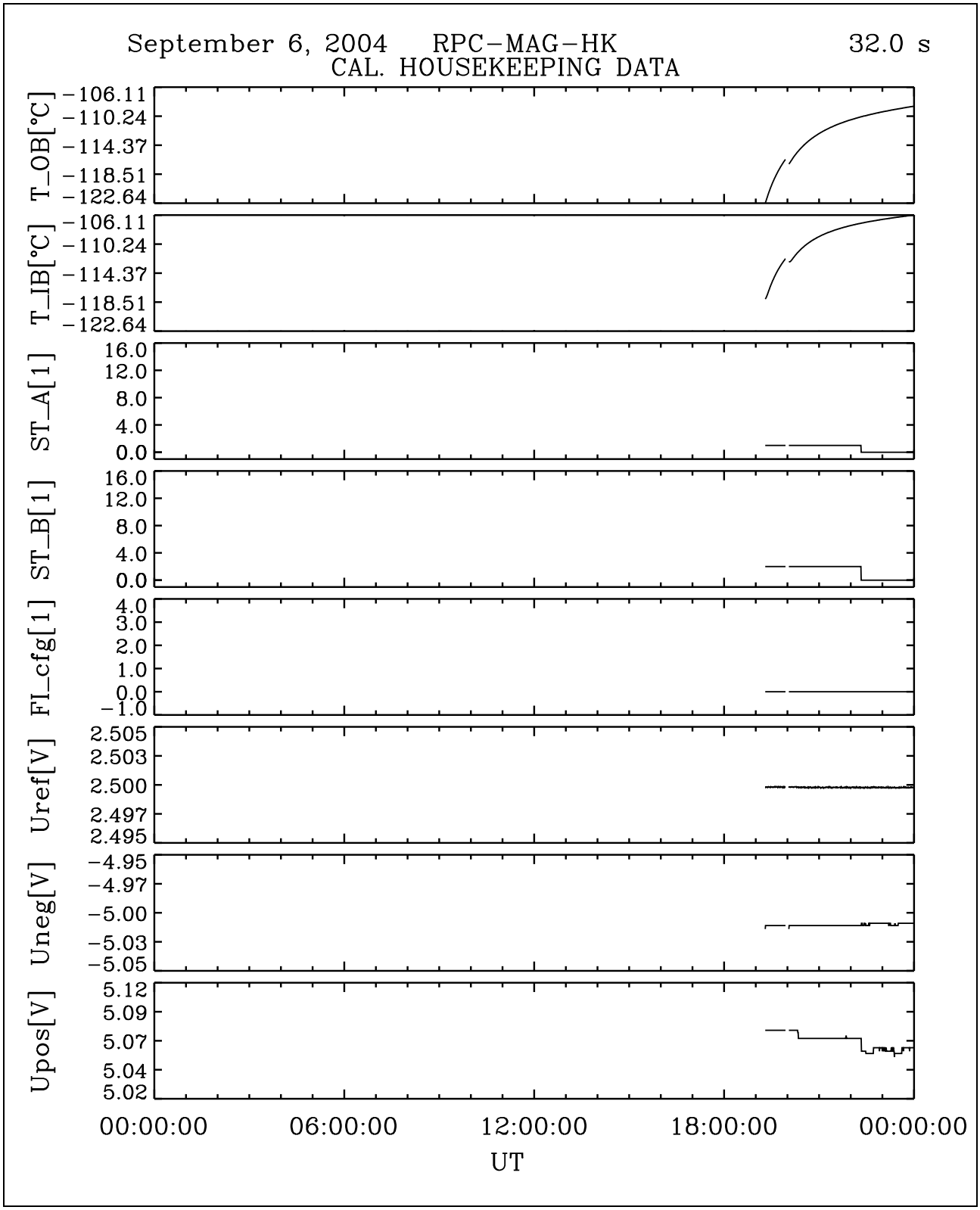

Figure 1: File: RPCMAG040906T1917_CLA_HK_P0000_2400

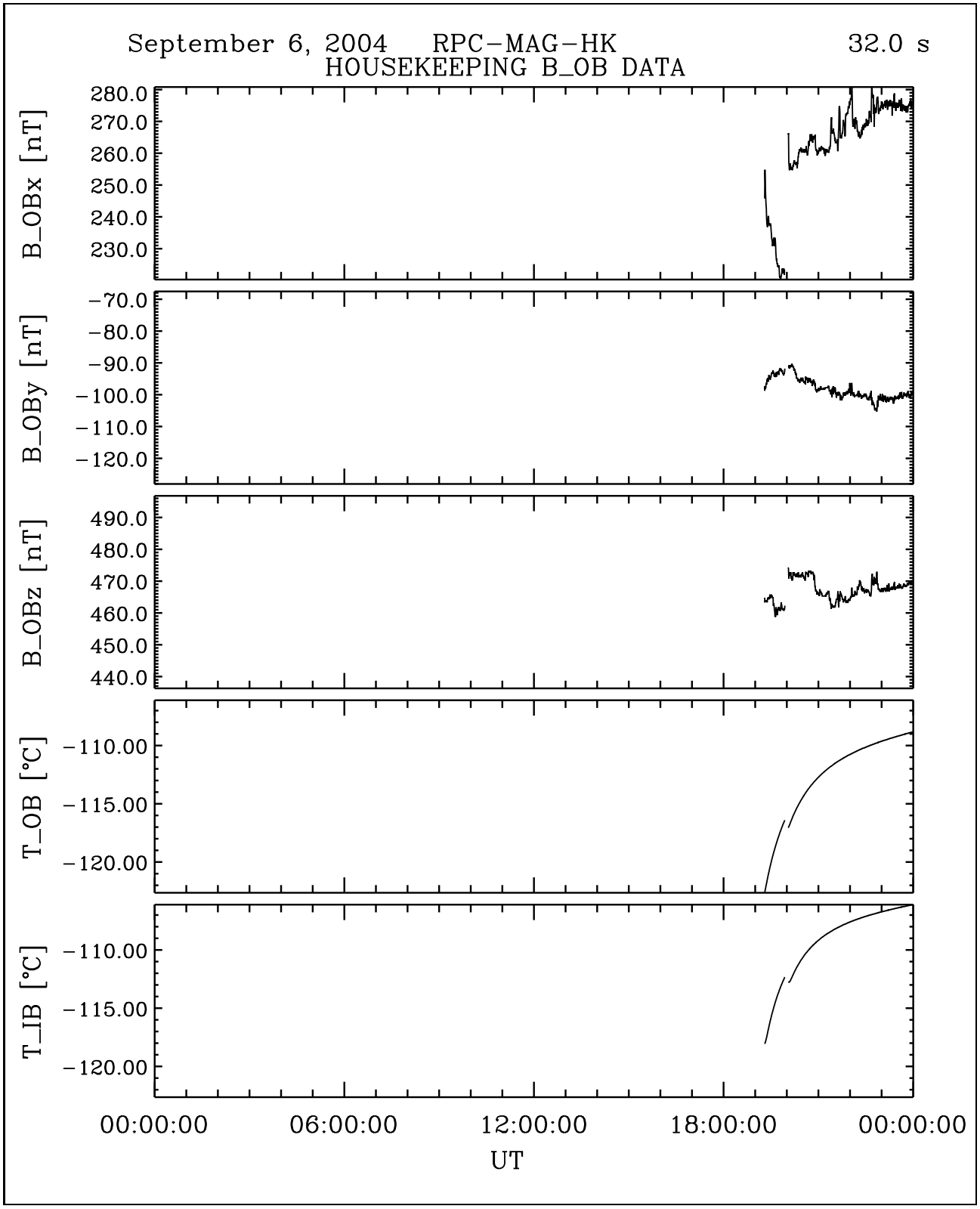

Figure 2: File: RPCMAG040906T1917_CLA_HK_B_P0000_2400

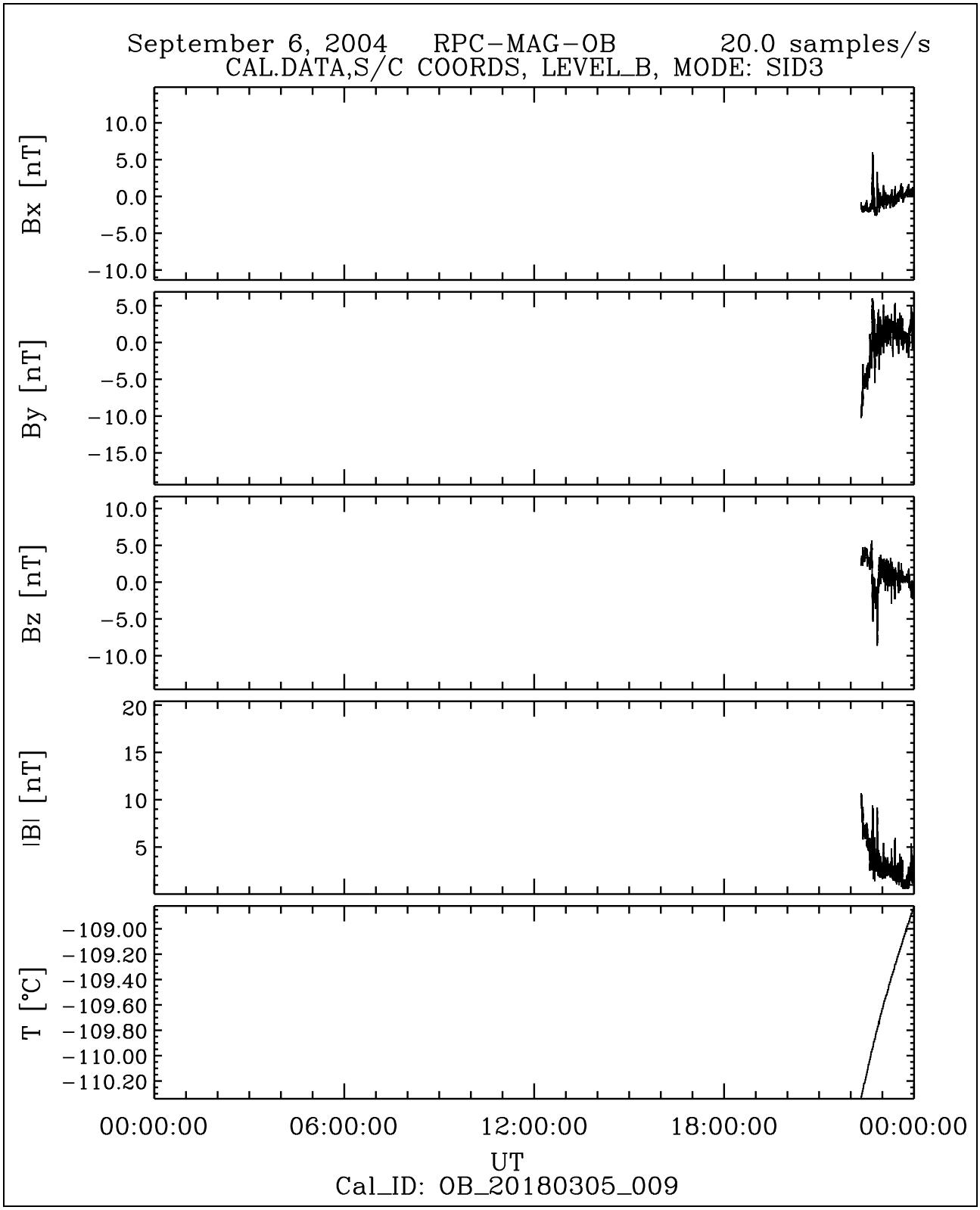

Figure 3: File: RPCMAG040906T2219_CLB_OB_M3_T0000_2400_009

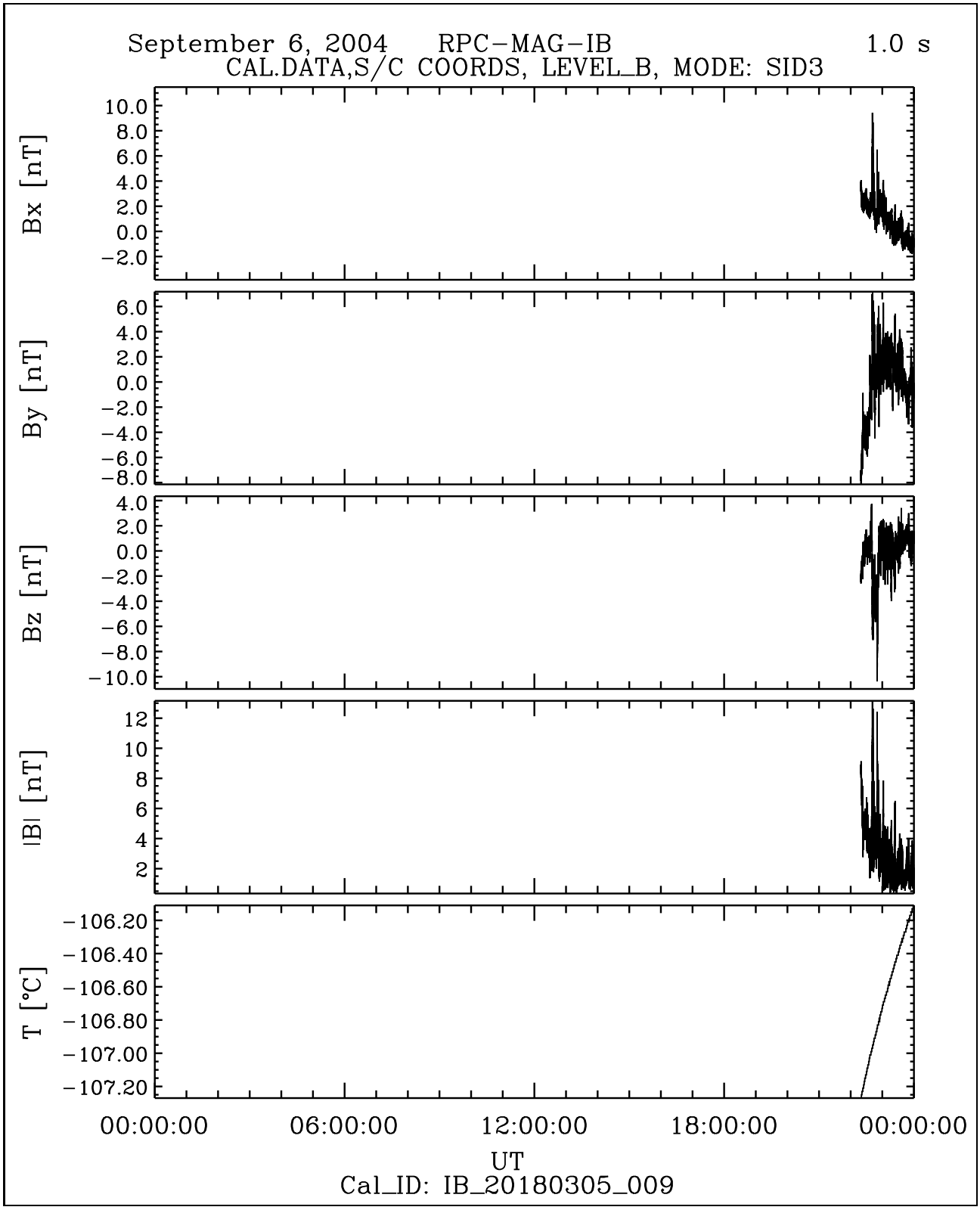

Figure 4: File: RPCMAG040906T2219_CLB_IB_M3_T0000_2400_009

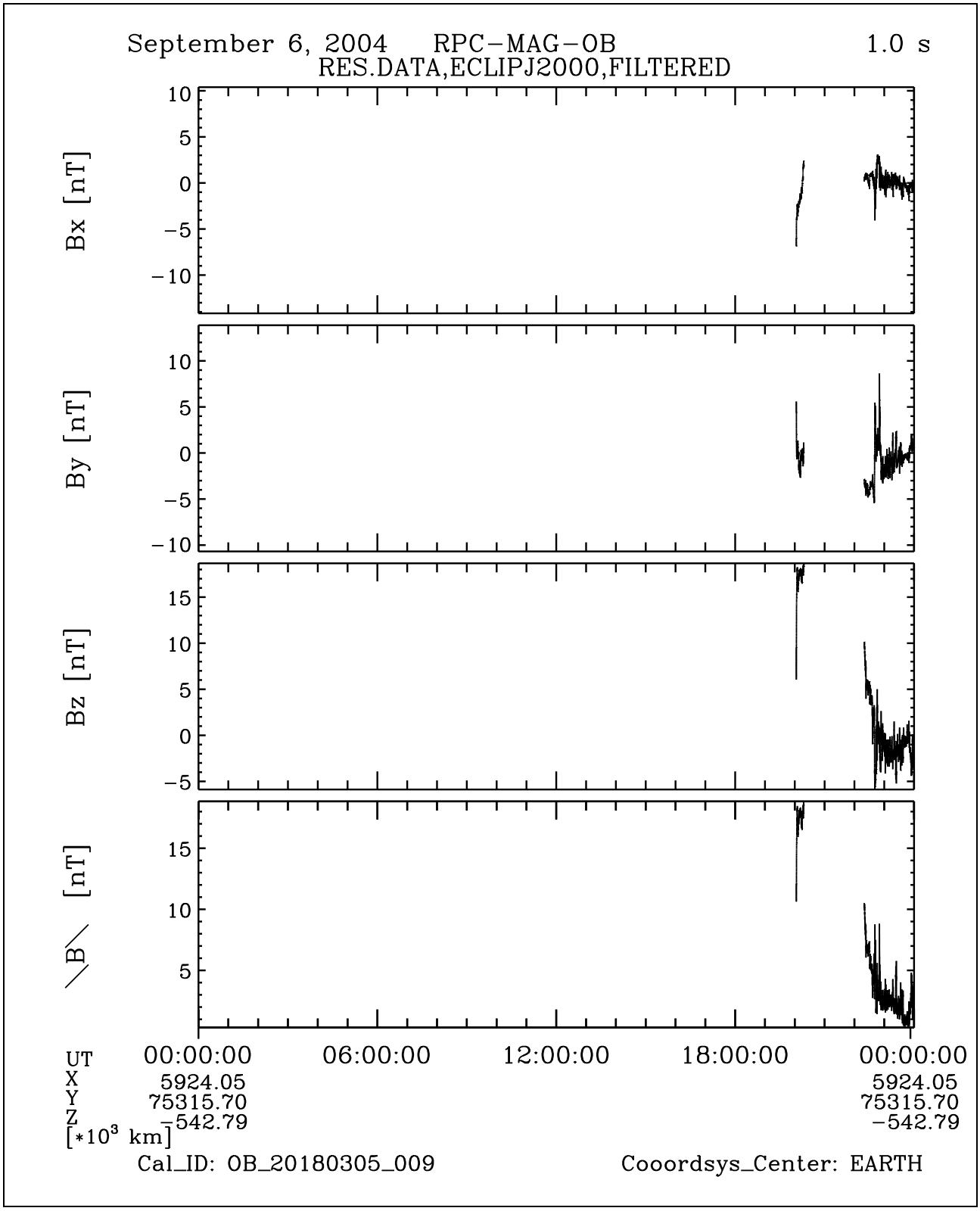

Figure 5: File: RPCMAG040906_CLG_OB_A1_T0000_2400_009

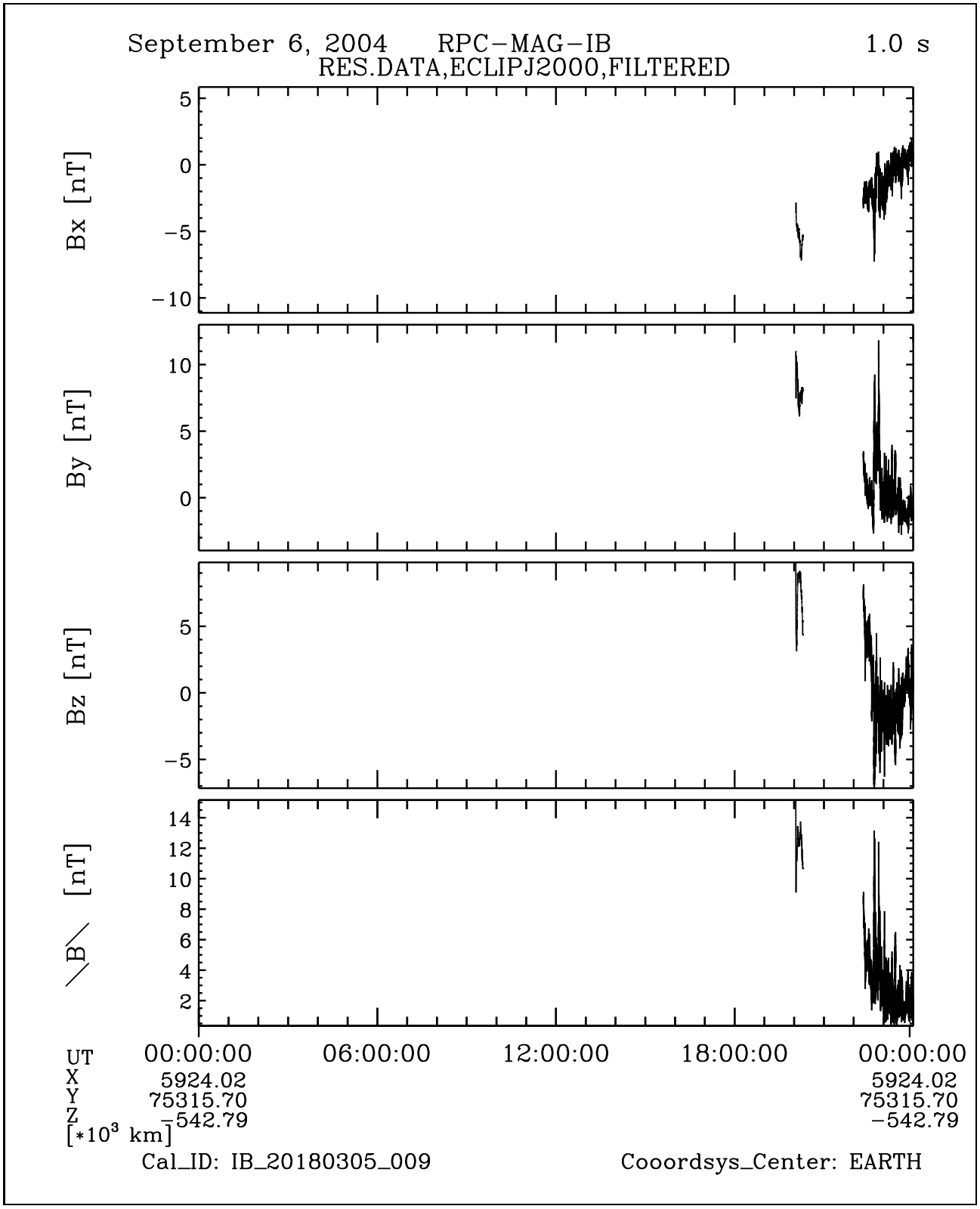

Figure 6: File: RPCMAG040906_CLG_IB_A1_T0000_2400_009

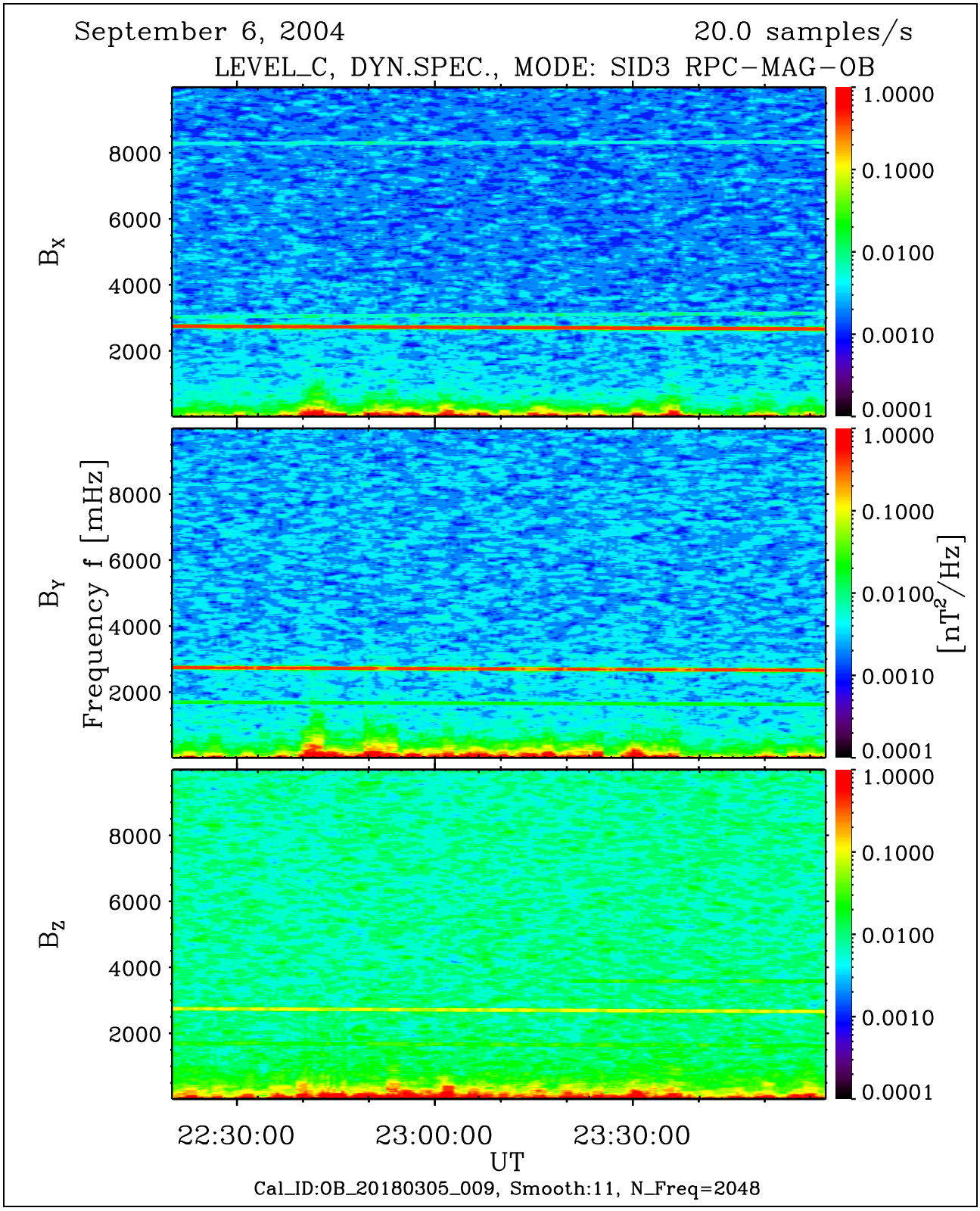

Figure 7: File: RPCMAG040906_CLC_OB_M3_DS0_10000_009

2.3 Plots of ROSETTA's Reaction Wheels Speeds

The following plots show the time series of the revolutions of the 4 reaction wheels. Two kinds of data are shown:

- The original reaction wheel data as they are stored in the DDS.
- The theoretical response of the wheels impact seen by an instrument sampling with different frequencies. Here the response in the at 20 Hz and 1 Hz sampling frequency is plotted.

A comparison with the dynamic spectra of the MAG data gives an impressive accordance between the reaction wheel frequencies and the spectral lines observed in the dynamic MAG spectra.

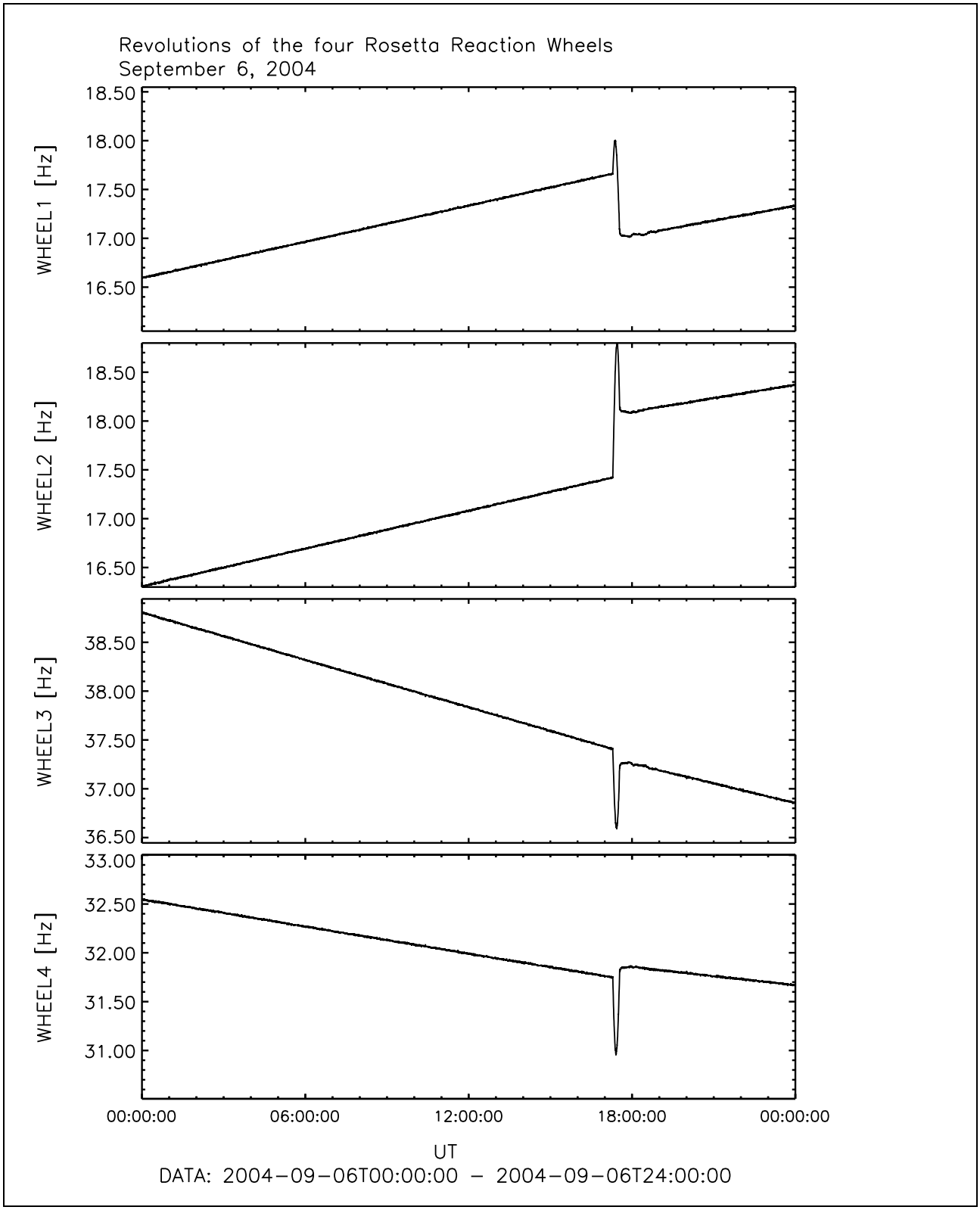

Figure 8: File: wheels_Hz2004-09-06T00-00

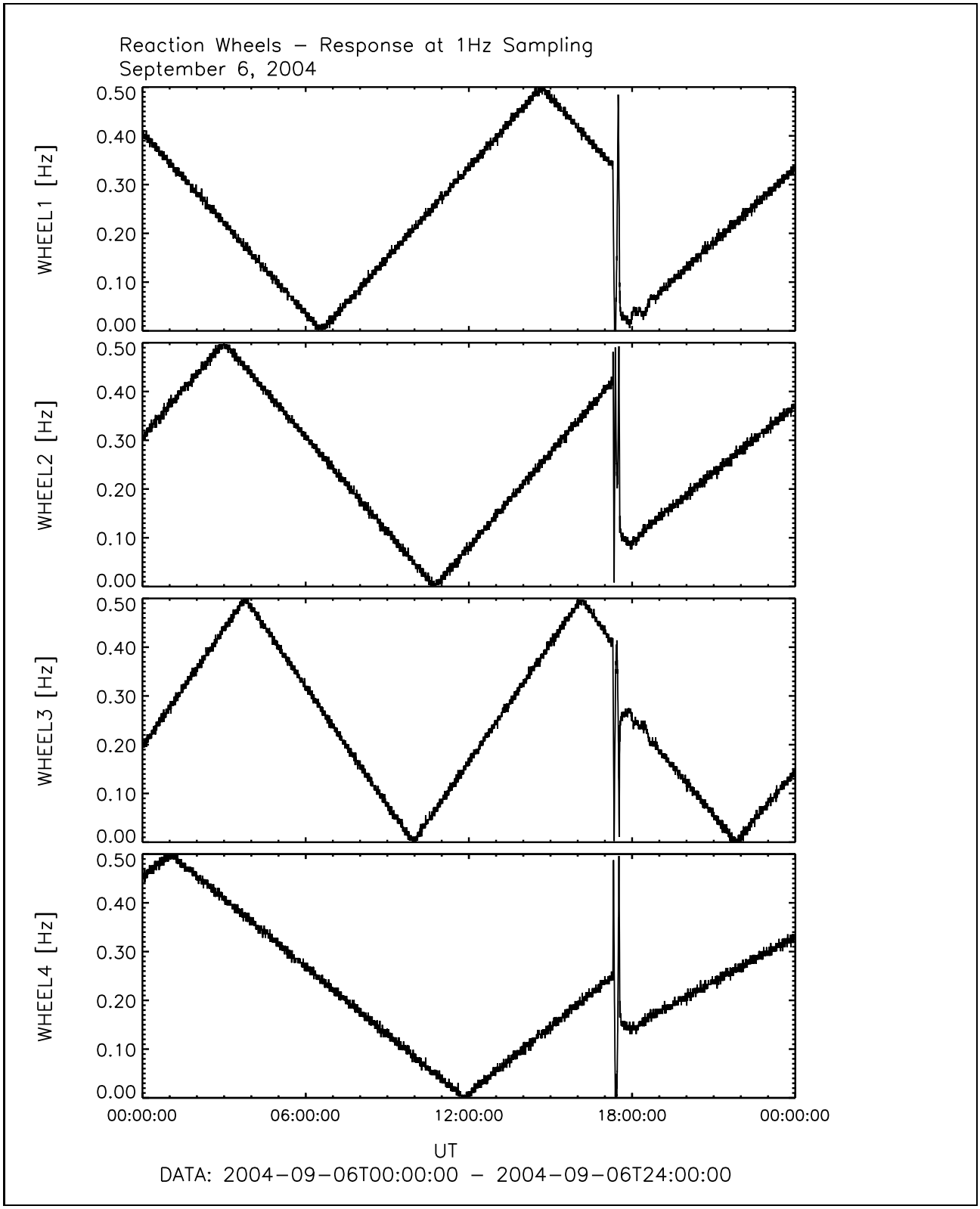

Figure 9: File: wheels_1Hz_Sampling2004-09-06T00-00

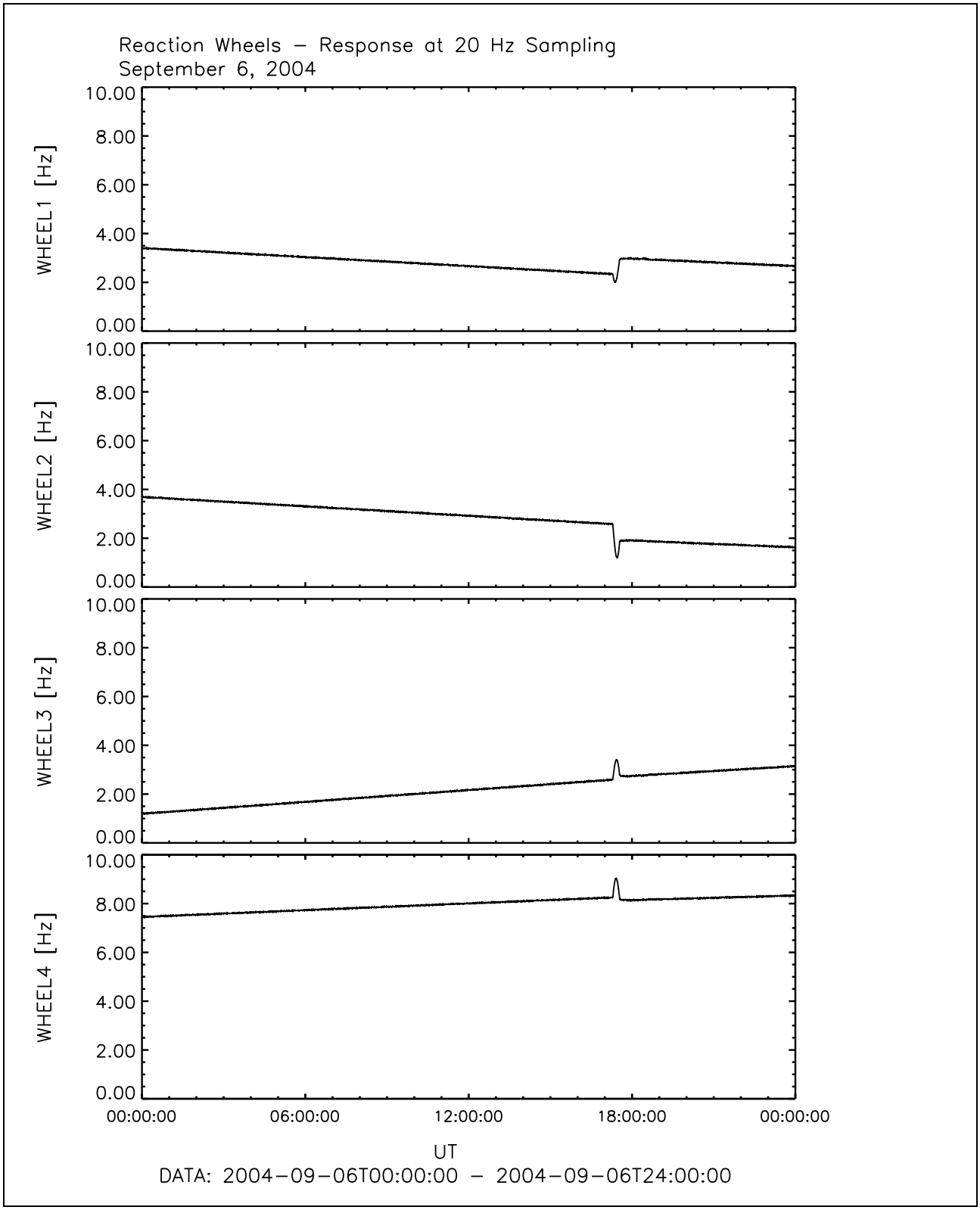

Figure 10: File: wheels_20Hz_Sampling2004-09-06T00-00

2.4 Plots of Reaction Wheel and LAP Disturbance corrected Data

The following plots show the dynamic spectra of the LEVEL_H data. These data have been purged from ROSETTAs reaction wheel disturbance and also from the disturbance of the LAP instrument. Plots are only shown for the primary sensor.

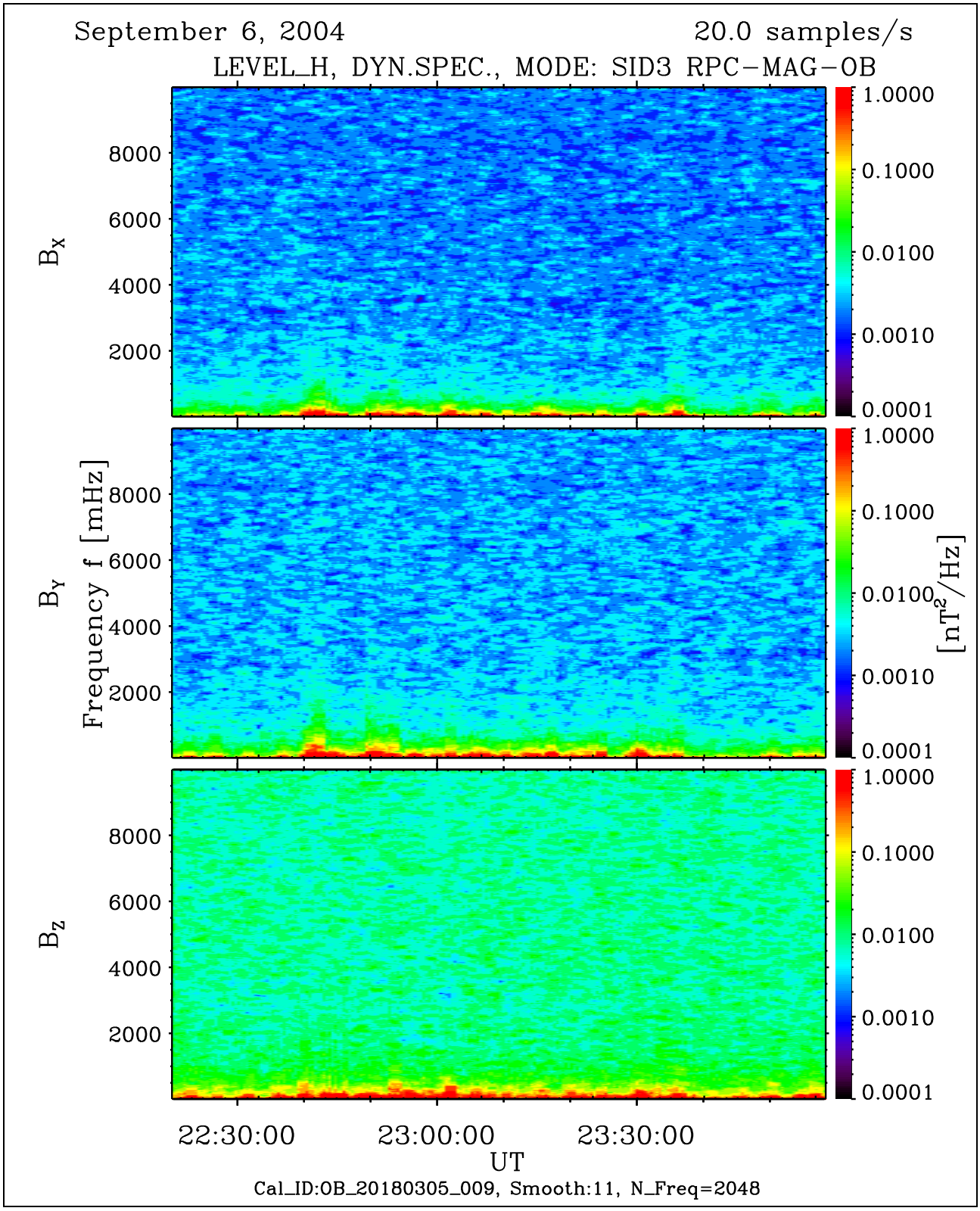

Figure 11: File: RPCMAG040906_CLH_OB_M3_DS0_10000_009

3 September 07, 2004:

3.1 Actions

Time	Stage A, Stage B,Filter cfg	Stage 1, Stage 2, Stage3	Mode
00:00 – 00:44	0 0 0	0 0 0	SID3
12:26 – 14:19	2 0 0	2 0 0	SID4
14:19 – 24:00	0 0 0	0 0 0	SID3

3.2 Plots of Calibrated Data using the new Temperature Model

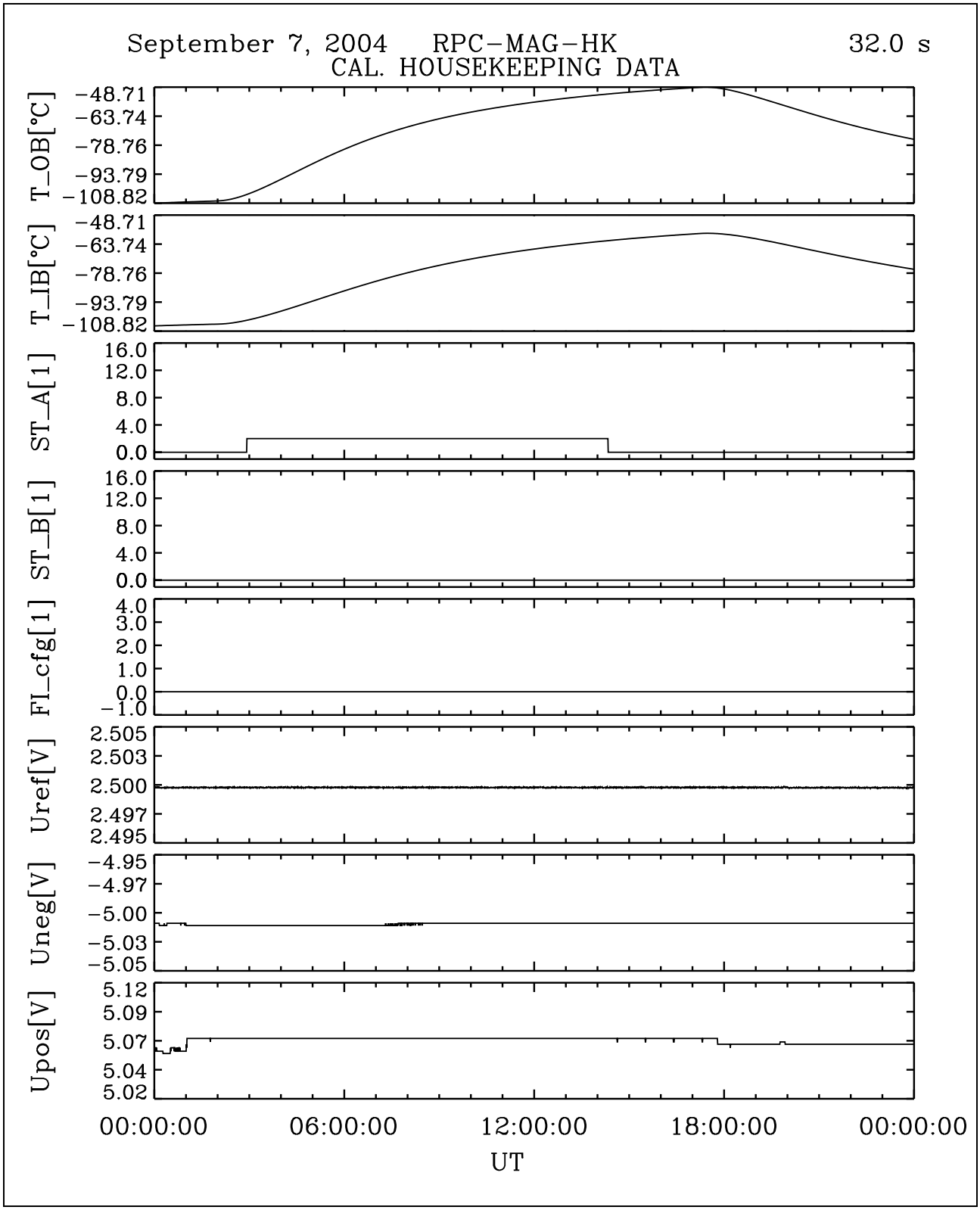

Figure 12: File: RPCMAG040907T0000_CLA_HK_P0000_2400

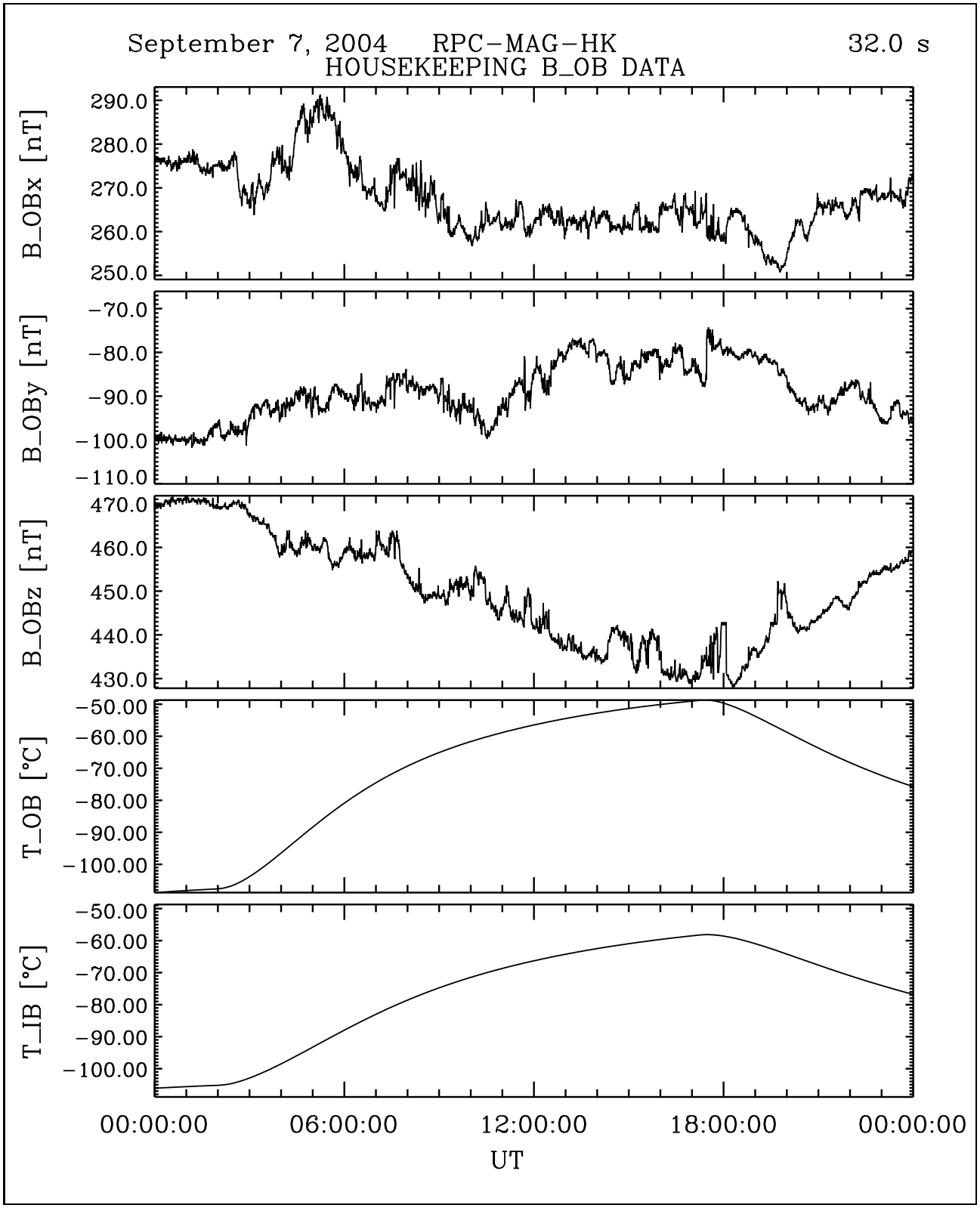

Figure 13: File: RPCMAG040907T0000_CLA_HK_B_P0000_2400

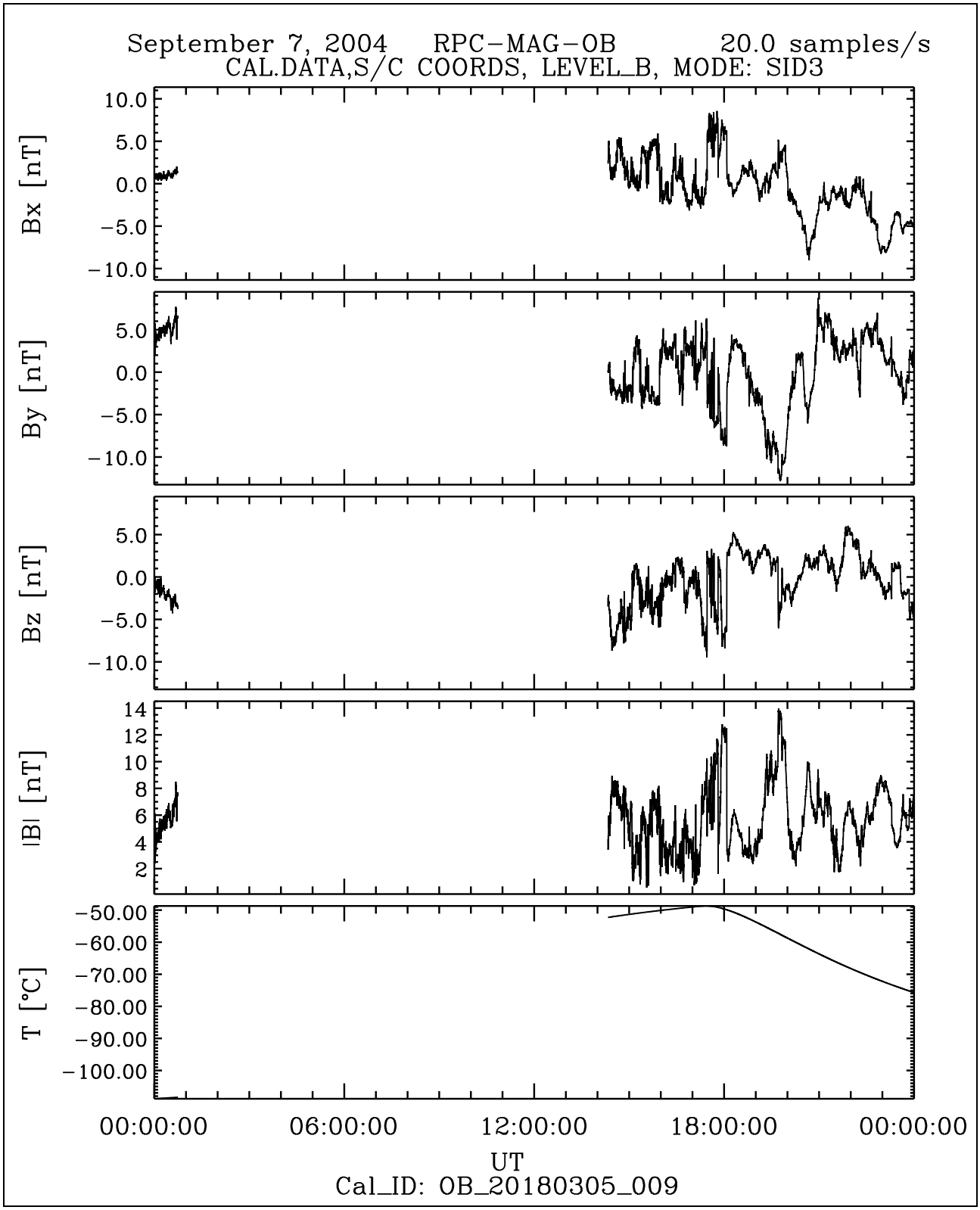

Figure 14: File: RPCMAG040907T0000_CLB_OB_M3_T0000_2400_009

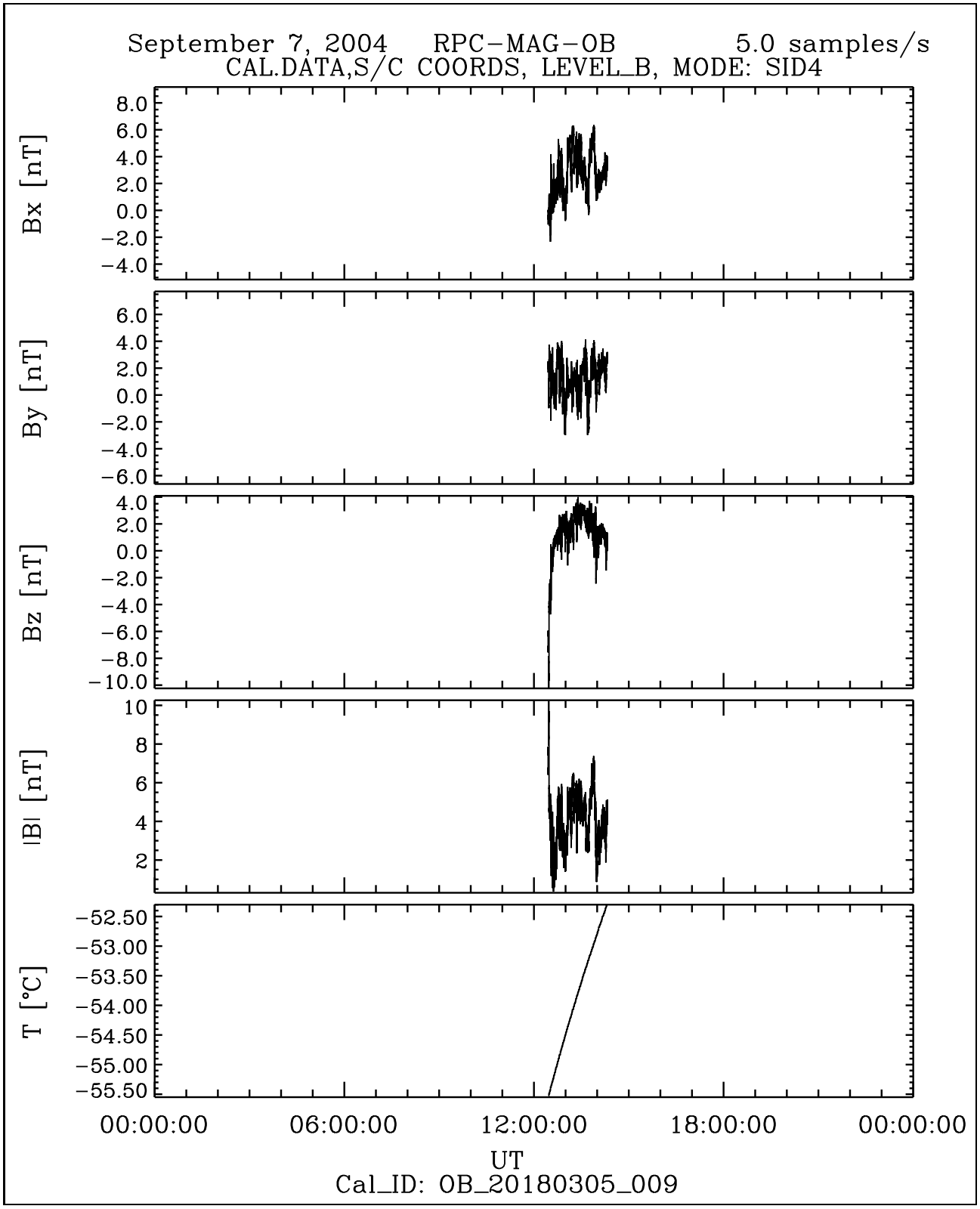

Figure 15: File: RPCMAG040907T1226_CLB_OB_M4_T0000_2400_009

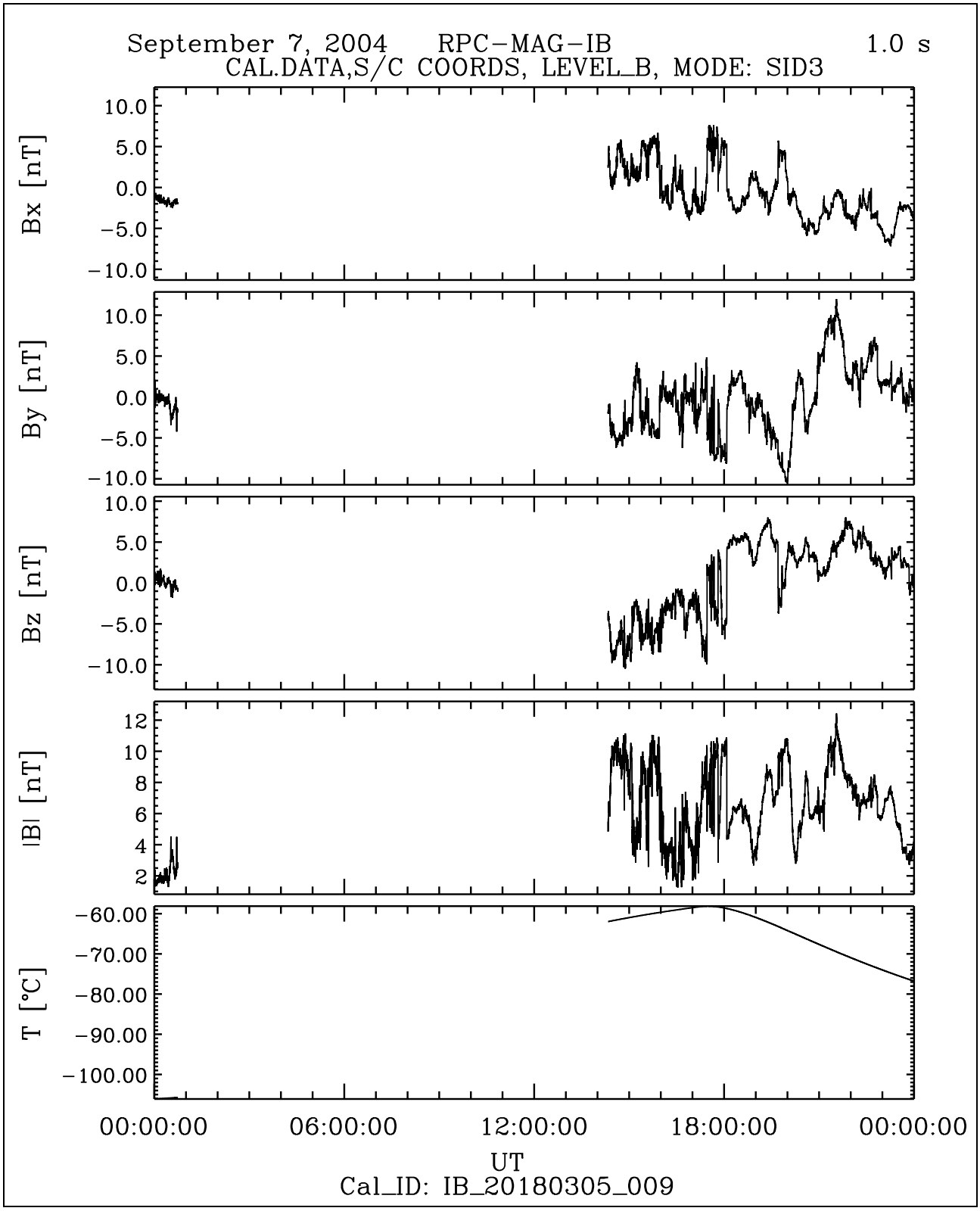

Figure 16: File: RPCMAG040907T0000_CLB_IB_M3_T0000_2400_009

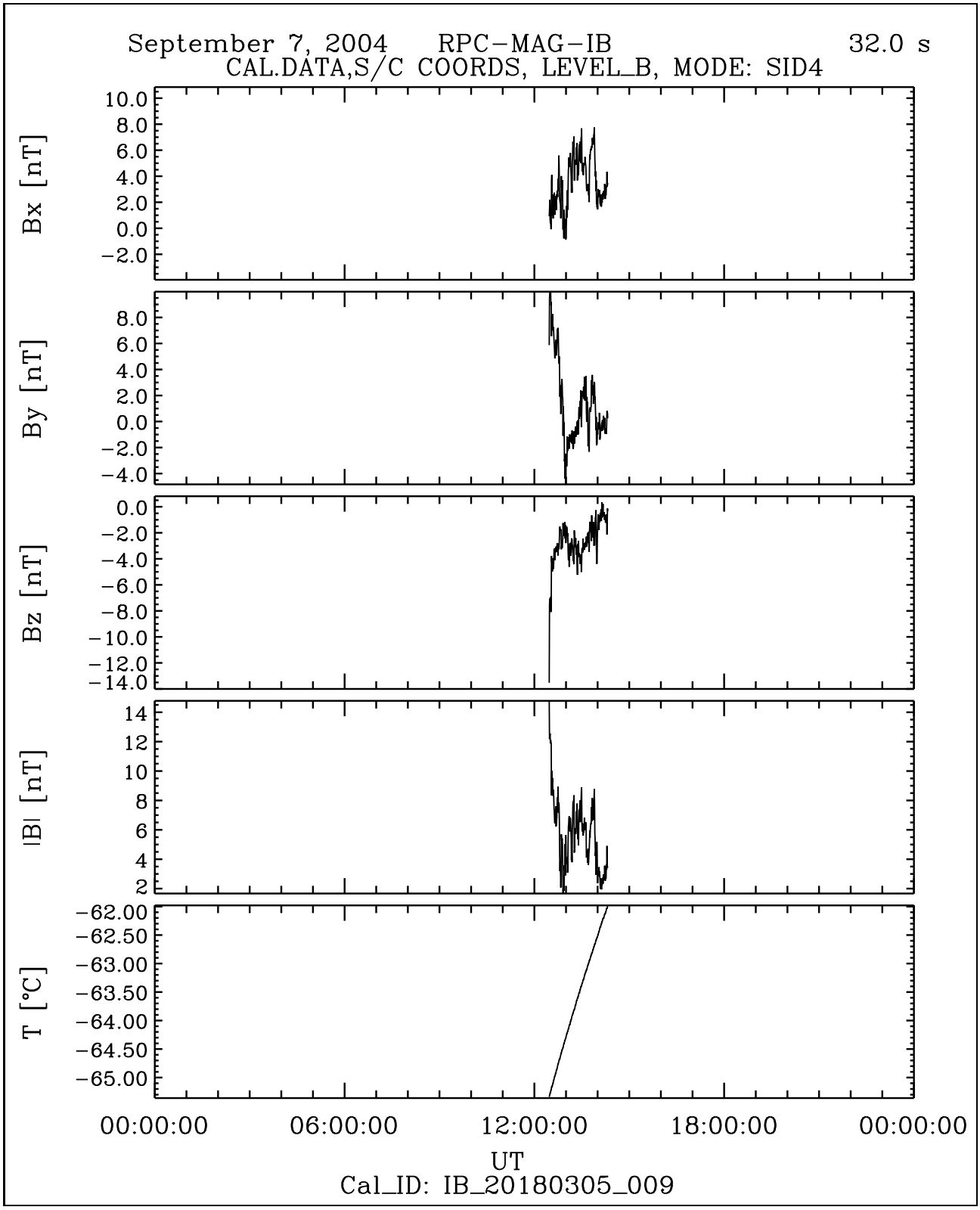

Figure 17: File: RPCMAG040907T1226_CLB_IB_M4_T0000_2400_009

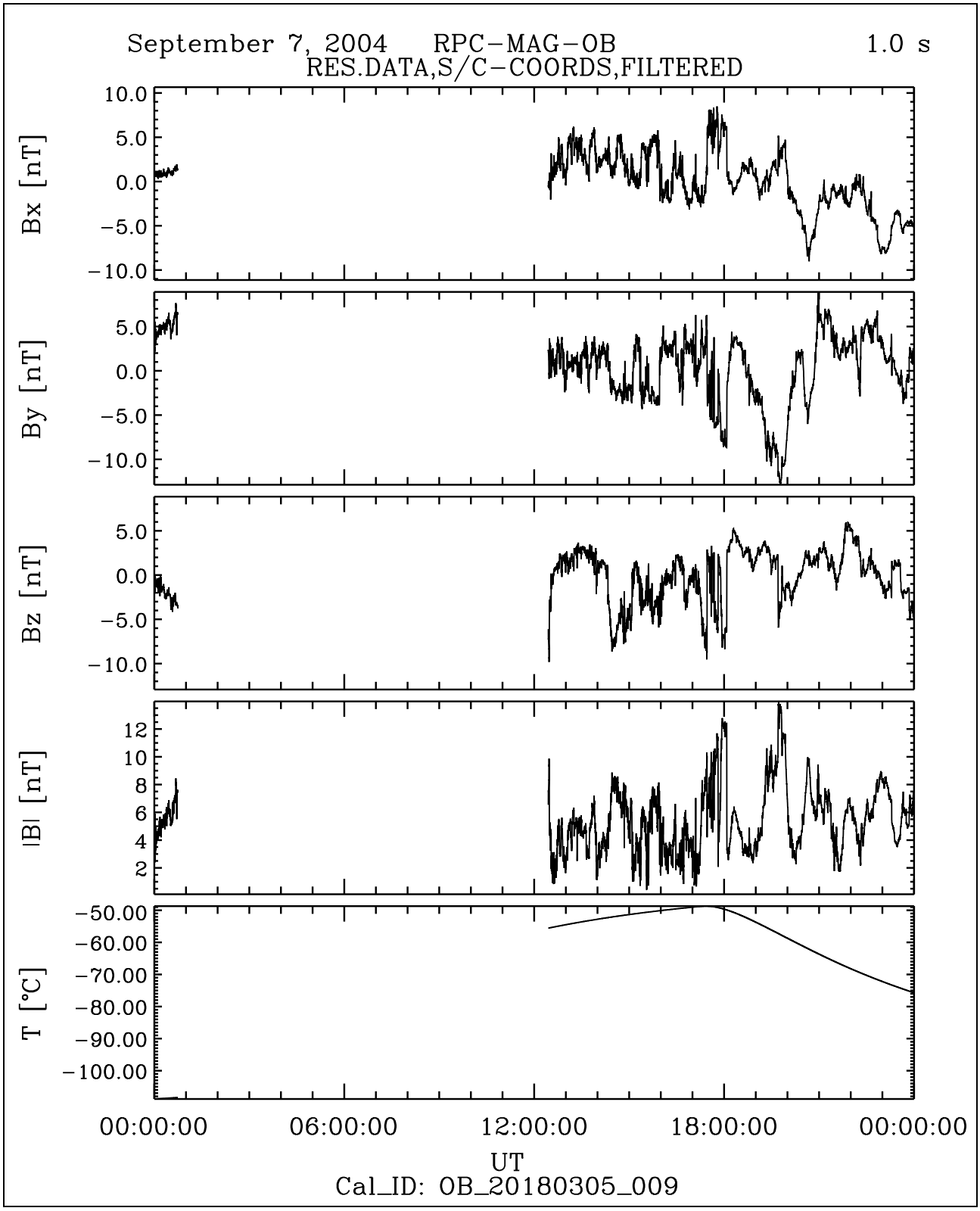

Figure 18: File: RPCMAG040907_CLF_OB_A1_T0000_2400_009

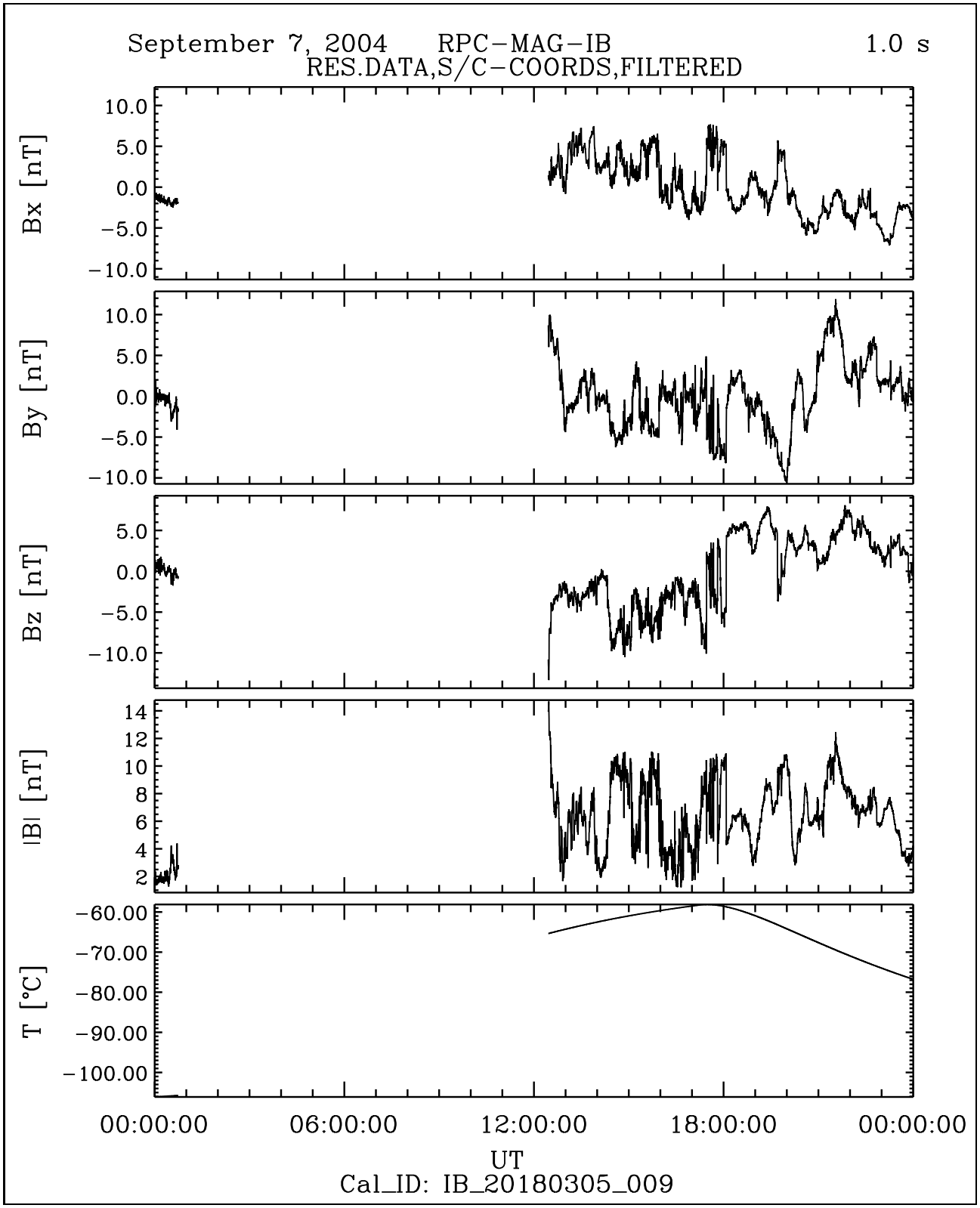

Figure 19: File: RPCMAG040907_CLF_IB_A1_T0000_2400_009

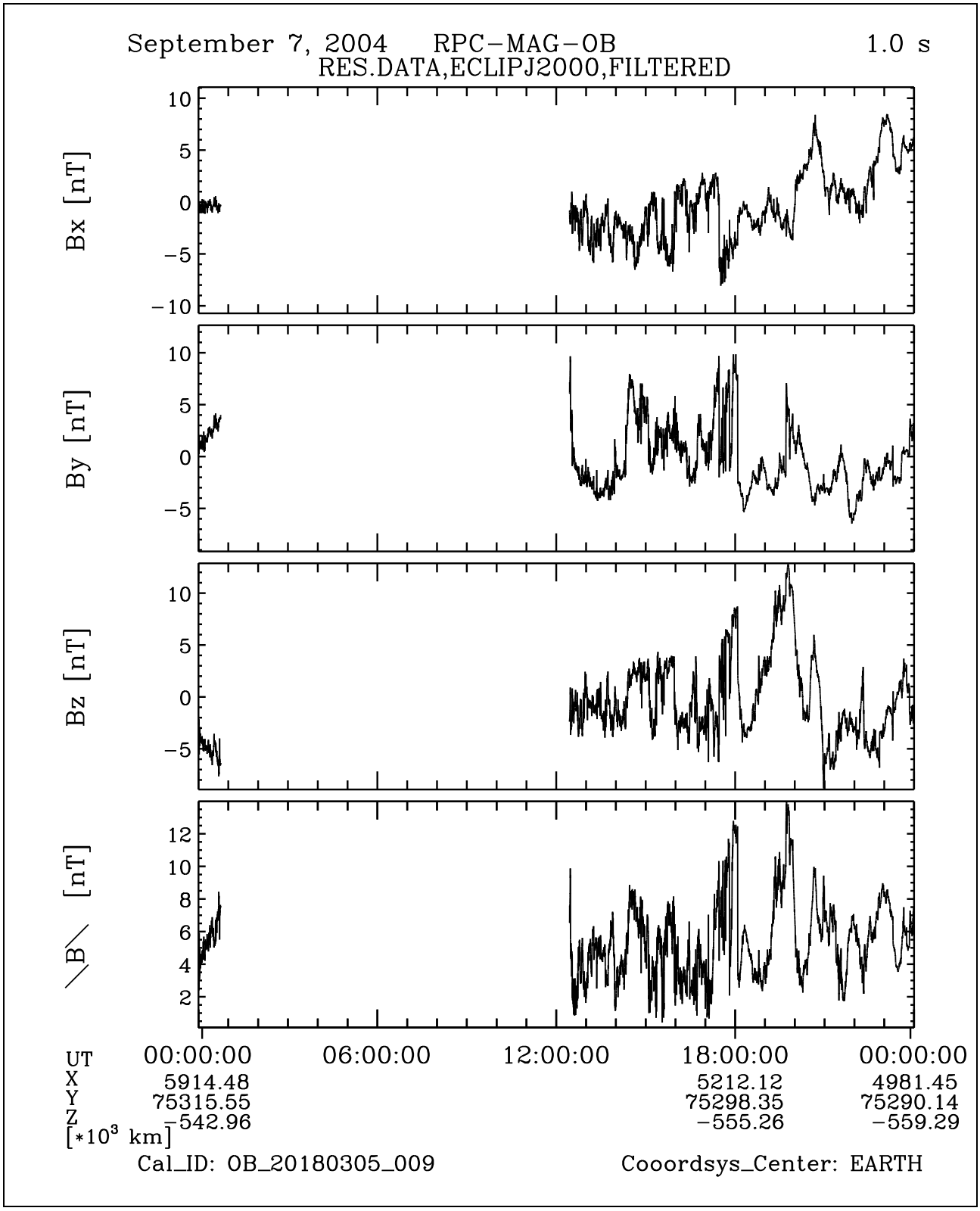

Figure 20: File: RPCMAG040907_CLG_OB_A1_T0000_2400_009

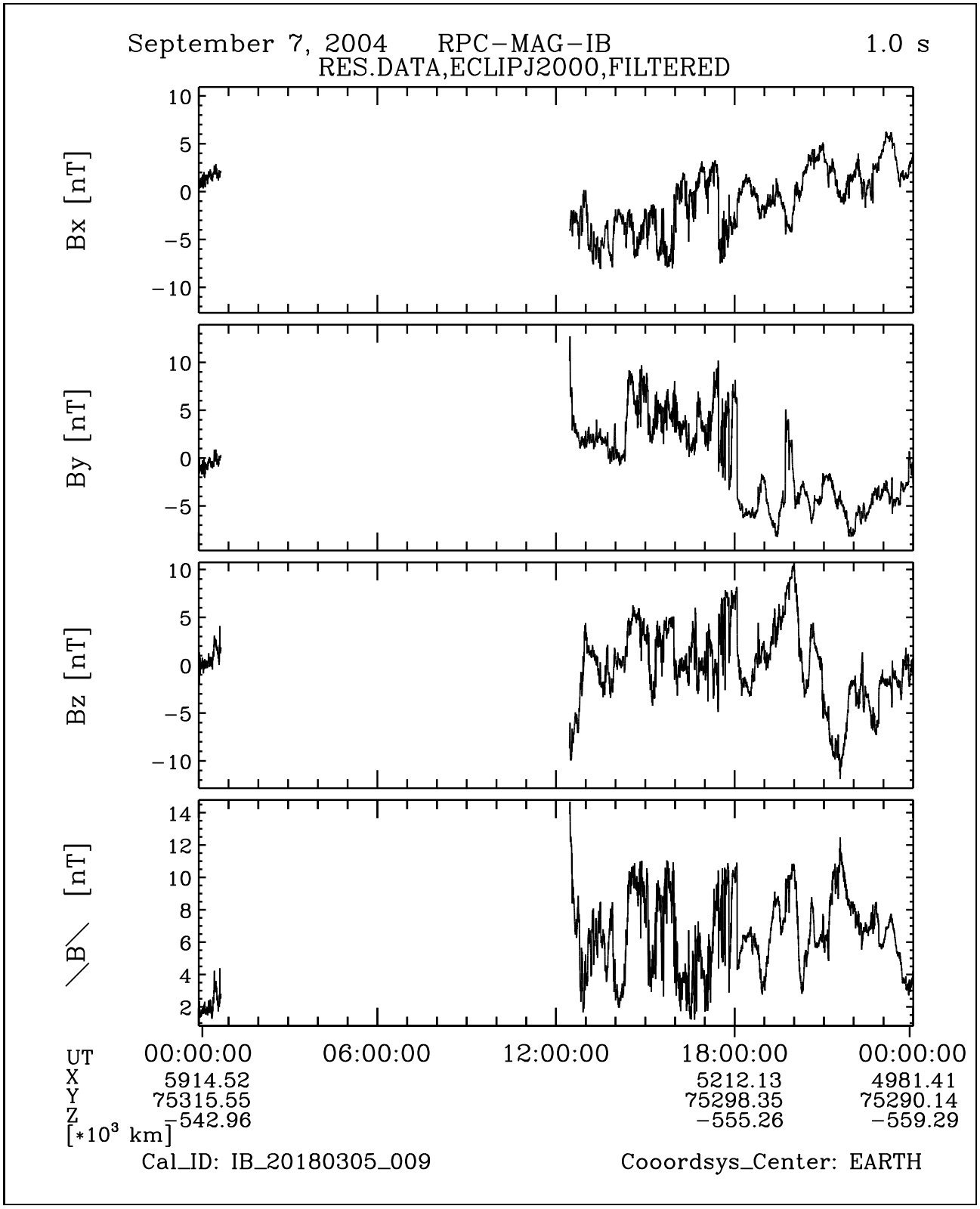

Figure 21: File: RPCMAG040907_CLG_IB_A1_T0000_2400_009

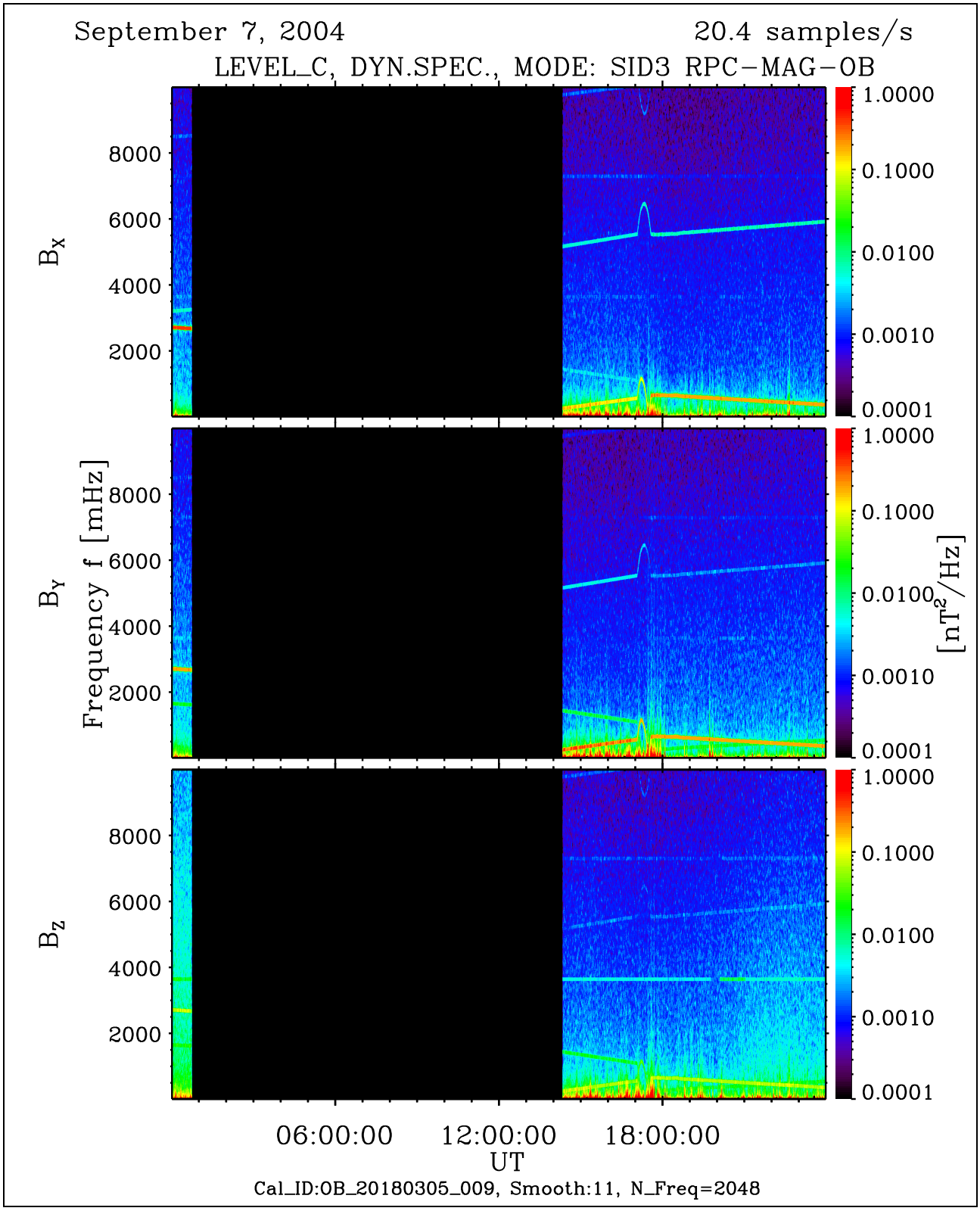

Figure 22: File: RPCMAG040907_CLC_OB_M3_DS0_10000_009

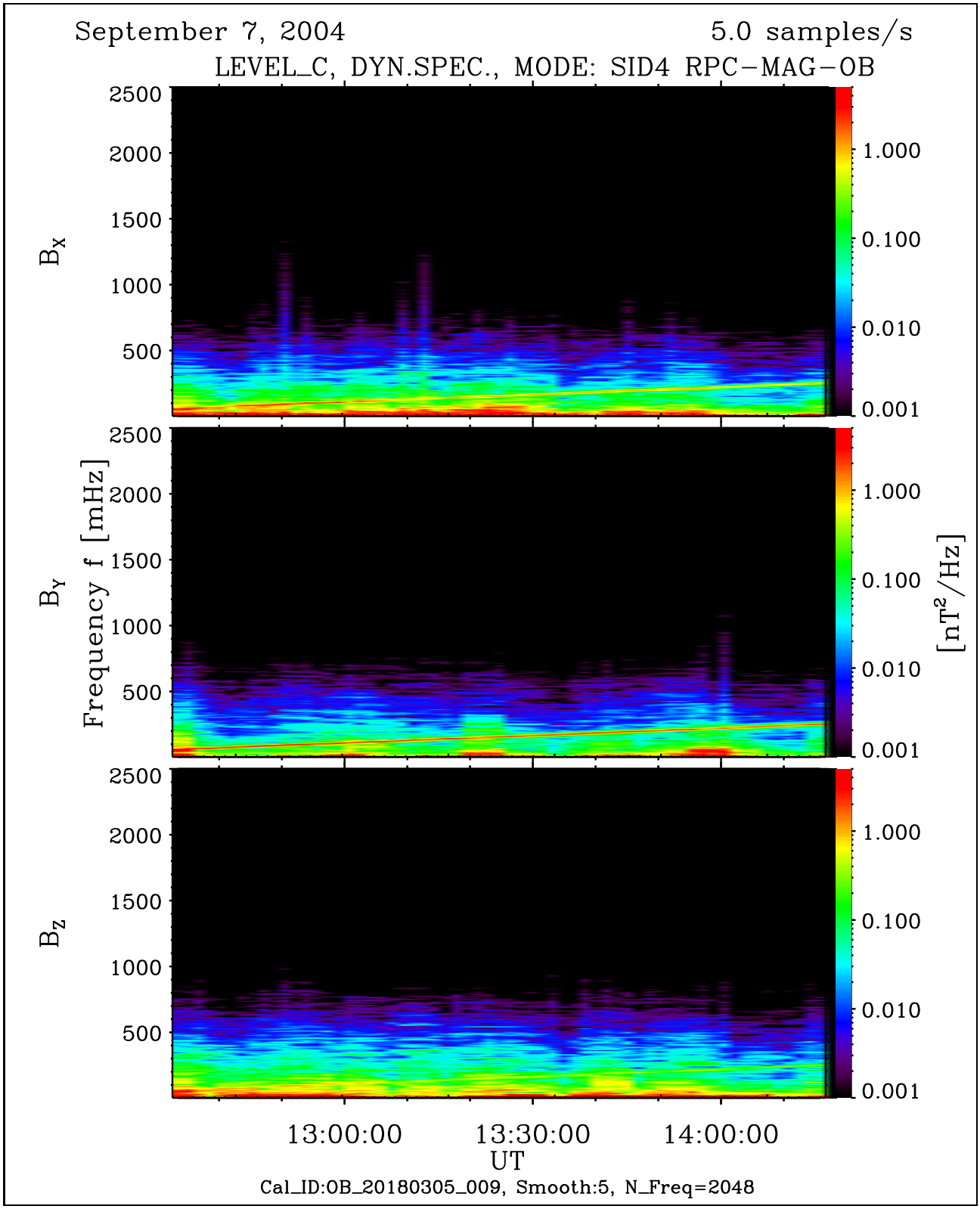

Figure 23: File: RPCMAG040907T1226_CLC_OB_M4_DS0_10000_009

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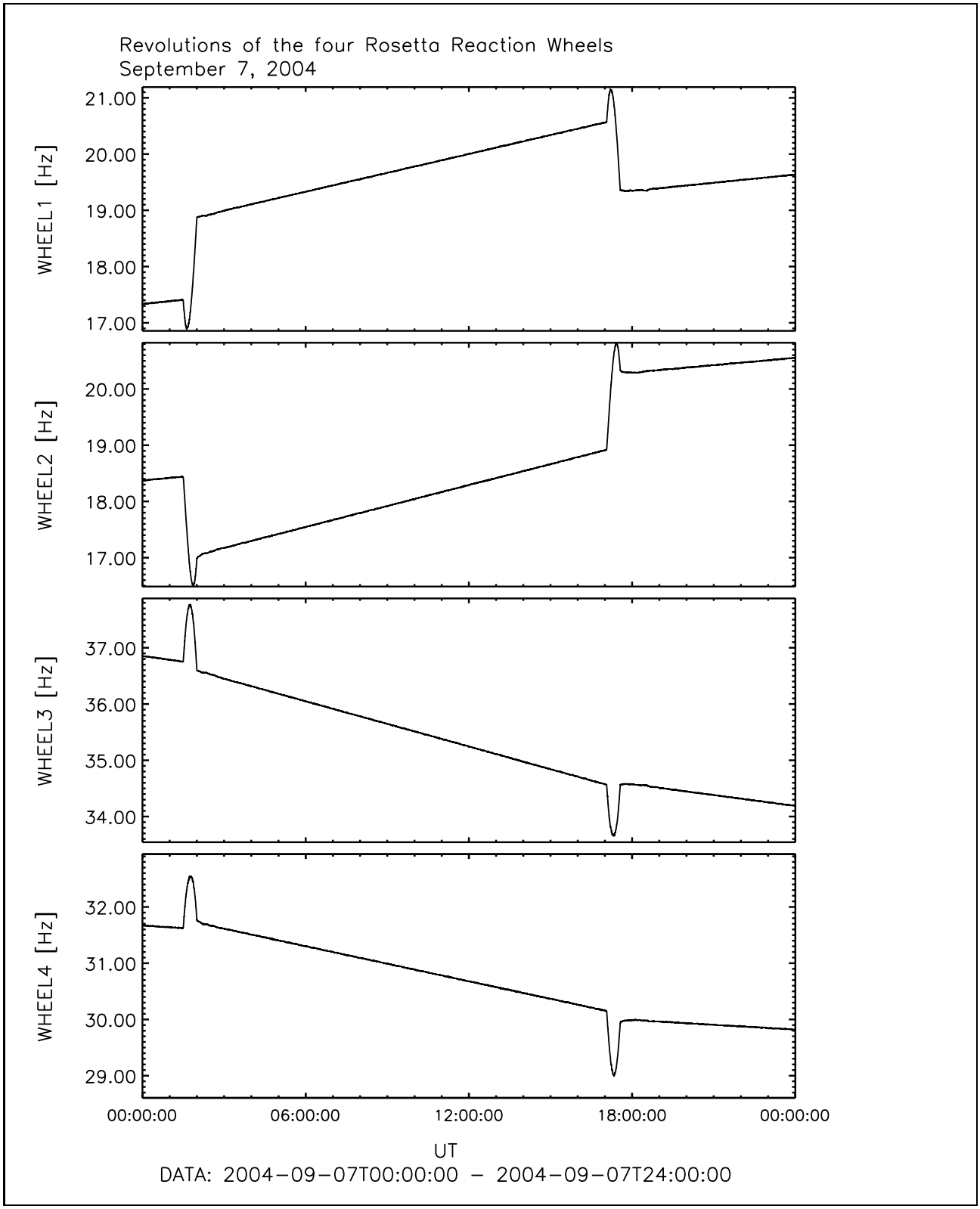

Figure 24: File: wheels_Hz2004-09-07T00-00

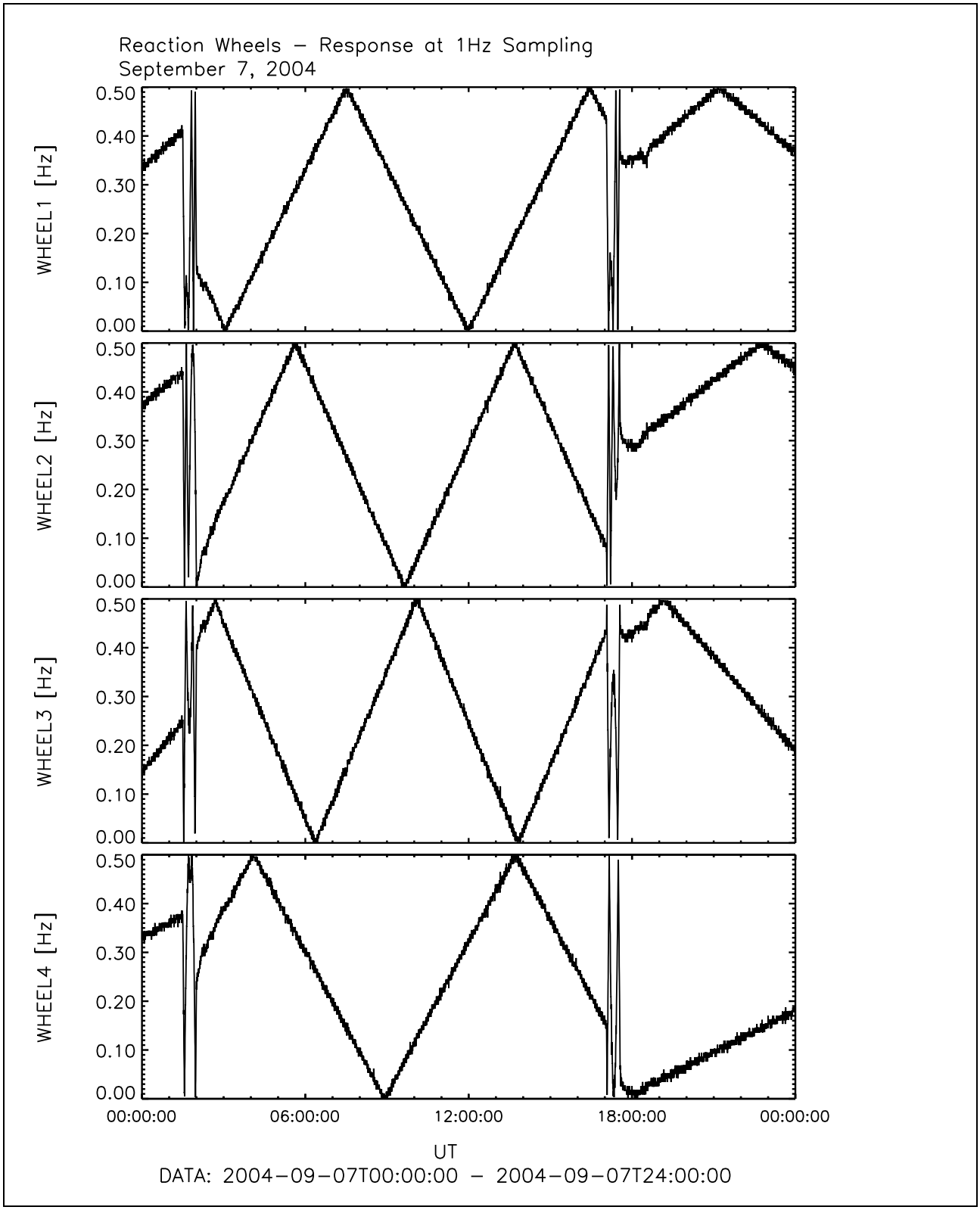

Figure 25: File: wheels_1Hz_Sampling2004-09-07T00-00

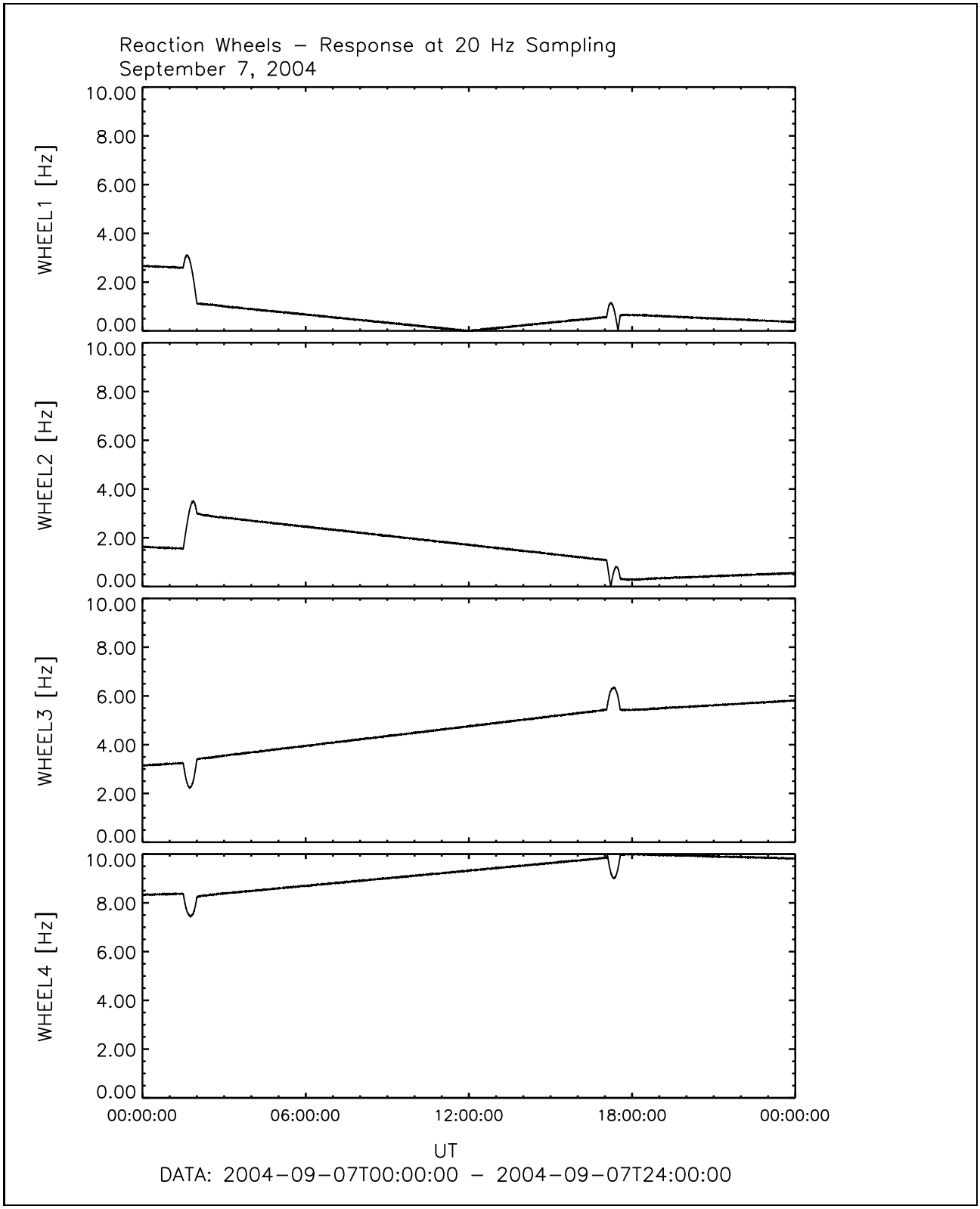

Figure 26: File: wheels_20Hz_Sampling2004-09-07T00-00

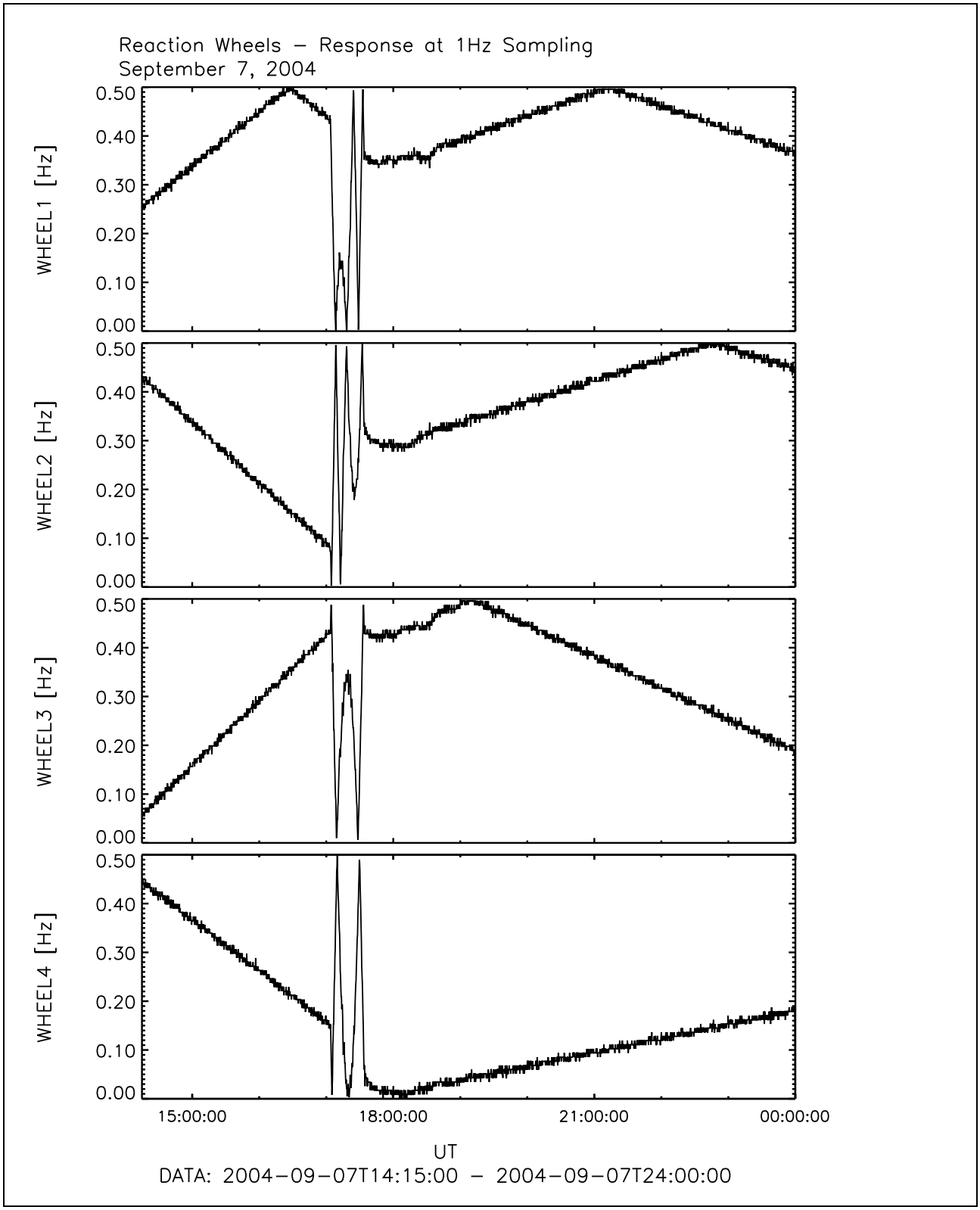

Figure 27: File: wheels_1Hz_Sampling2004-09-07T14-15

3.4 Plots of Reaction Wheel and LAP Disturbance corrected Data

The following plots show the dynamic spectra of the LEVEL_H data. These data have been purged from ROSETTAs reaction wheel disturbance and also from the disturbance of the LAP instrument. Plots are only shown for the primary sensor.

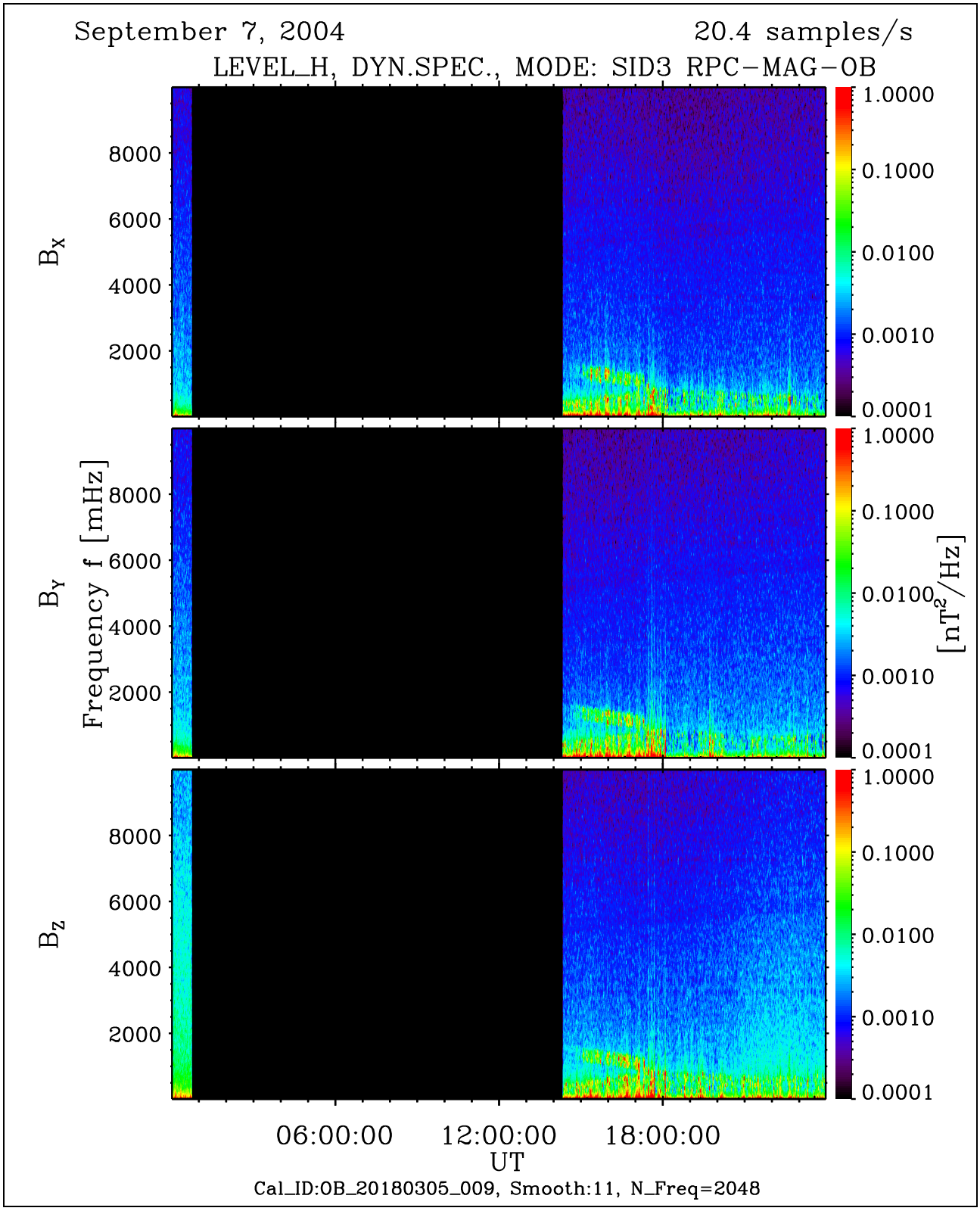

Figure 28: File: RPCMAG040907_CLH_OB_M3_DS0_10000_009

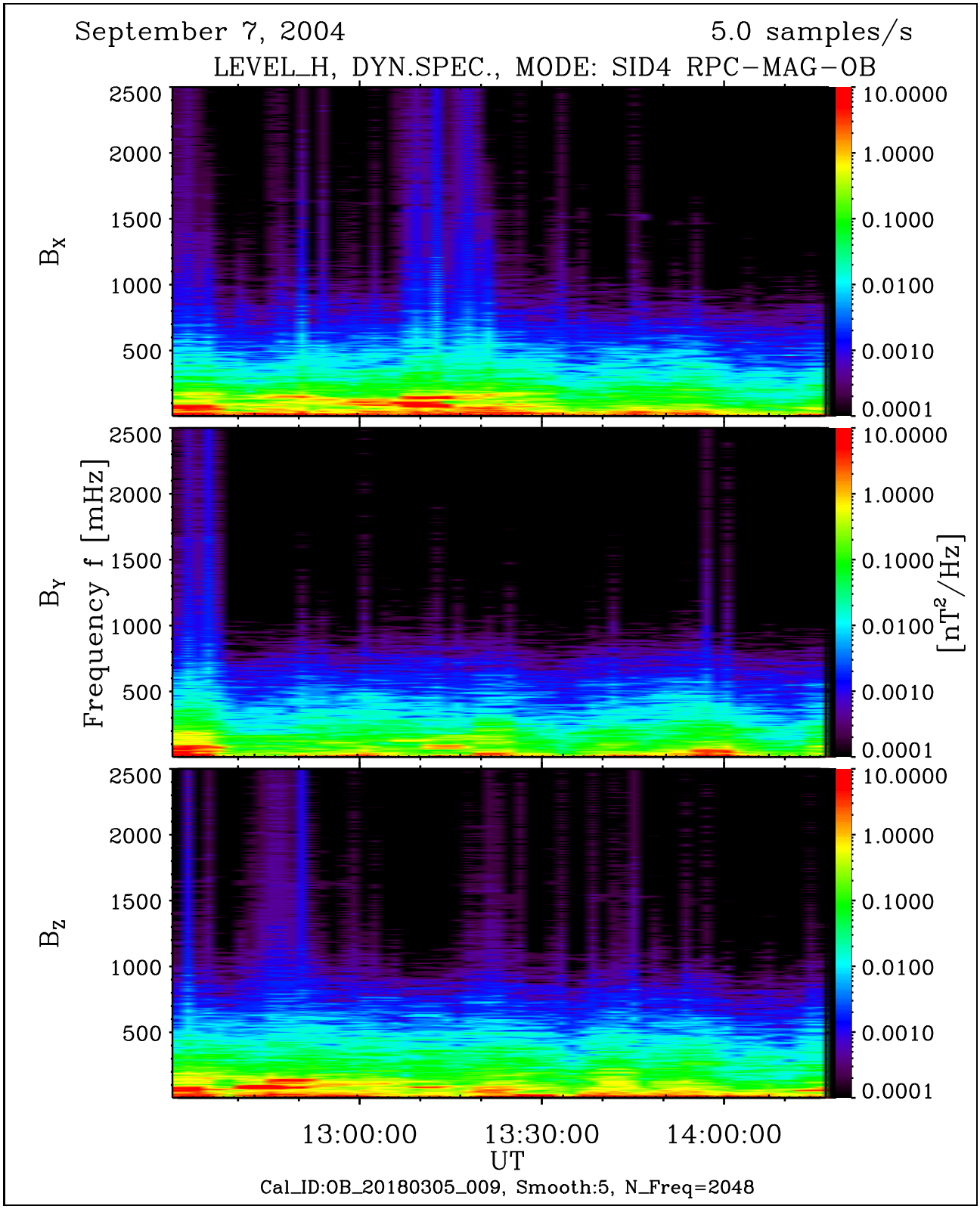

Figure 29: File: RPCMAG040907_CLH_OB_M4_DS0_10000_009

4 September 08, 2004:

4.1 Actions

Time	Stage A, Stage B,Filter cfg	Stage 1, Stage 2, Stage3	Mode
00:00 – 00:44	0 0 0	0 0 0	SID3
03:58 – 14:54	0 0 0	0 0 0	SID3
14:54 – 17:48	2 0 0	2 0 0	SID4
17:48 – 19:07	0 0 0	0 0 0	SID3
19:07 – 22:02	1 2 0	1 2 0	SID2
22:03 – 23:56	0 0 0	0 0 0	SID3
23:56 – 24:00	2 0 0	2 0 0	SID4

4.2 Plots of Calibrated Data using the new Temperature Model

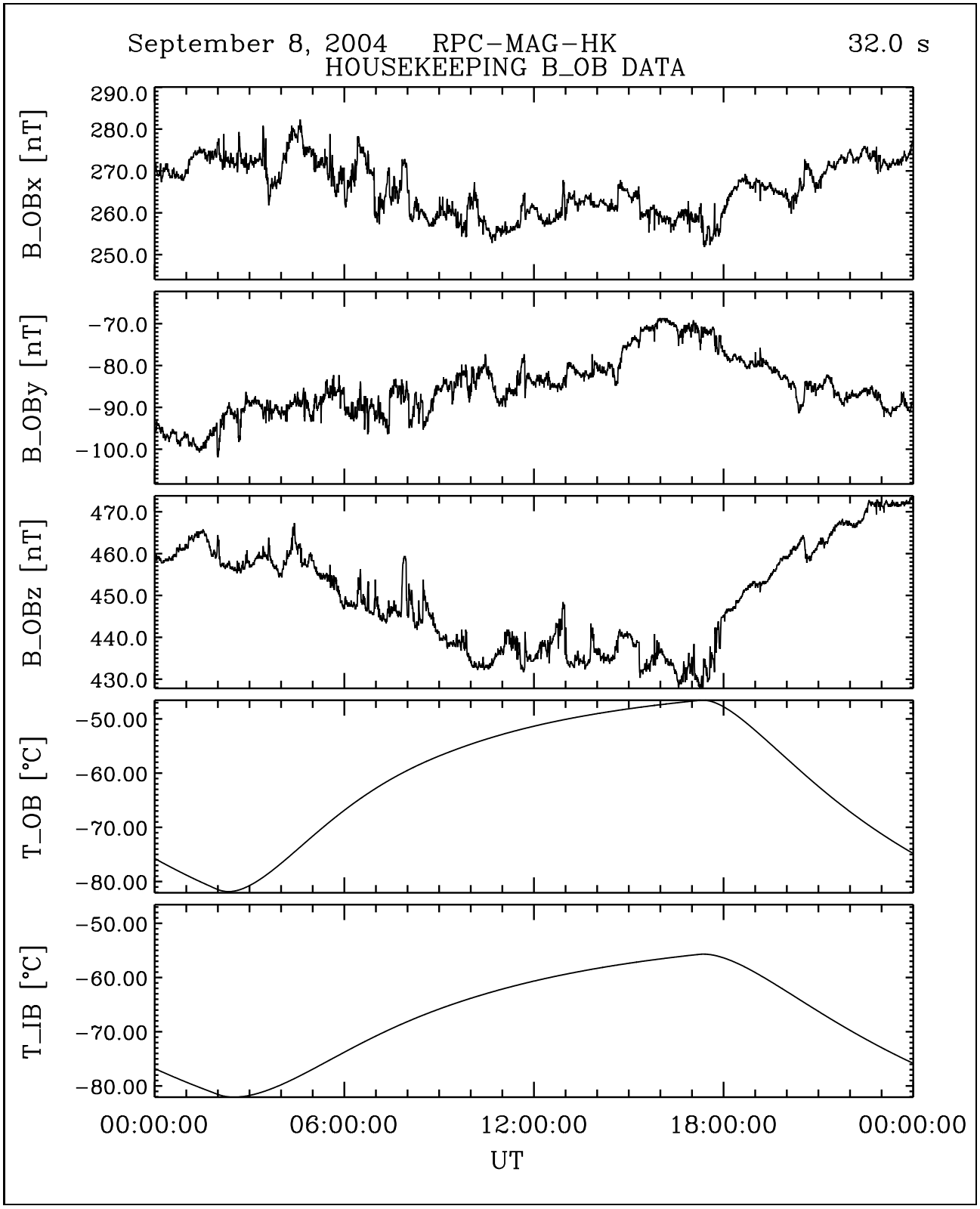

Figure 30: File: RPCMAG040908T0000_CLA_HK_B_P0000_2400

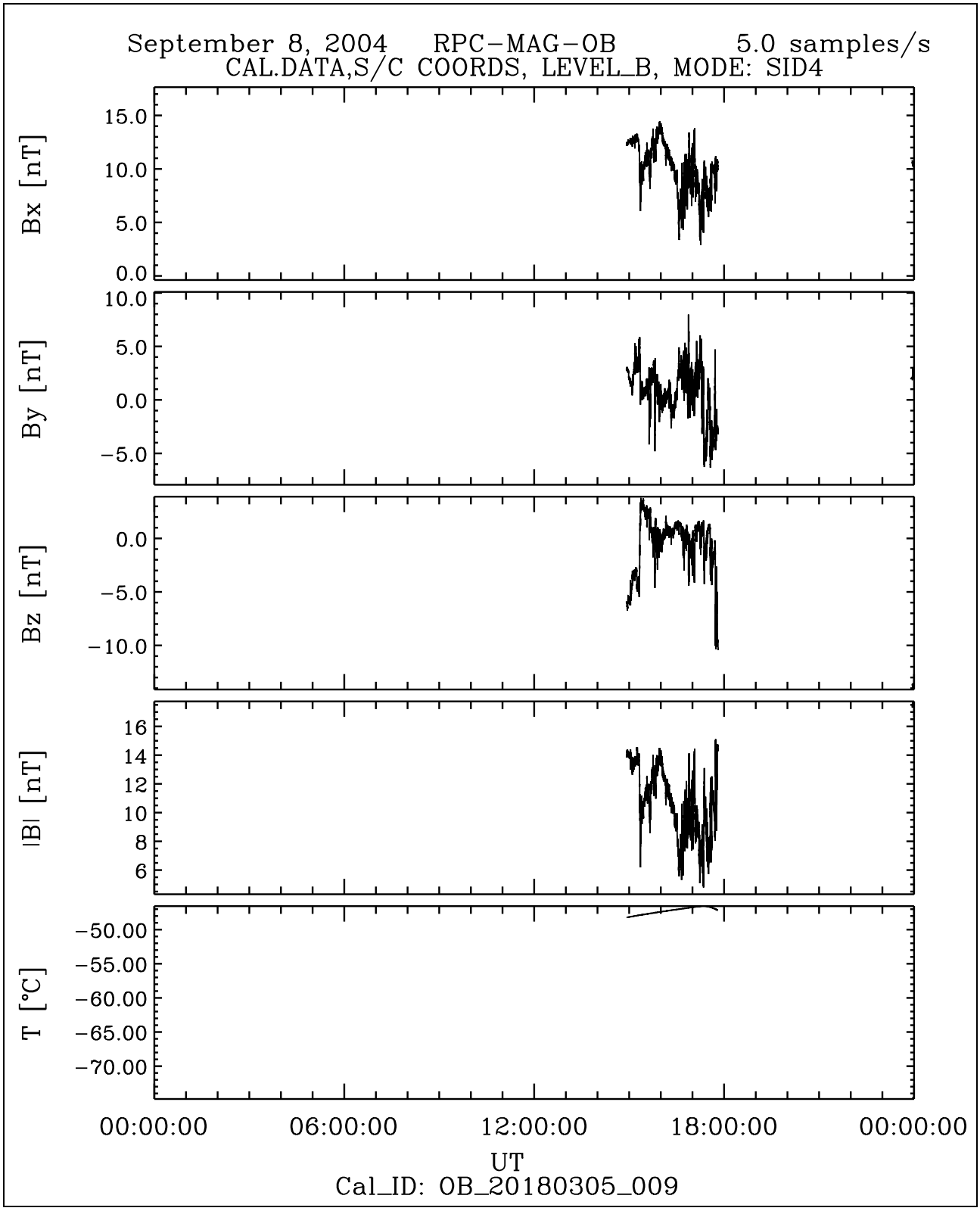

Figure 31: File: RPCMAG040908T1454_CLB_OB_M4_T0000_2400_009

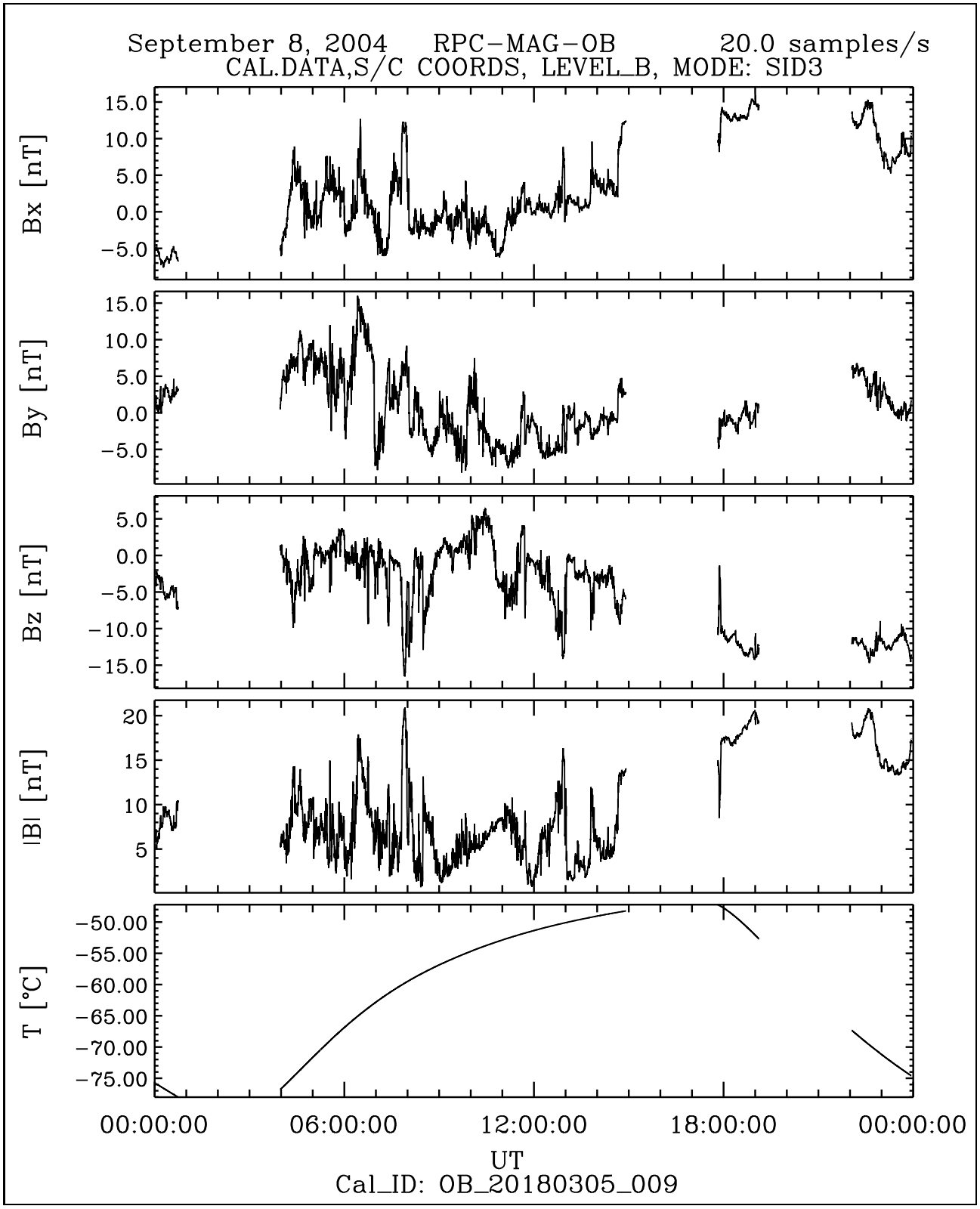

Figure 32: File: RPCMAG040908T0000_CLB_OB_M3_T0000_2400_009

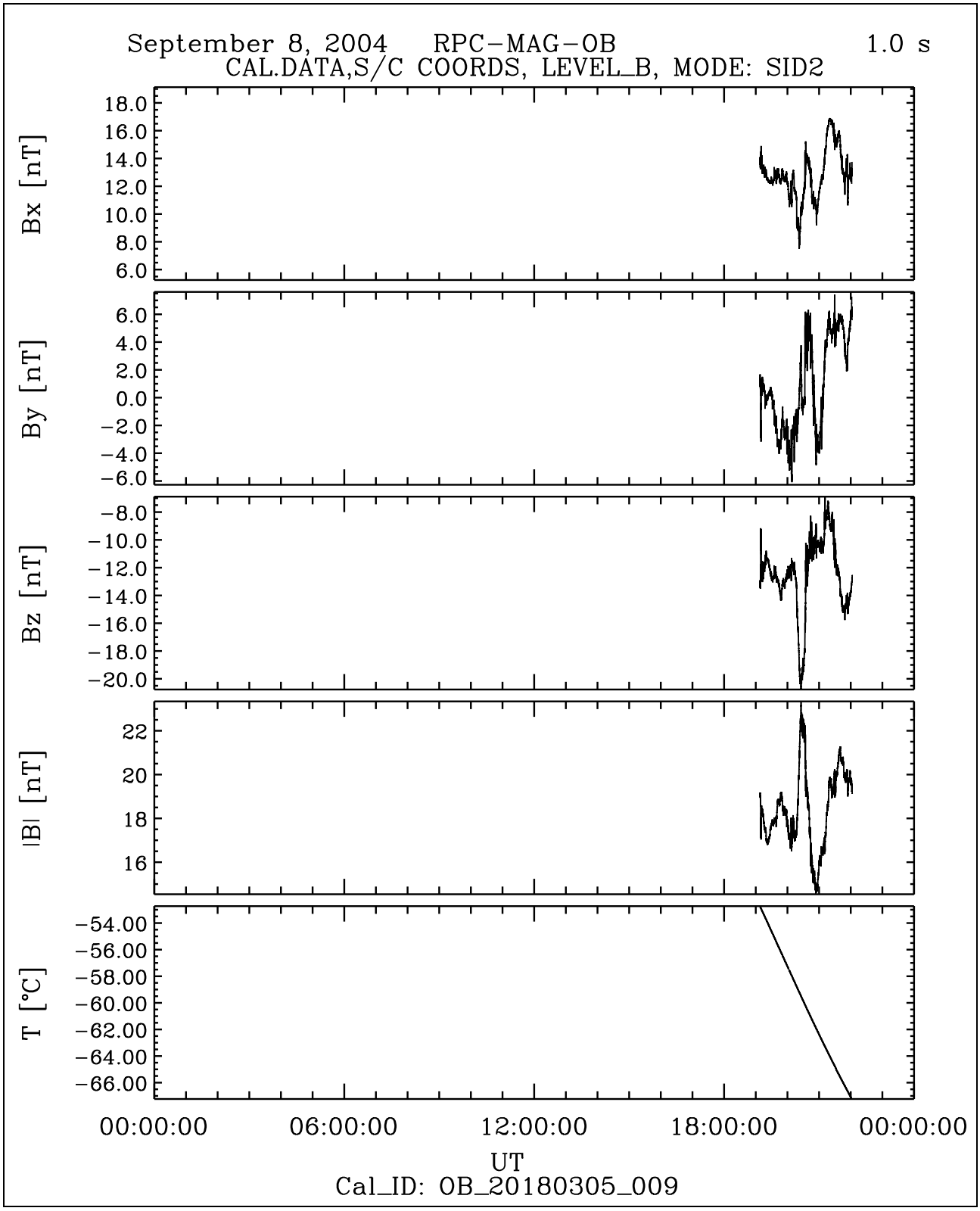

Figure 33: File: RPCMAG040908T1907_CLB_OB_M2_T0000_2400_009

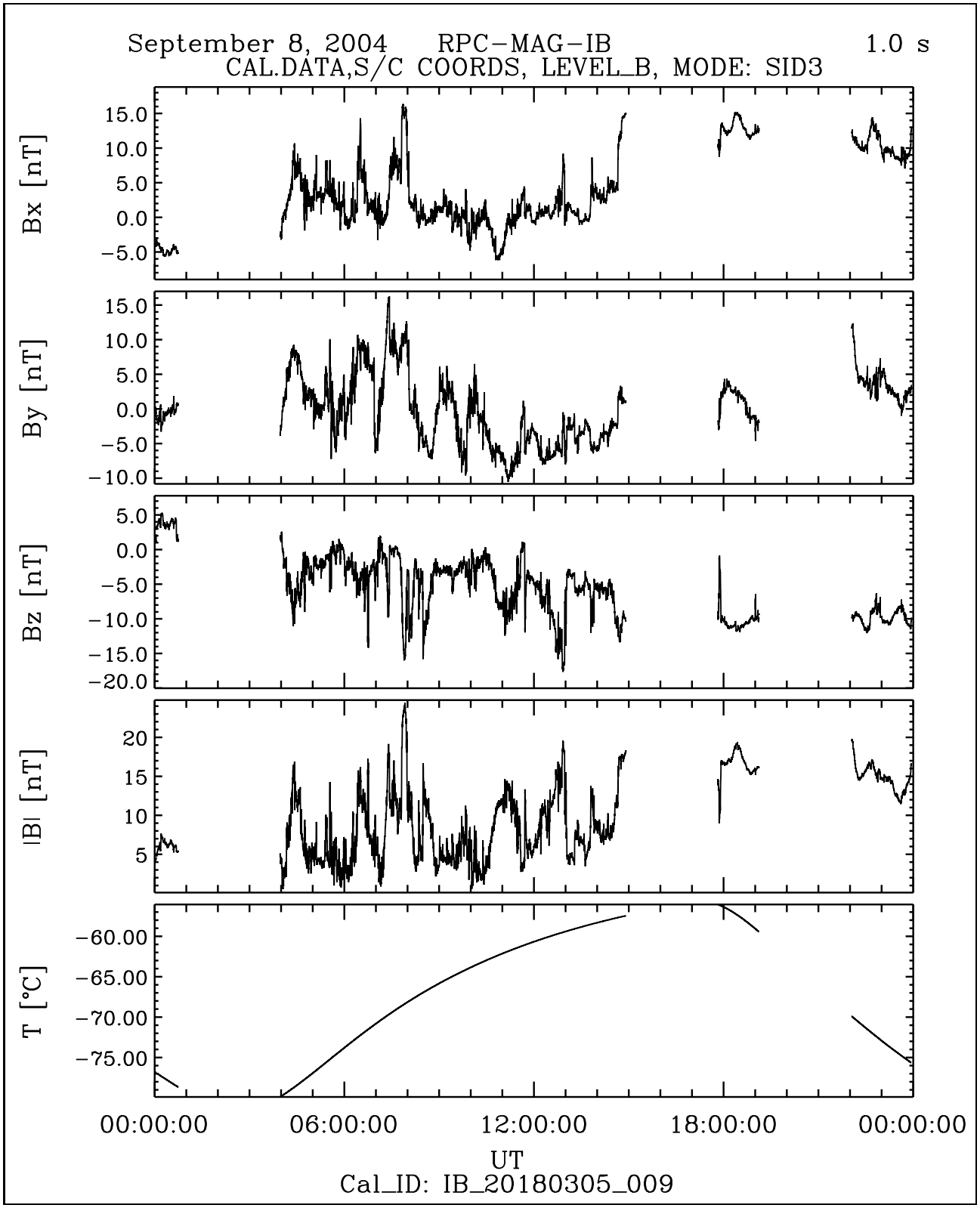

Figure 34: File: RPCMAG040908T0000_CLB_IB_M3_T0000_2400_009

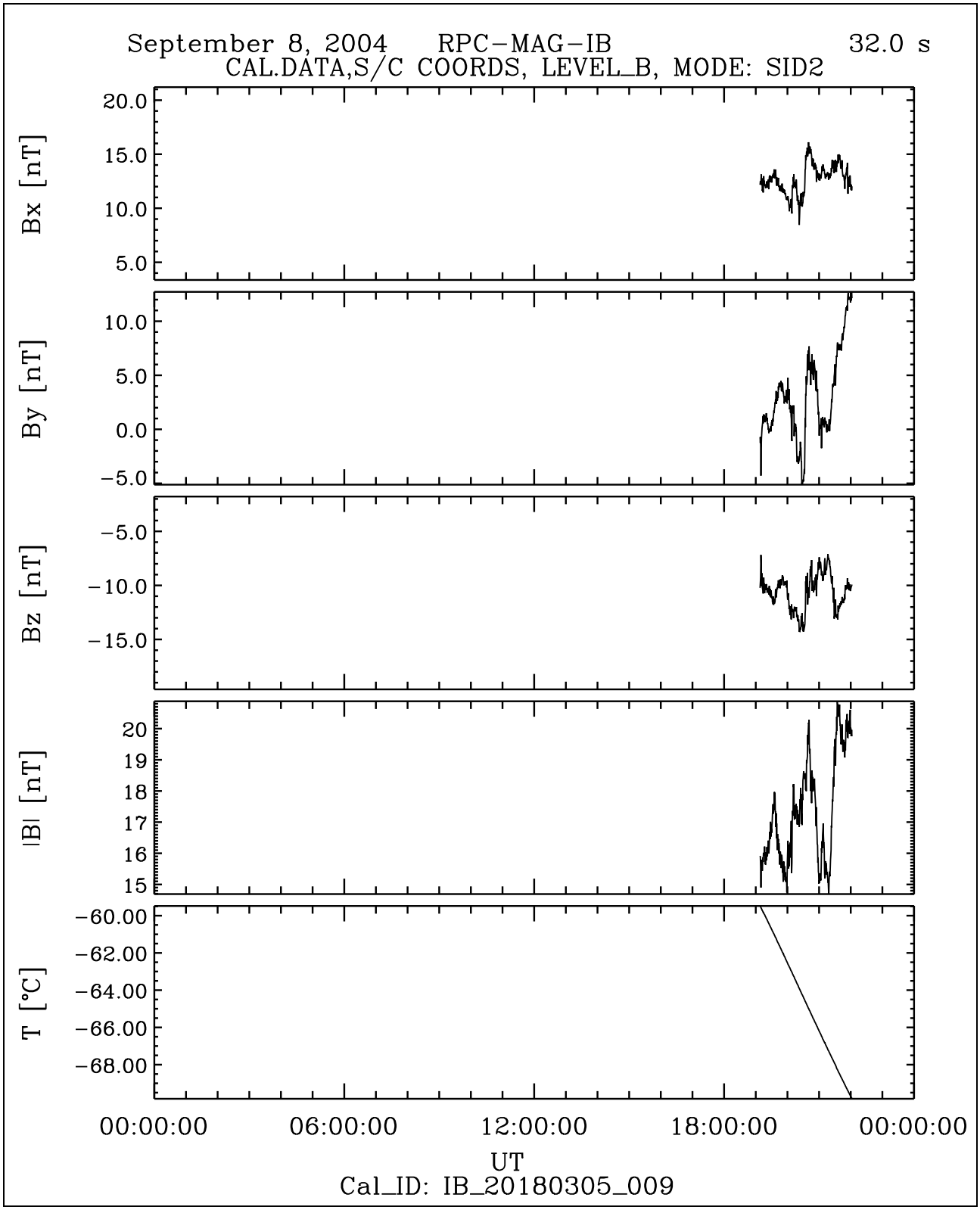

Figure 35: File: RPCMAG040908T1907_CLB_IB_M2_T0000_2400_009

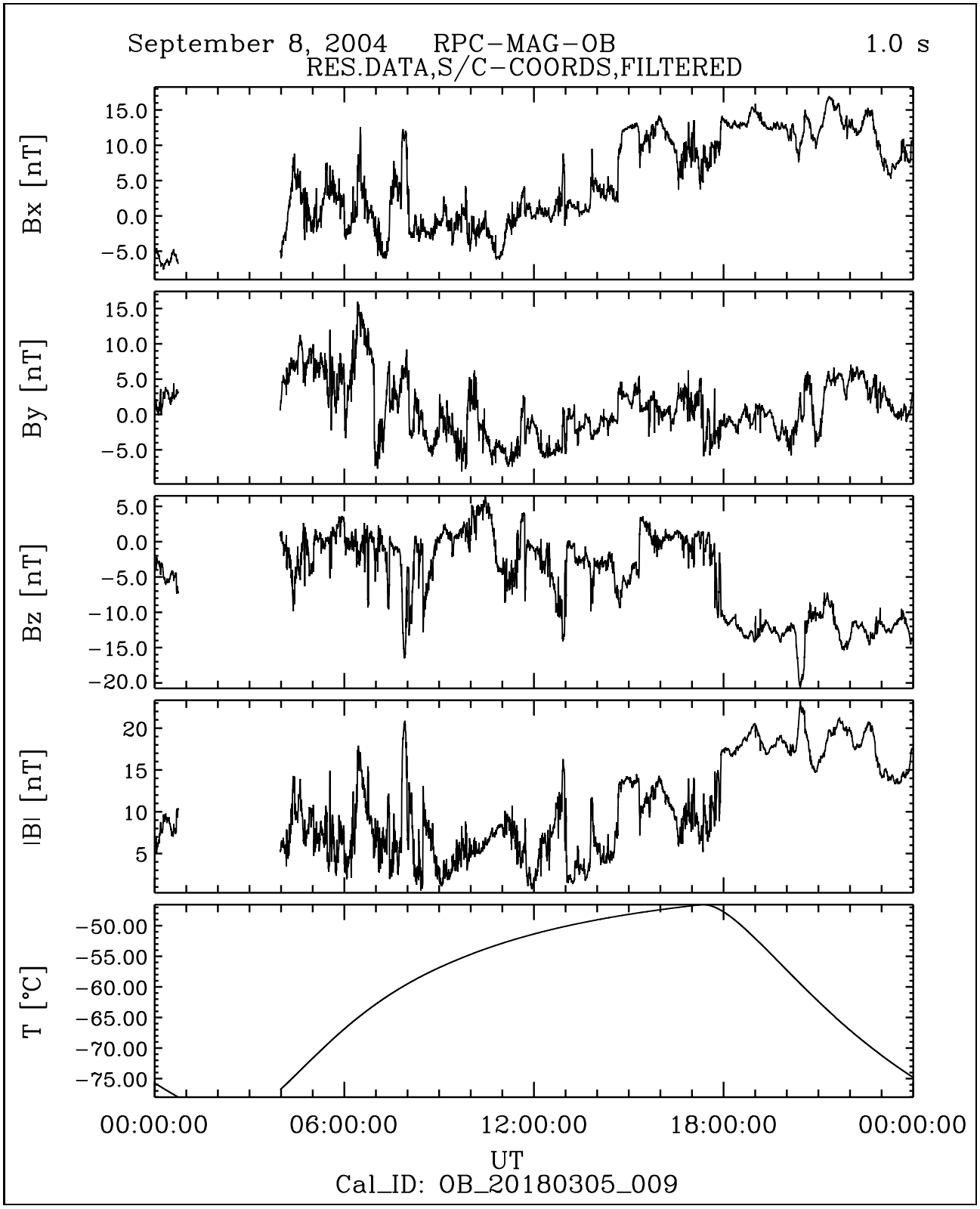

Figure 36: File: RPCMAG040908_CLF_OB_A1_T0000_2400_009

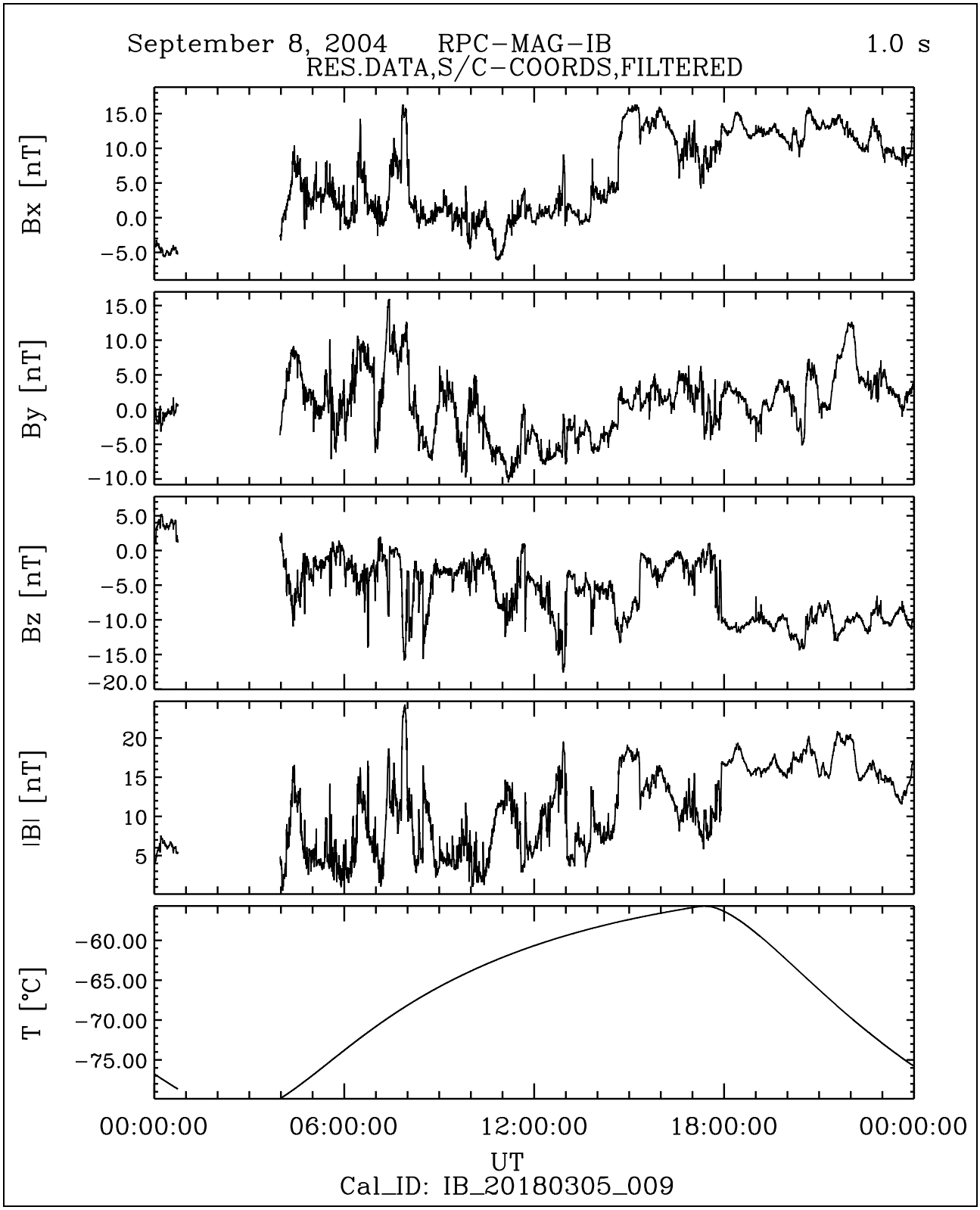

Figure 37: File: RPCMAG040908_CLF_IB_A1_T0000_2400_009

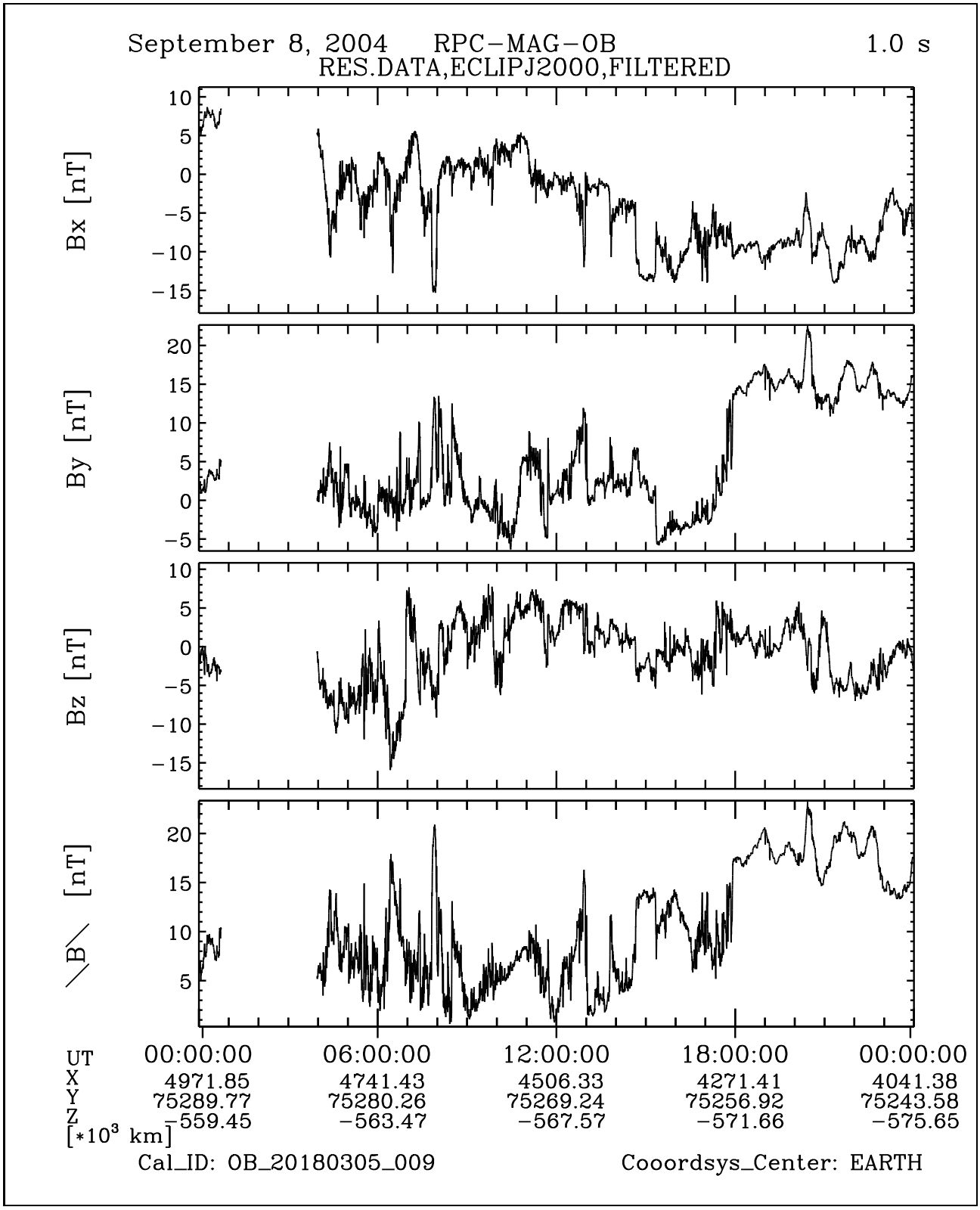

Figure 38: File: RPCMAG040908_CLG_OB_A1_T0000_2400_009

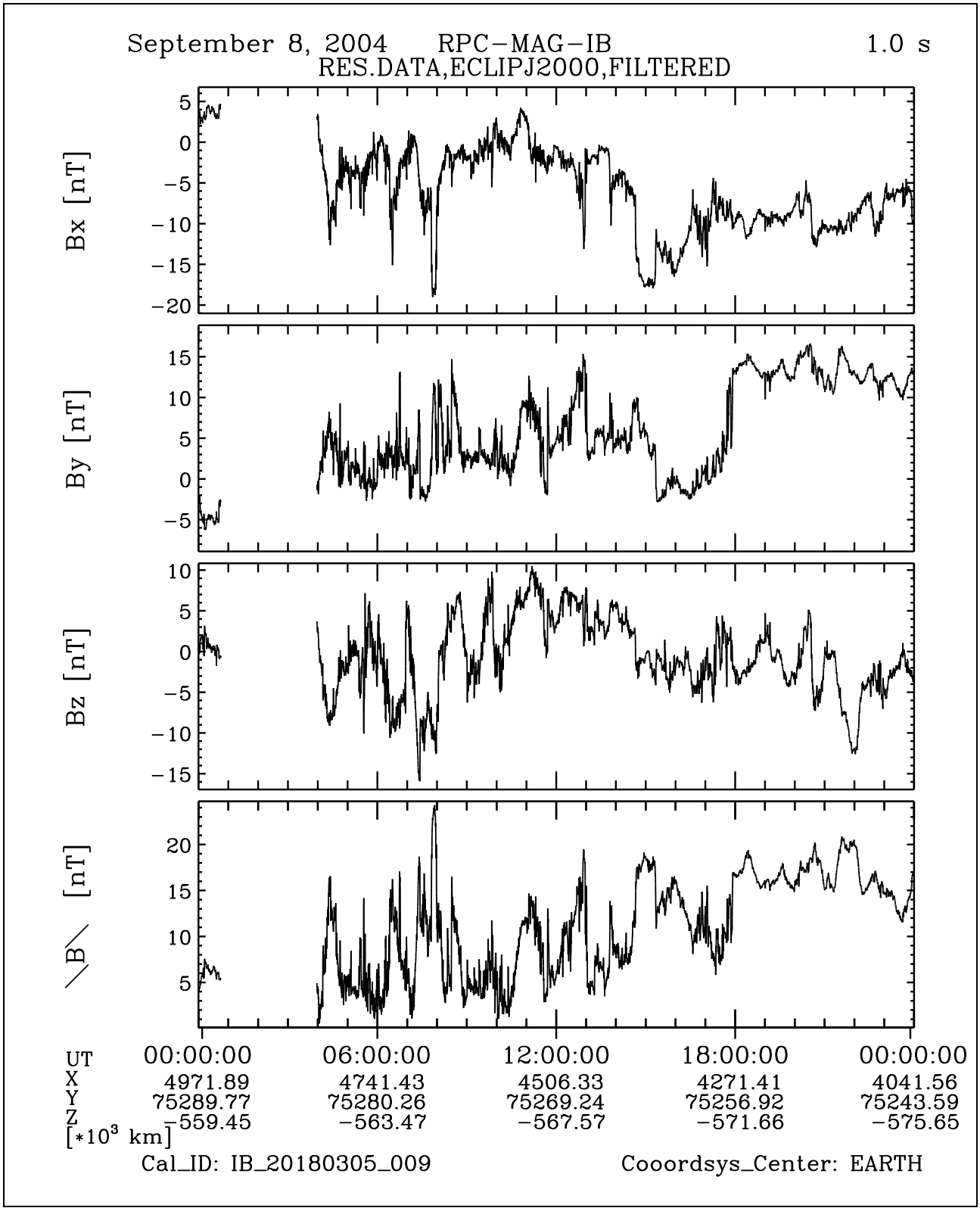

Figure 39: File: RPCMAG040908_CLG_IB_A1_T0000_2400_009

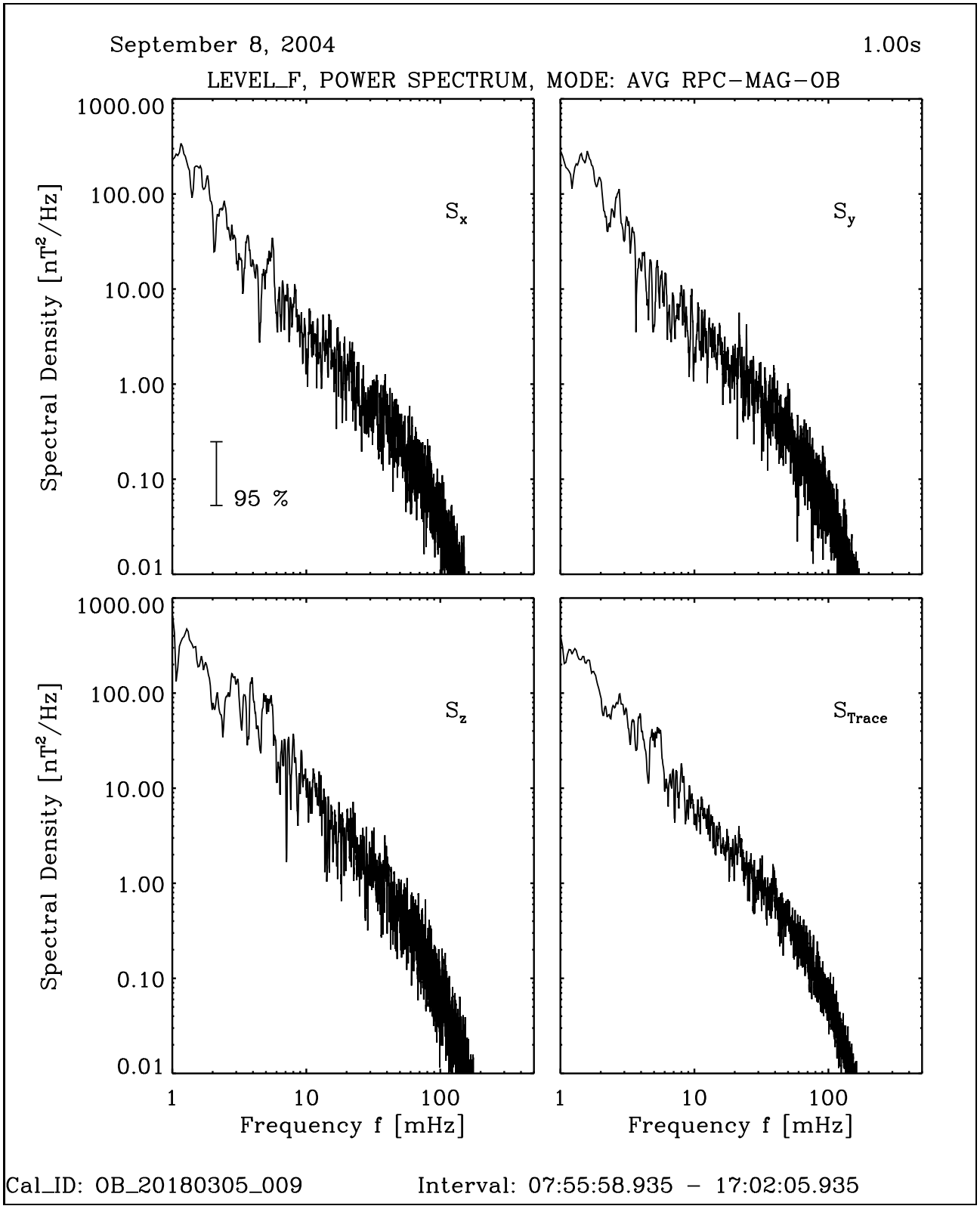

Figure 40: File: RPCMAG040908_CLF_OB_A1_PS1_500_009

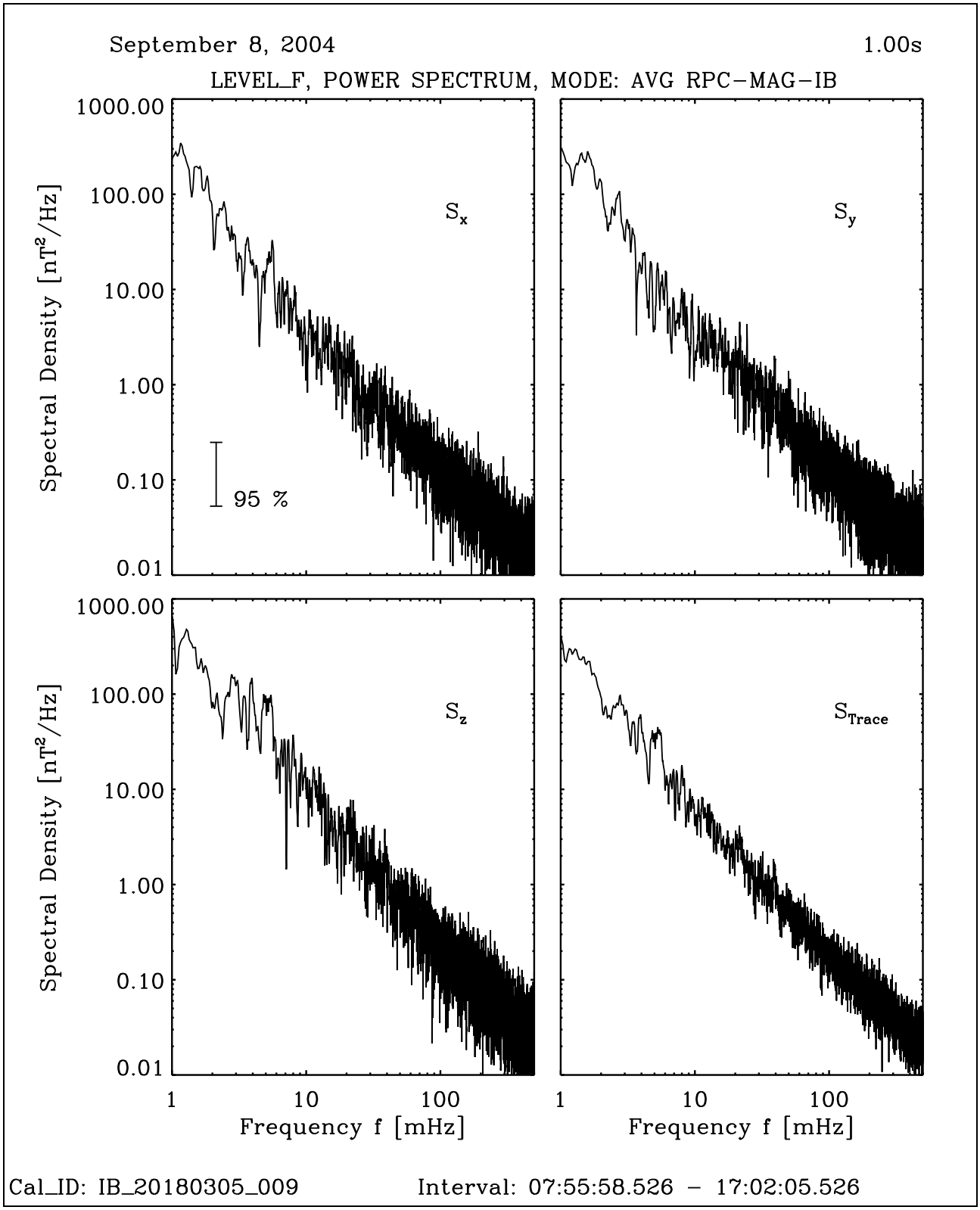

Figure 41: File: RPCMAG040908_CLF_IB_A1_PS1_500_009

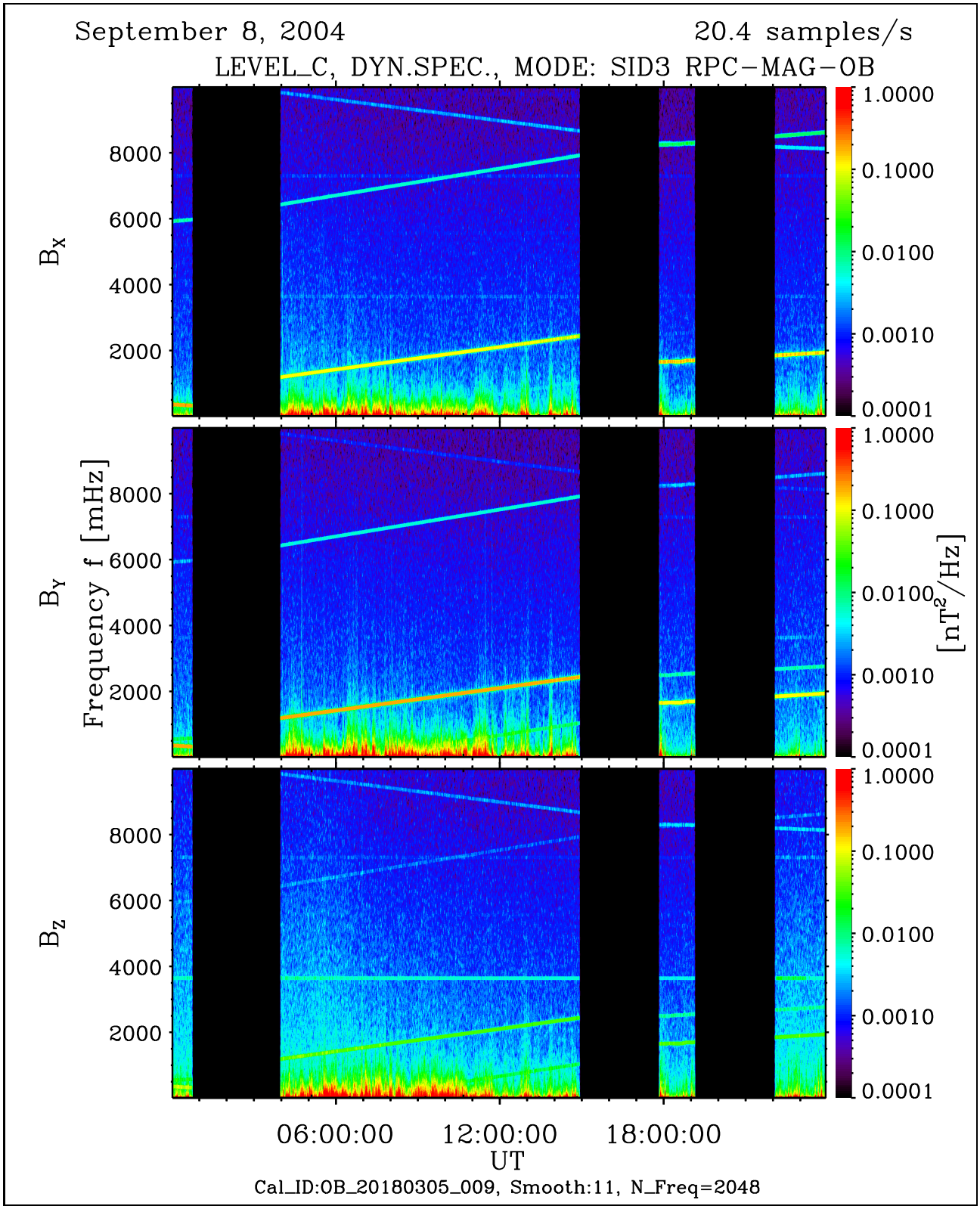

Figure 42: File: RPCMAG040908T0000_CLC_OB_M3_DS0_10000_009

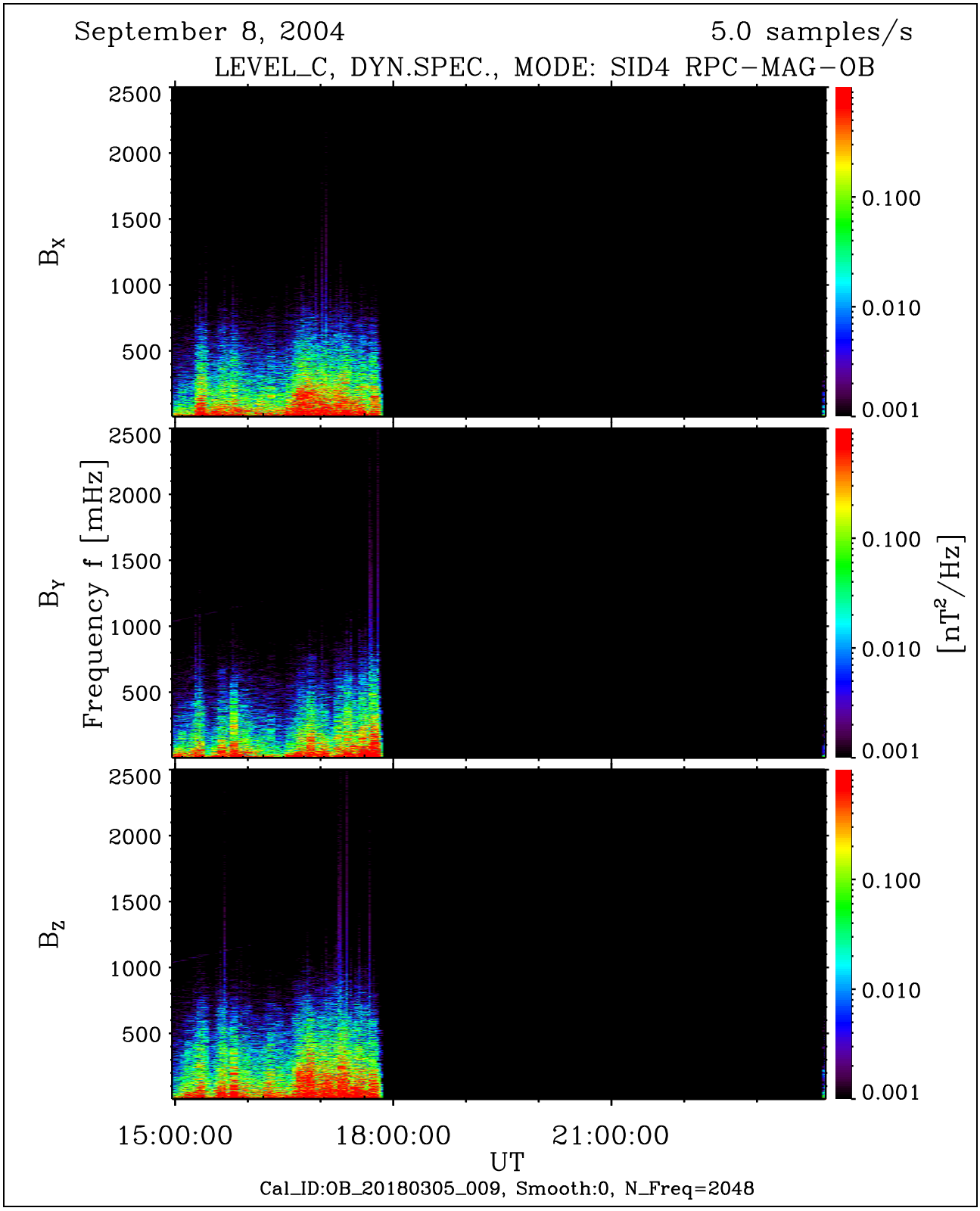

Figure 43: File: RPCMAG040908T1454_CLC_OB_M4_DS0_10000_009

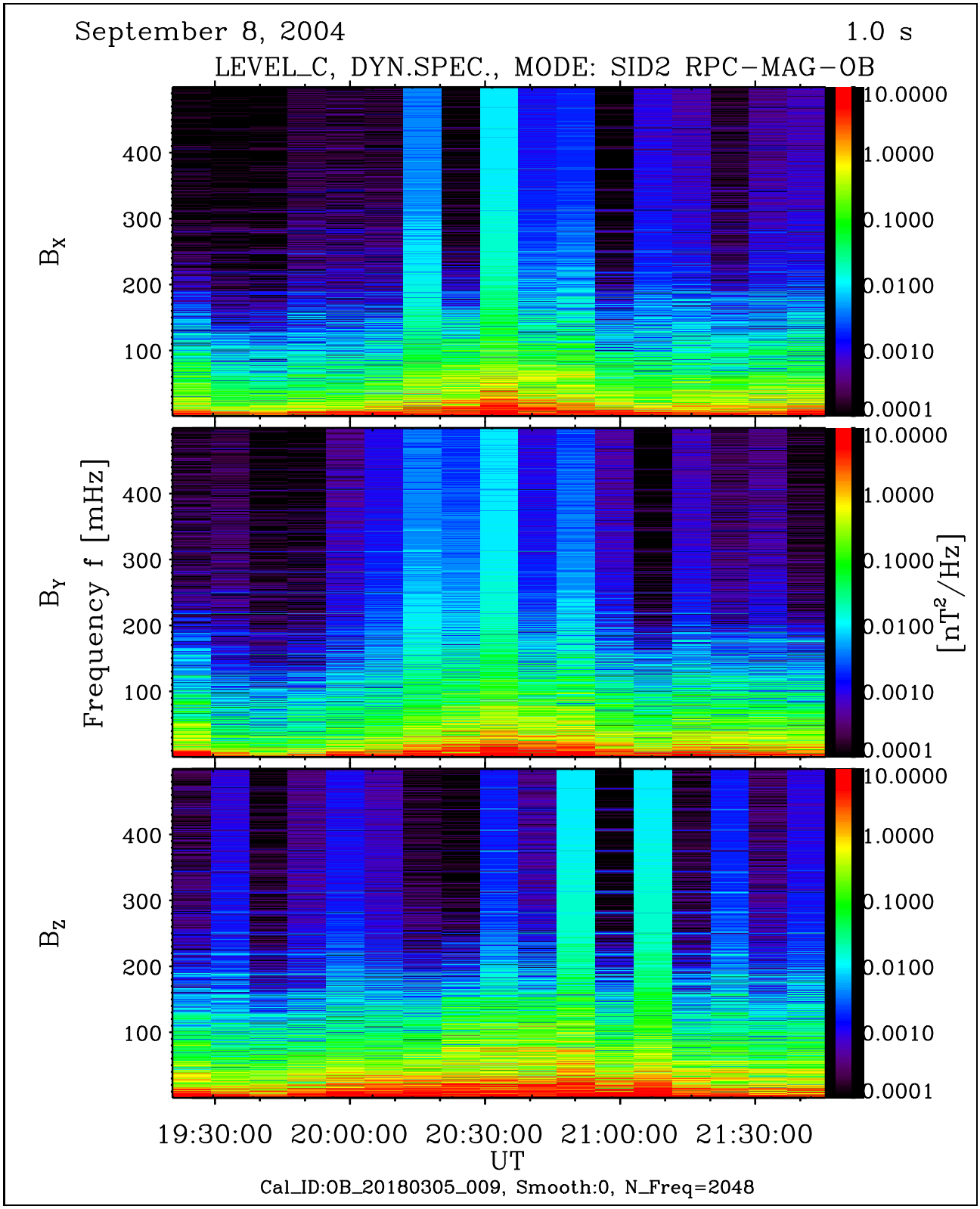

Figure 44: File: RPCMAG040908T1907_CLC_OB_M2_DS0_500_009

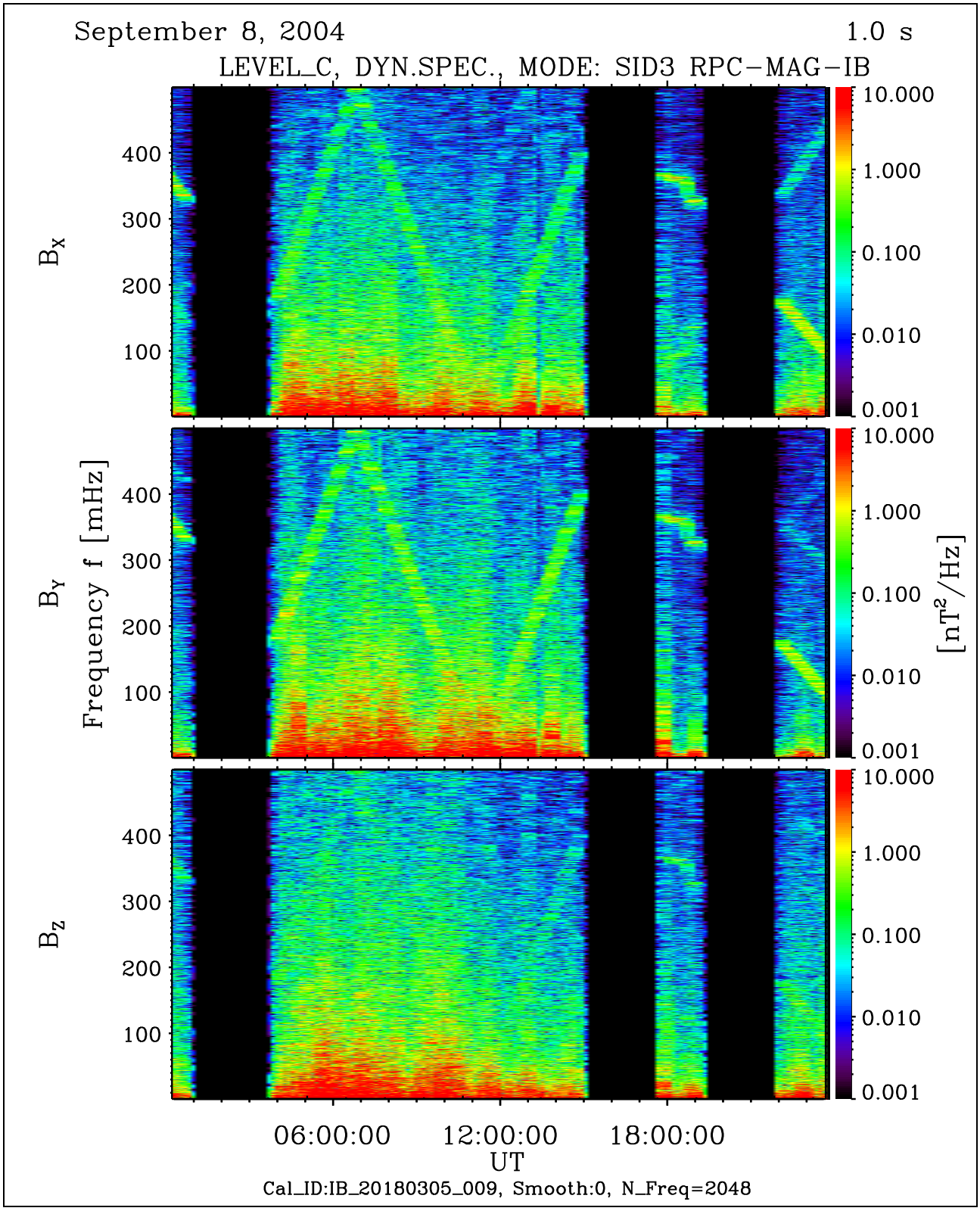

Figure 45: File: RPCMAG040908T0000_CLC_IB_M3_DS0_500_009

4.3 Plots of ROSETTA's Reaction Wheels Speeds

The following plots show the time series of the revolutions of the 4 reaction wheels. Two kinds of data are shown:

- The original reaction wheel data as they are stored in the DDS.
- The theoretical response of the wheels impact seen by an instrument sampling with different frequencies. Here the response in the at 20 Hz and 1 Hz sampling frequency is plotted.

A comparison with the dynamic spectra of the MAG data gives an impressive accordance between the reaction wheel frequencies and the spectral lines observed in the dynamic MAG spectra.

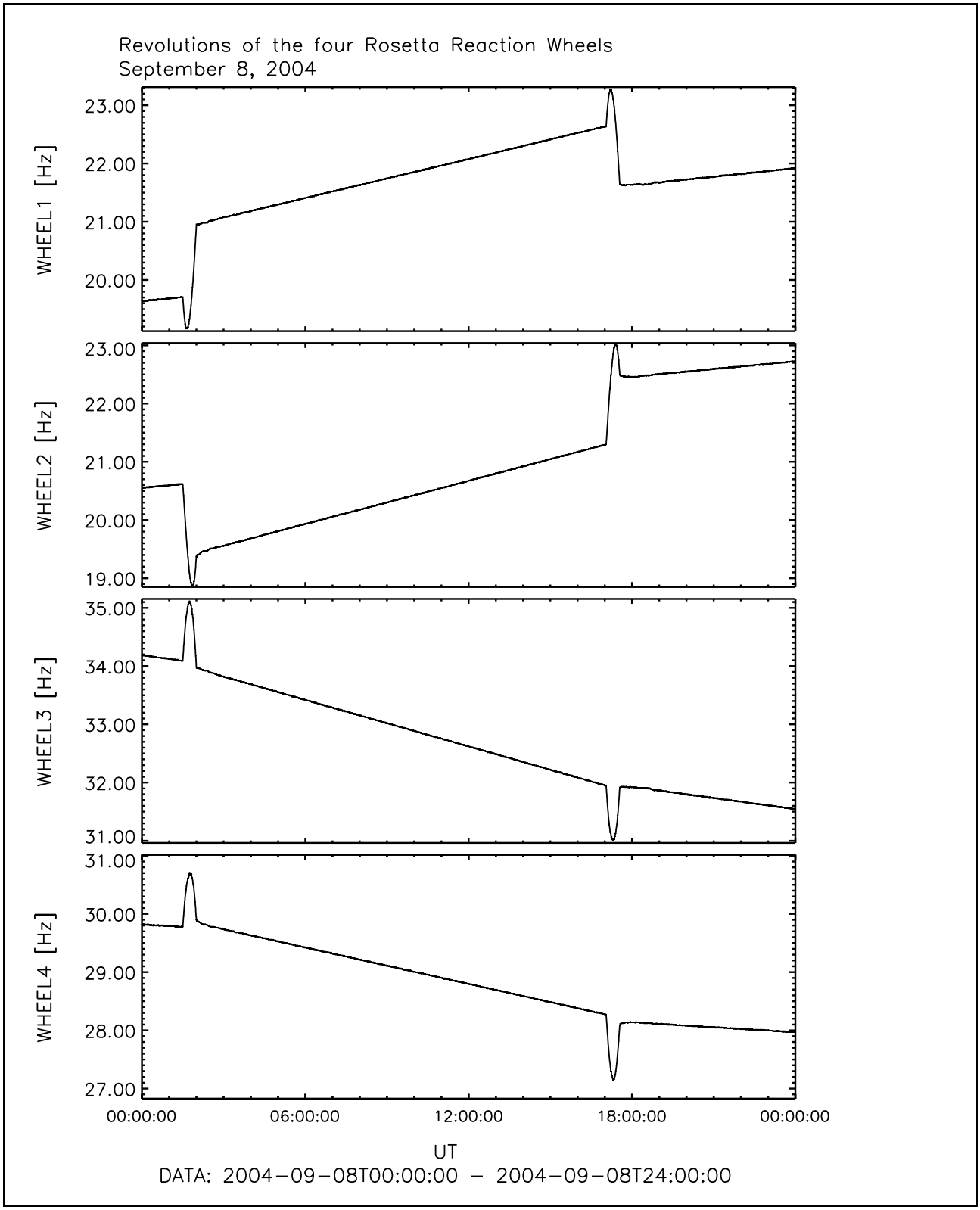

Figure 46: File: wheels_Hz2004-09-08T00-00

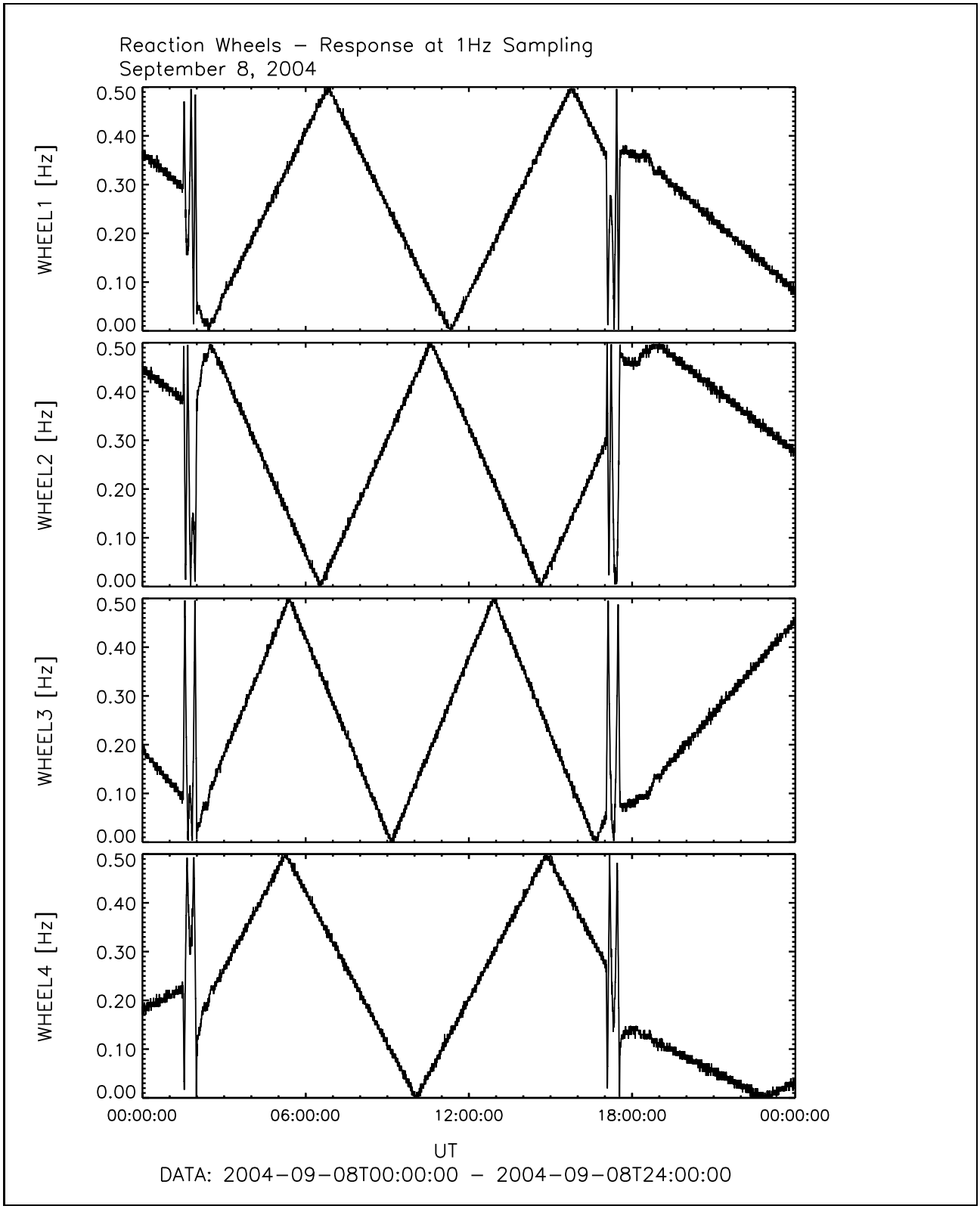

Figure 47: File: wheels_1Hz_Sampling2004-09-08T00-00

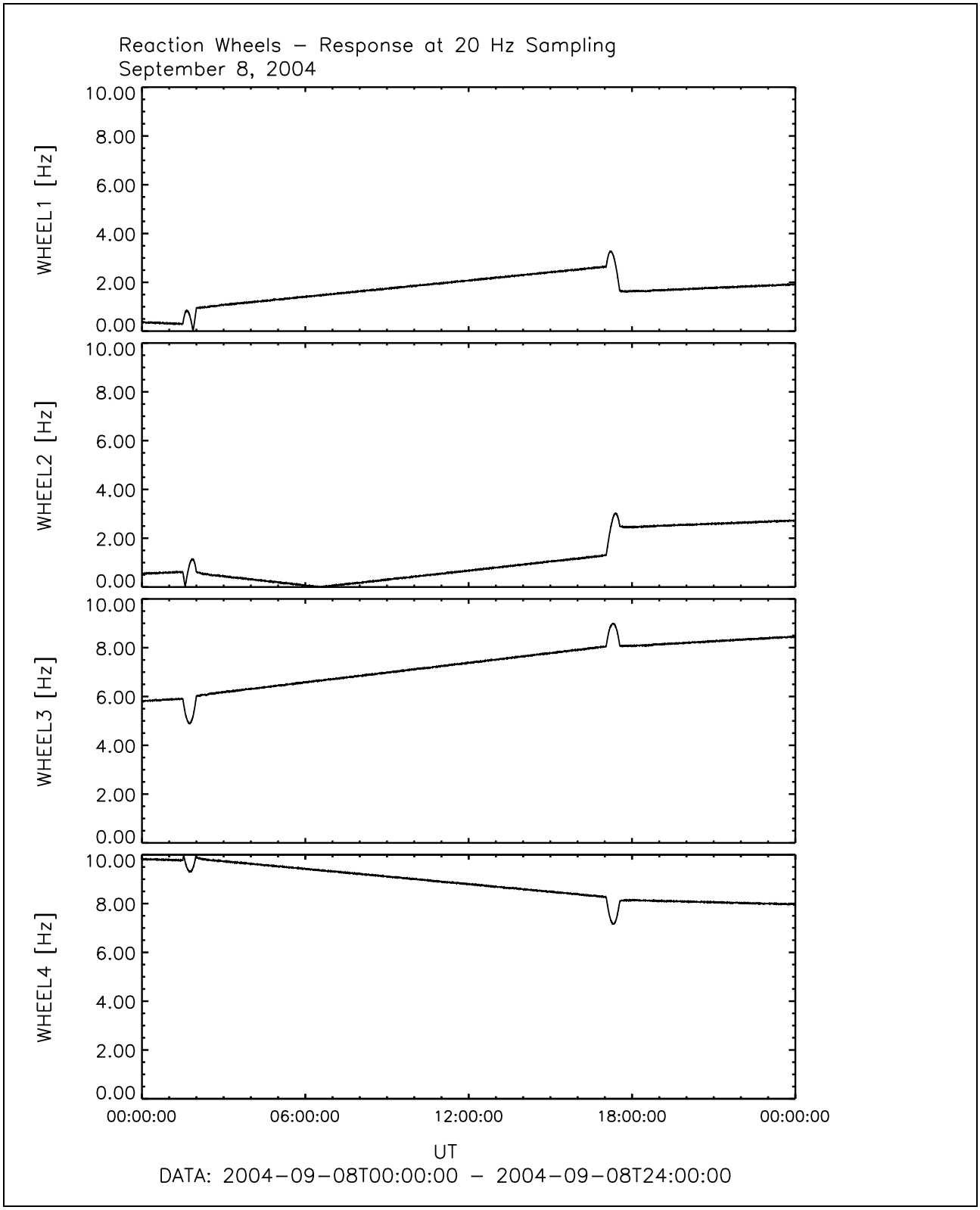

Figure 48: File: wheels_20Hz_Sampling2004-09-08T00-00

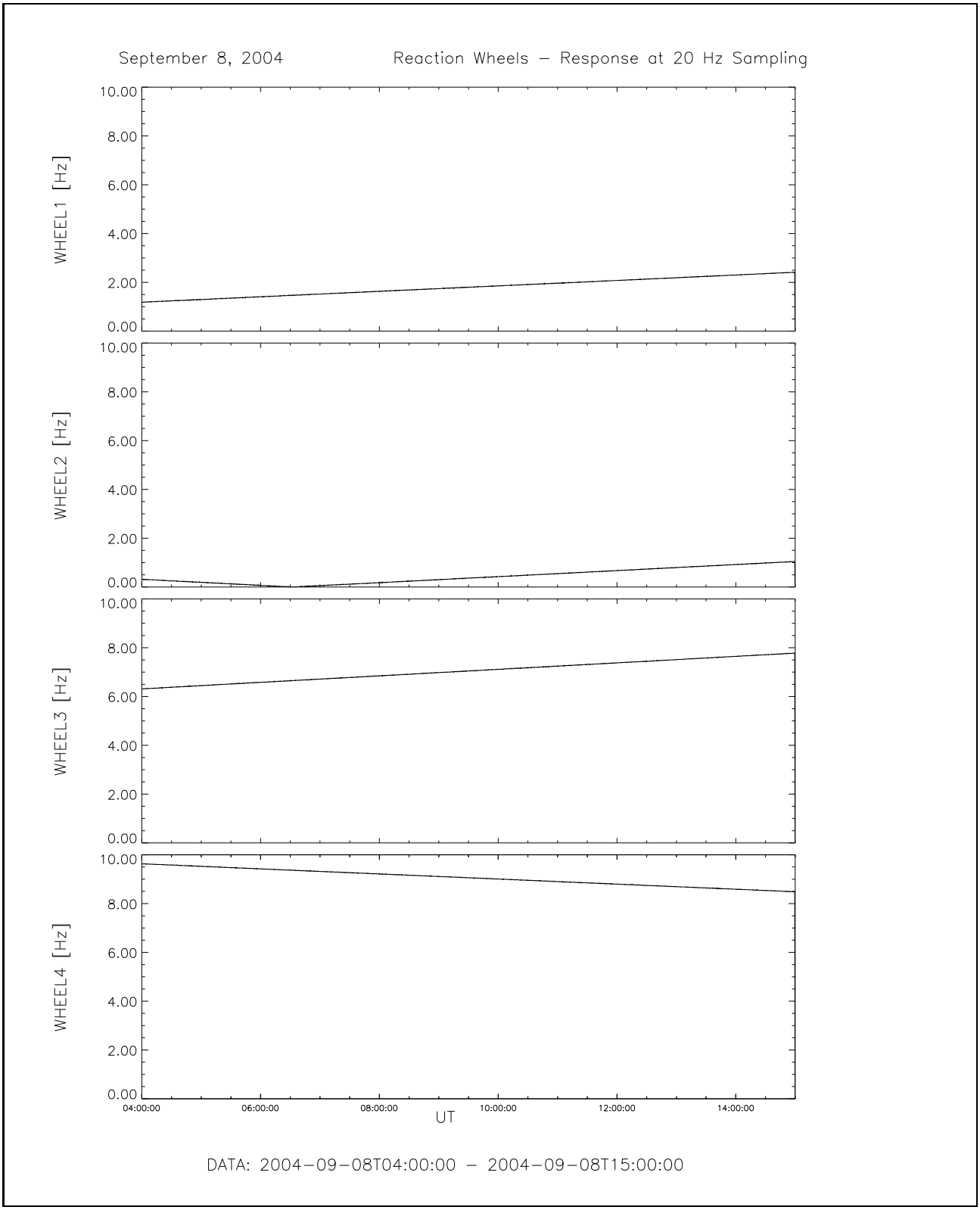

Figure 49: File: wheels_20Hz_Sampling2004-09-08T04-00

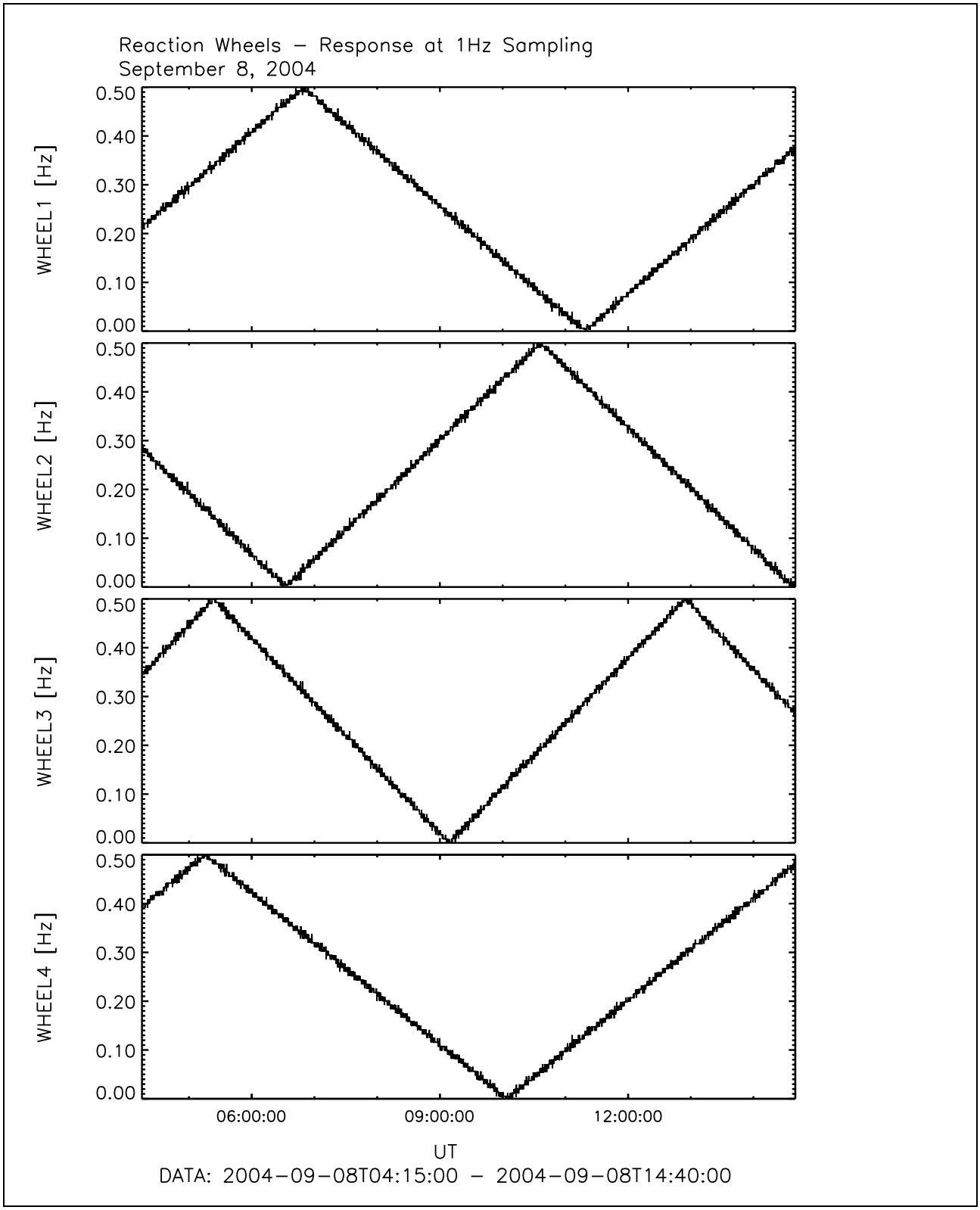

Figure 50: File: wheels_1Hz_Sampling2004-09-08T04-15

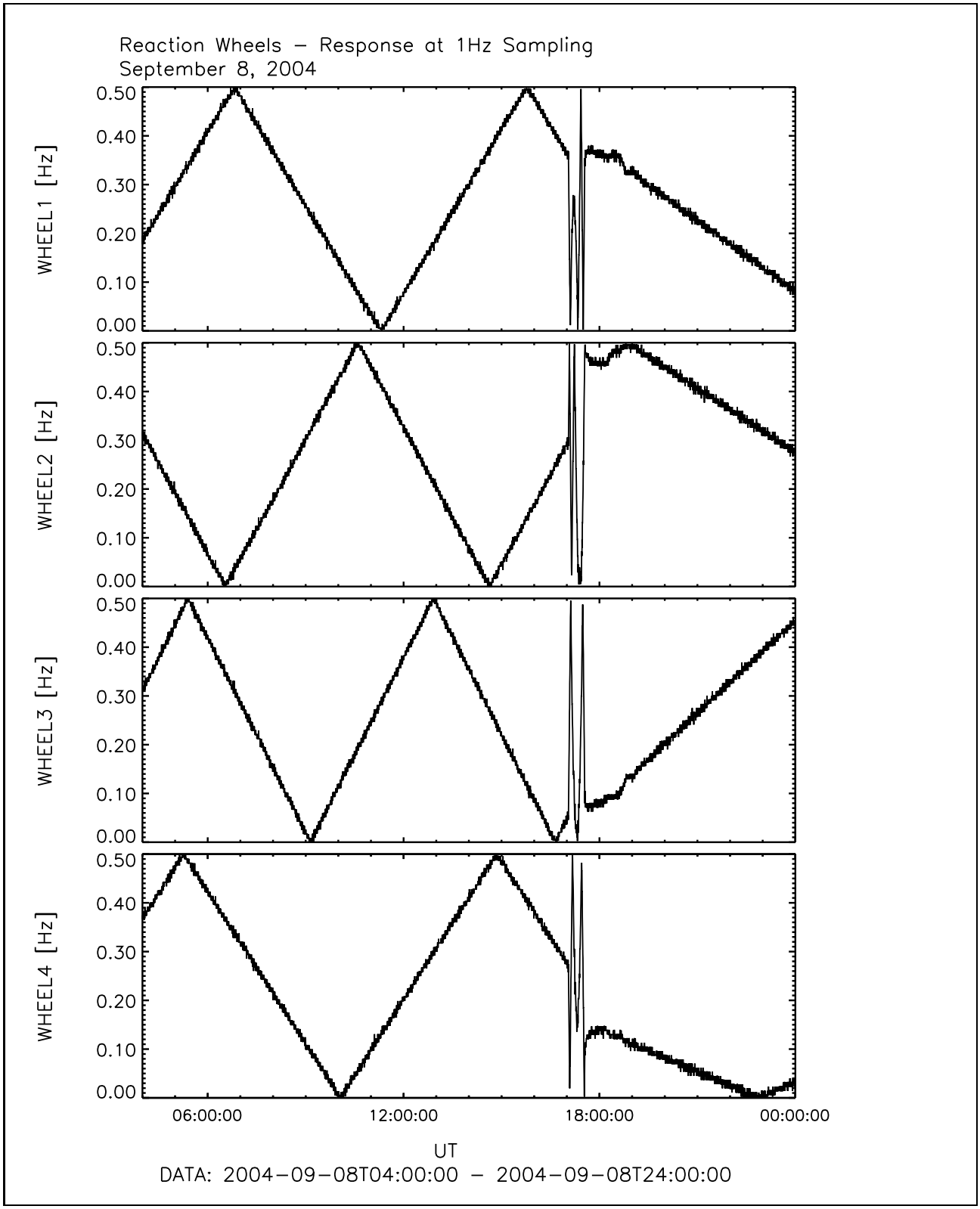

Figure 51: File: wheels_1Hz_Sampling2004-09-08T04-00

4.4 Plots of Reaction Wheel and LAP Disturbance corrected Data

The following plots show the dynamic spectra of the LEVEL_H data. These data have been purged from ROSETTAs reaction wheel disturbance and also from the disturbance of the LAP instrument. Plots are only shown for the primary sensor.

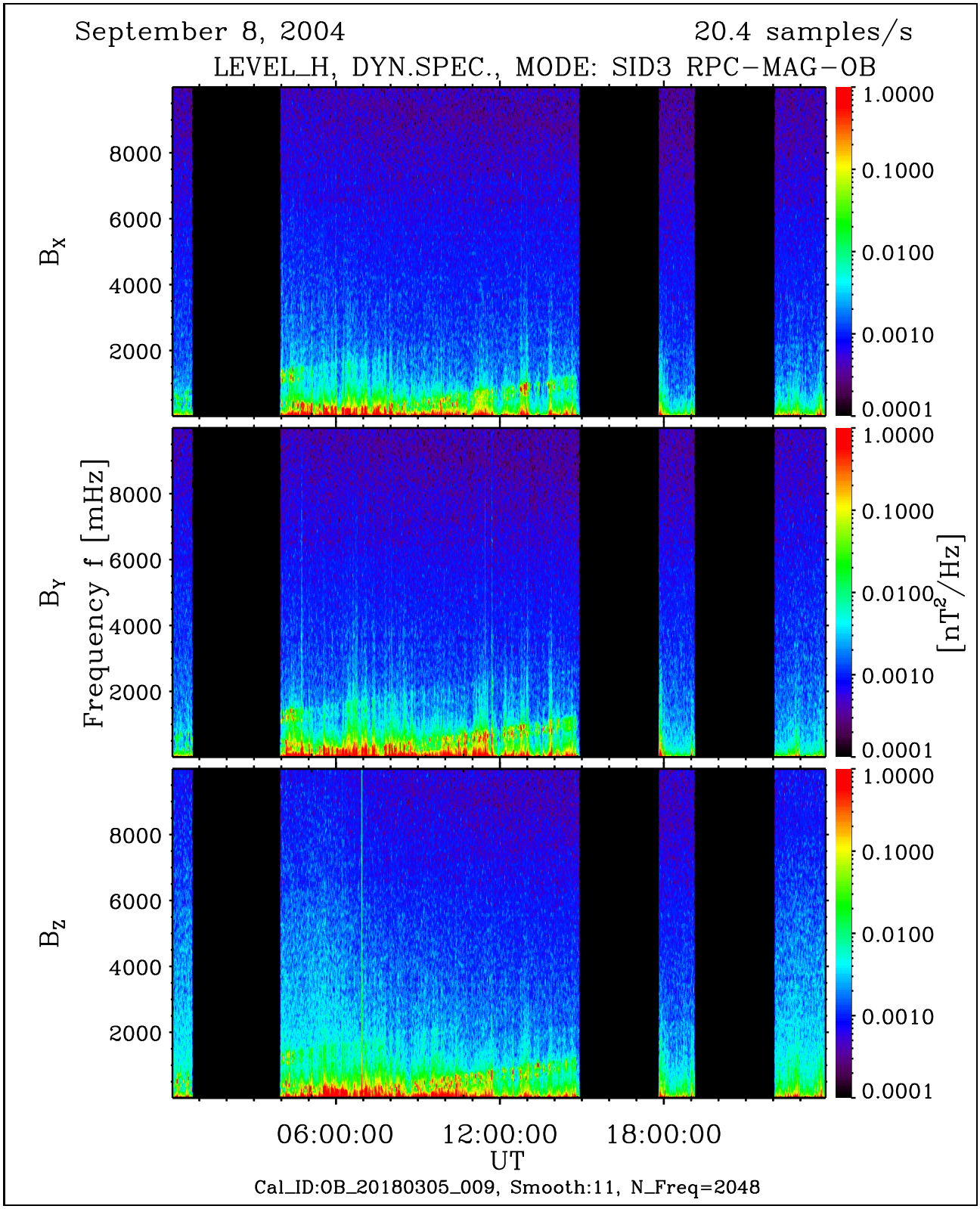

Figure 52: File: RPCMAG040908_CLH_OB_M3_DS0_10000_009

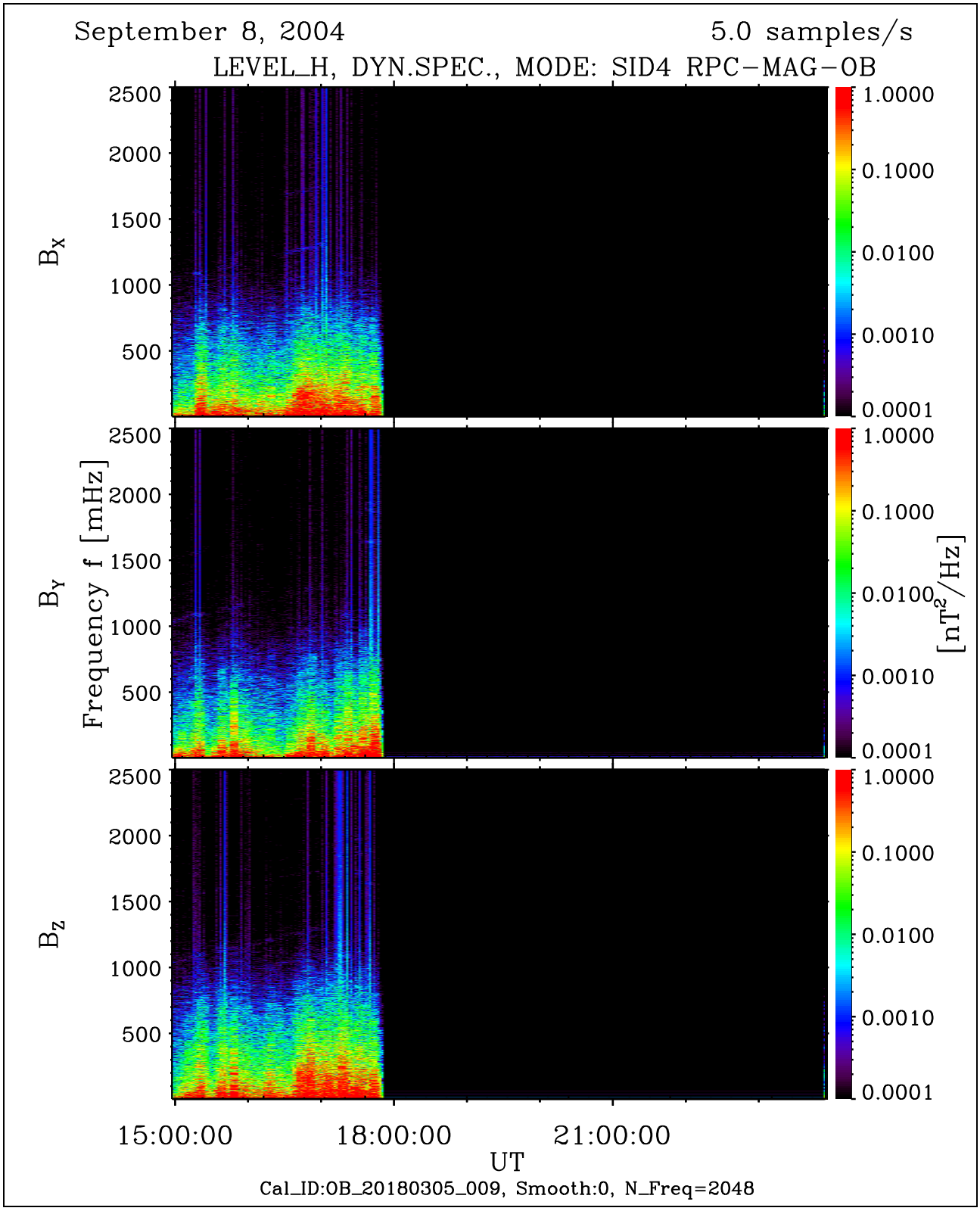

Figure 53: File: RPCMAG040908_CLH_OB_M4_DS0_10000_009

5 September 09, 2004:

5.1 Actions

Time	Stage A, Stage B,Filter cfg	Stage 1, Stage 2, Stage3	Mode
00:00 – 09:37	2 0 0	2 0 0	SID4
09:38 – 23:59	0 0 0	0 0 0	SID3

5.2 Plots of Calibrated Data using the new Temperature Model

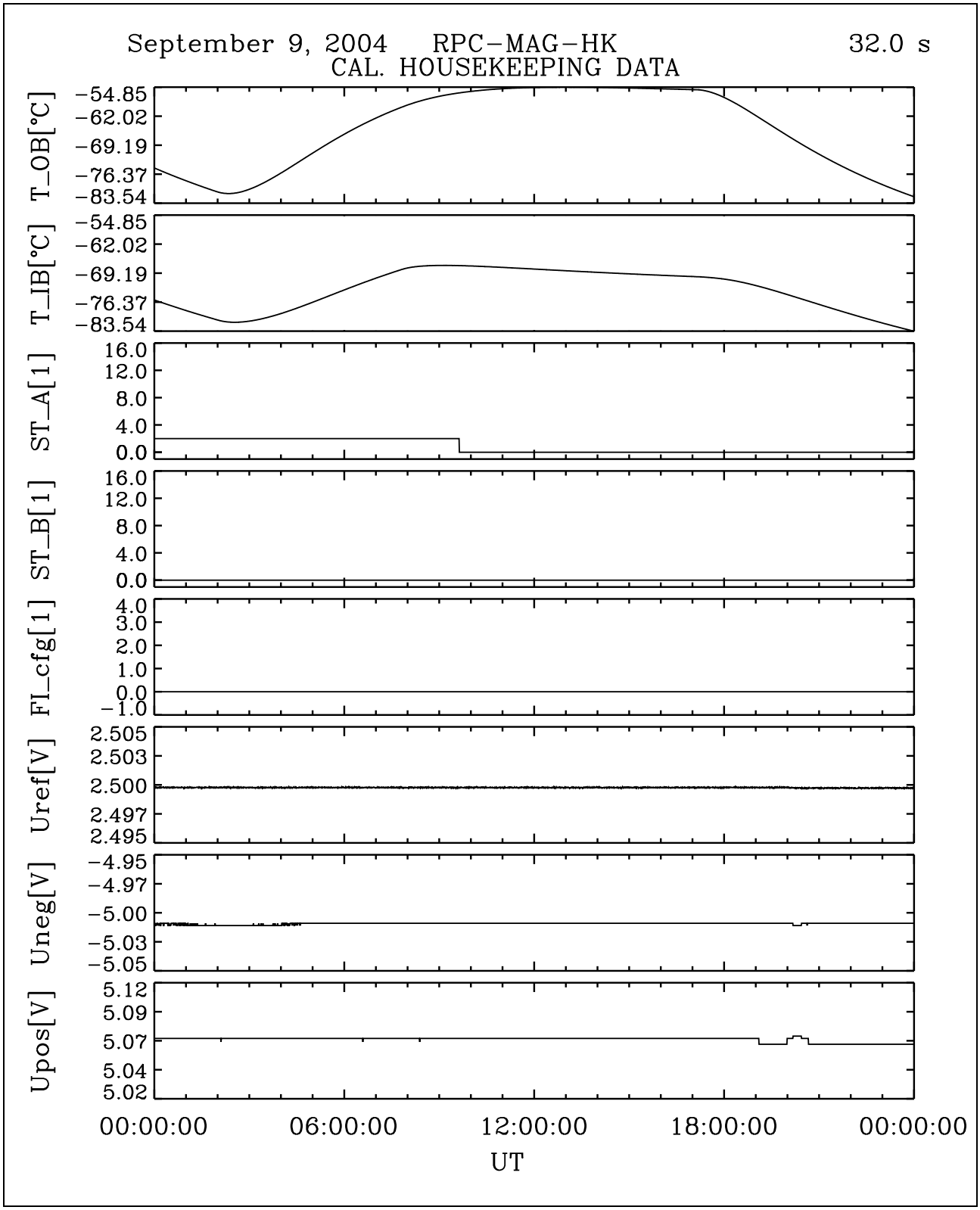

Figure 54: File: RPCMAG040909T0000_CLA_HK_P0000_2400

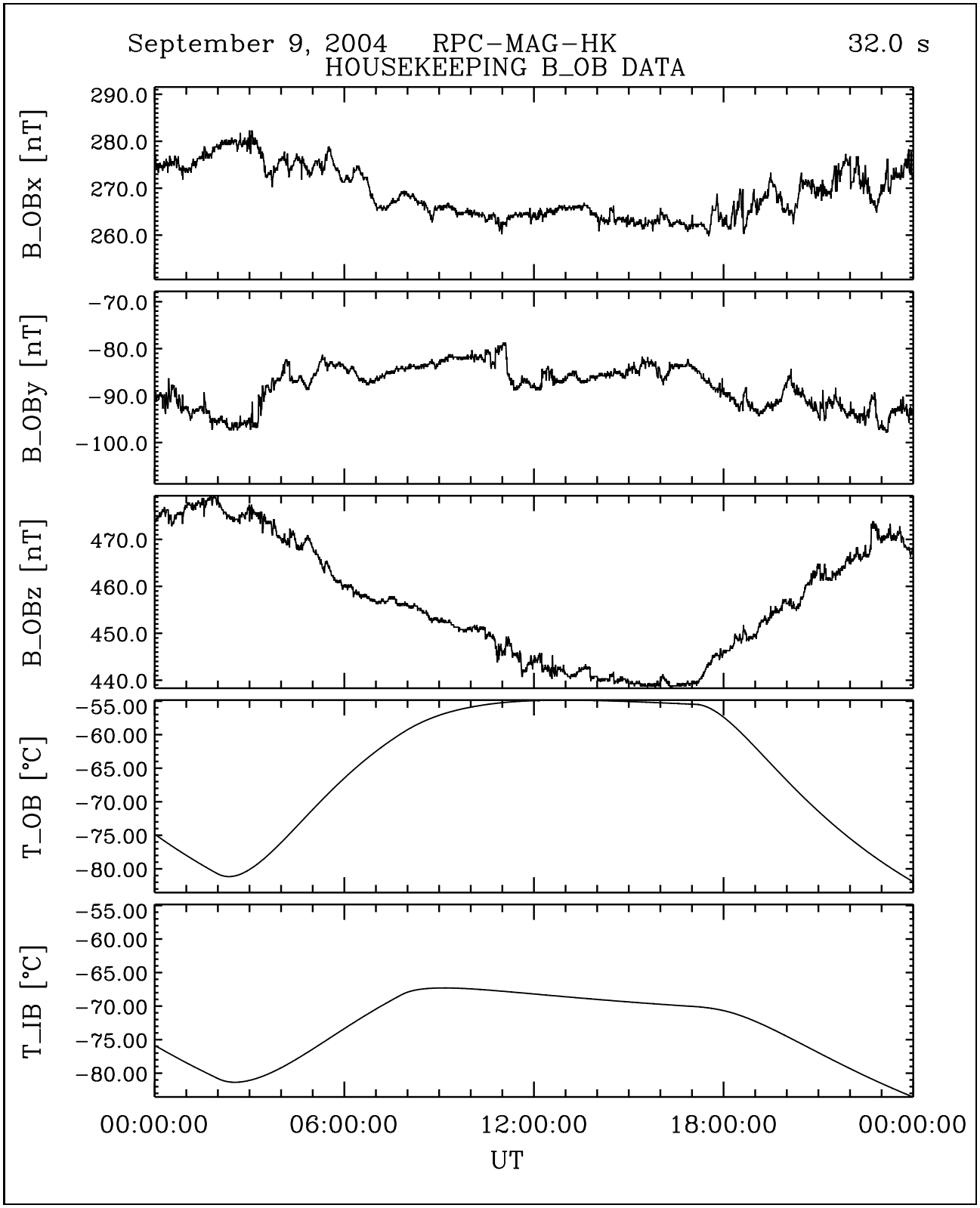

Figure 55: File: RPCMAG040909T0000_CLA_HK_B_P0000_2400

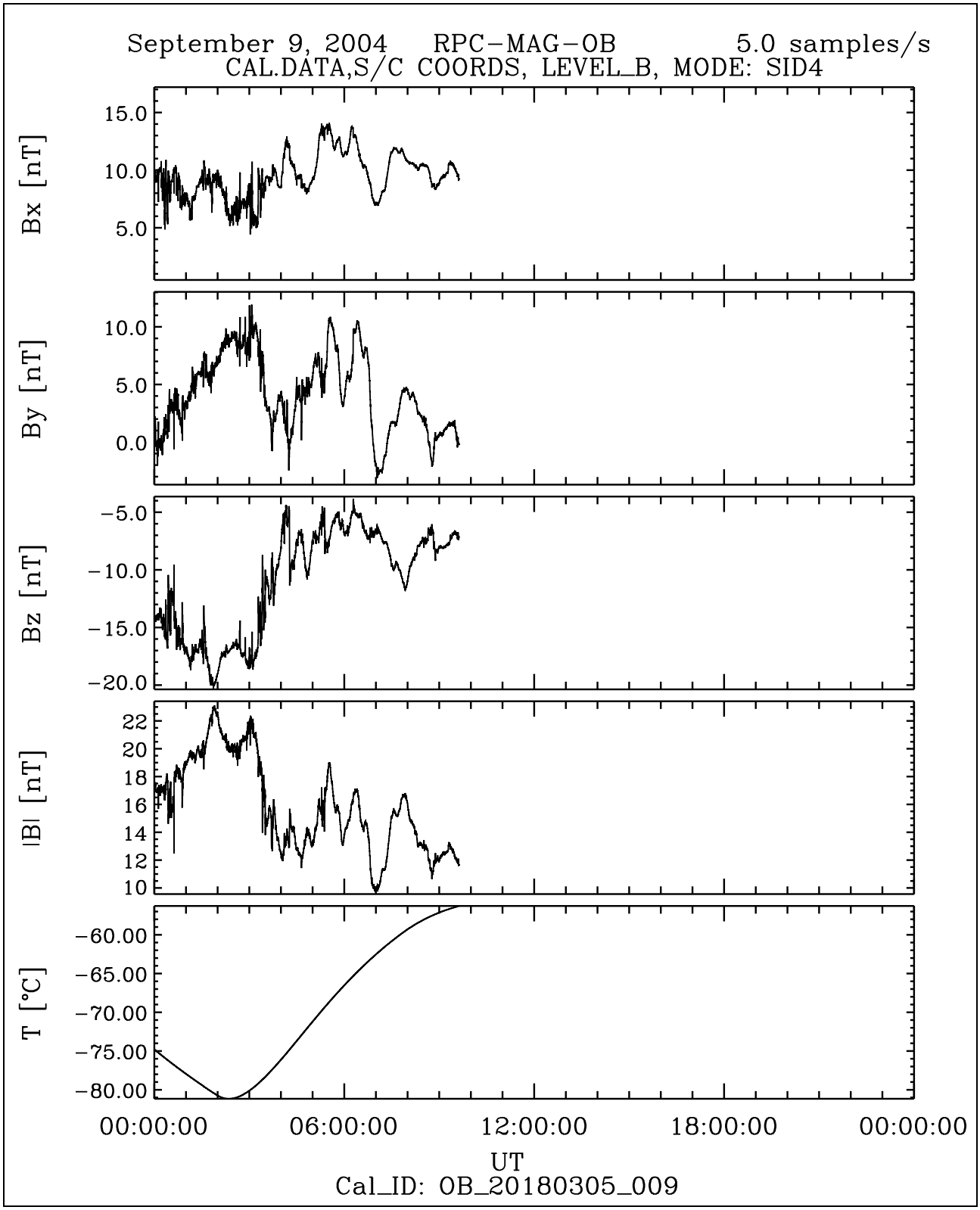

Figure 56: File: RPCMAG040909T0000_CLB_OB_M4_T0000_2400_009

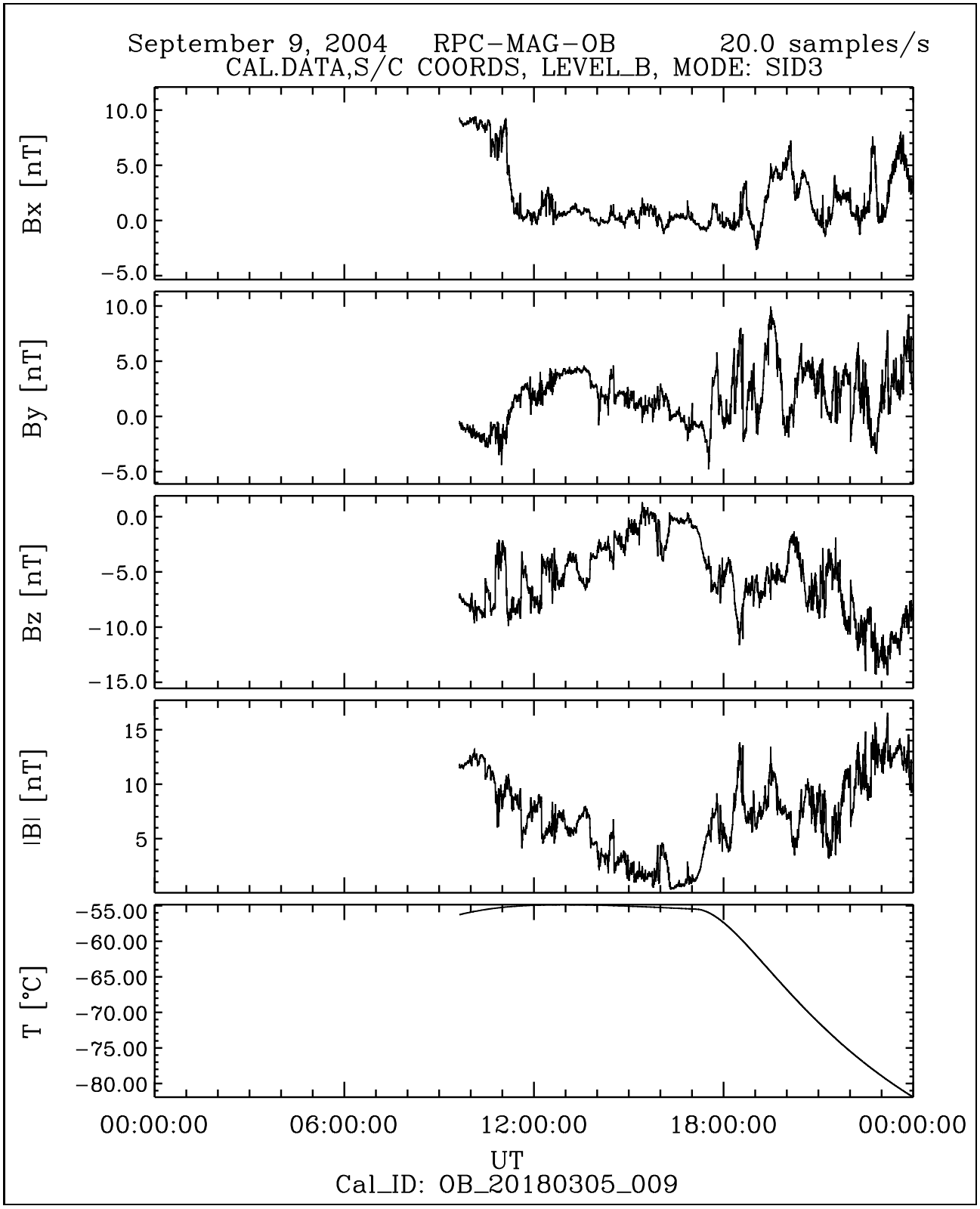

Figure 57: File: RPCMAG040909T0938_CLB_OB_M3_T0000_2400_009

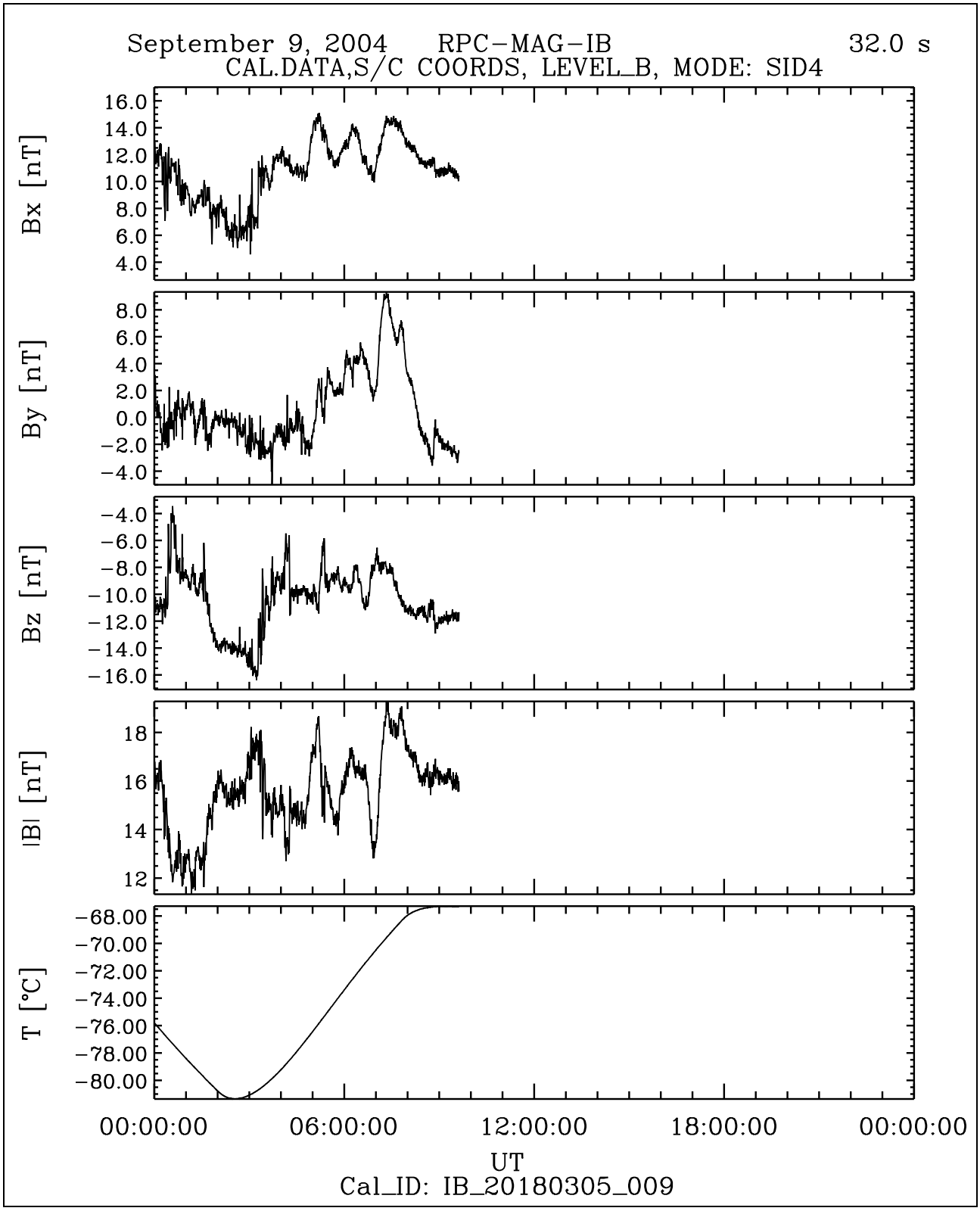

Figure 58: File: RPCMAG040909T0000_CLB_IB_M4_T0000_2400_009

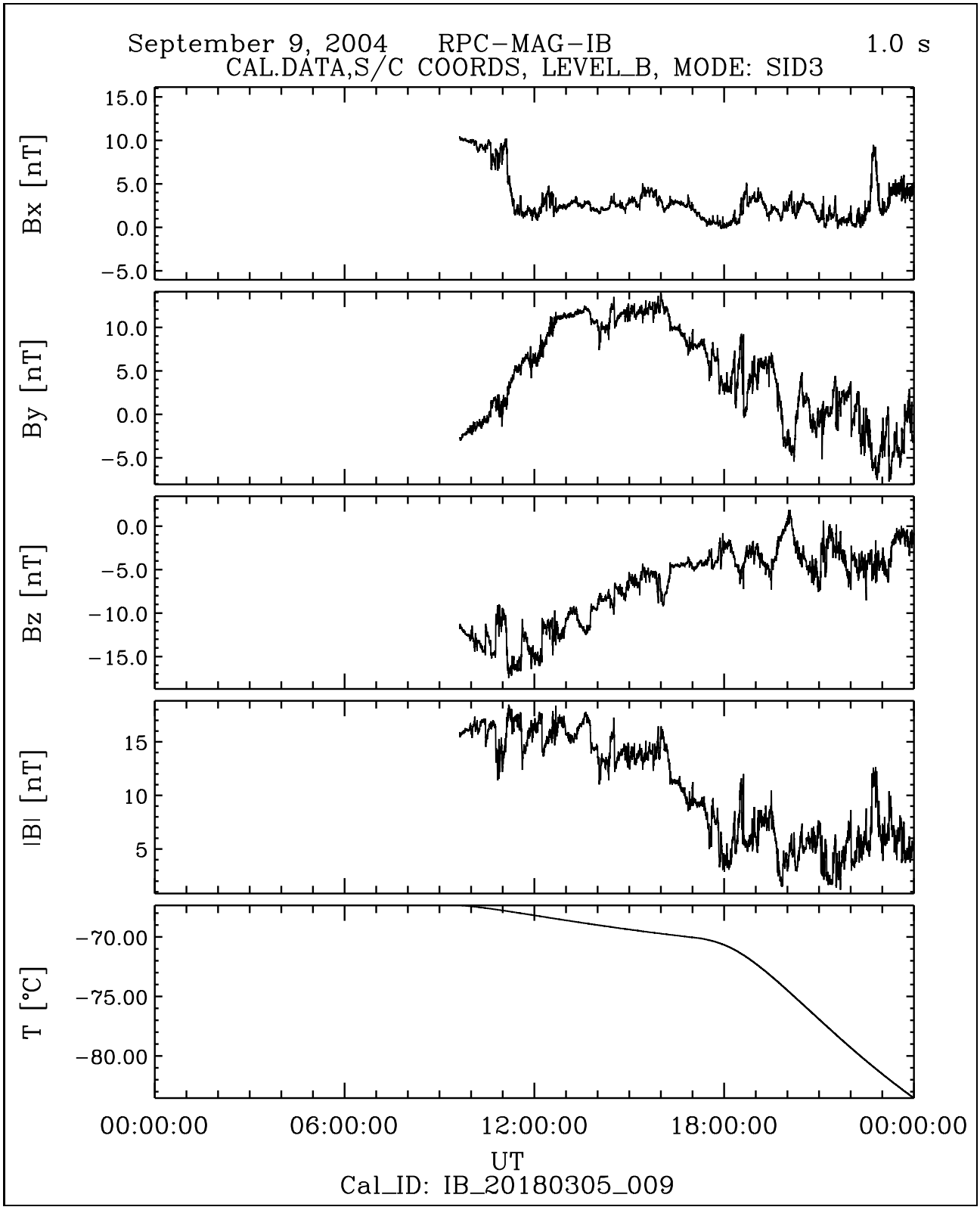

Figure 59: File: RPCMAG040909T0938_CLB_IB_M3_T0000_2400_009

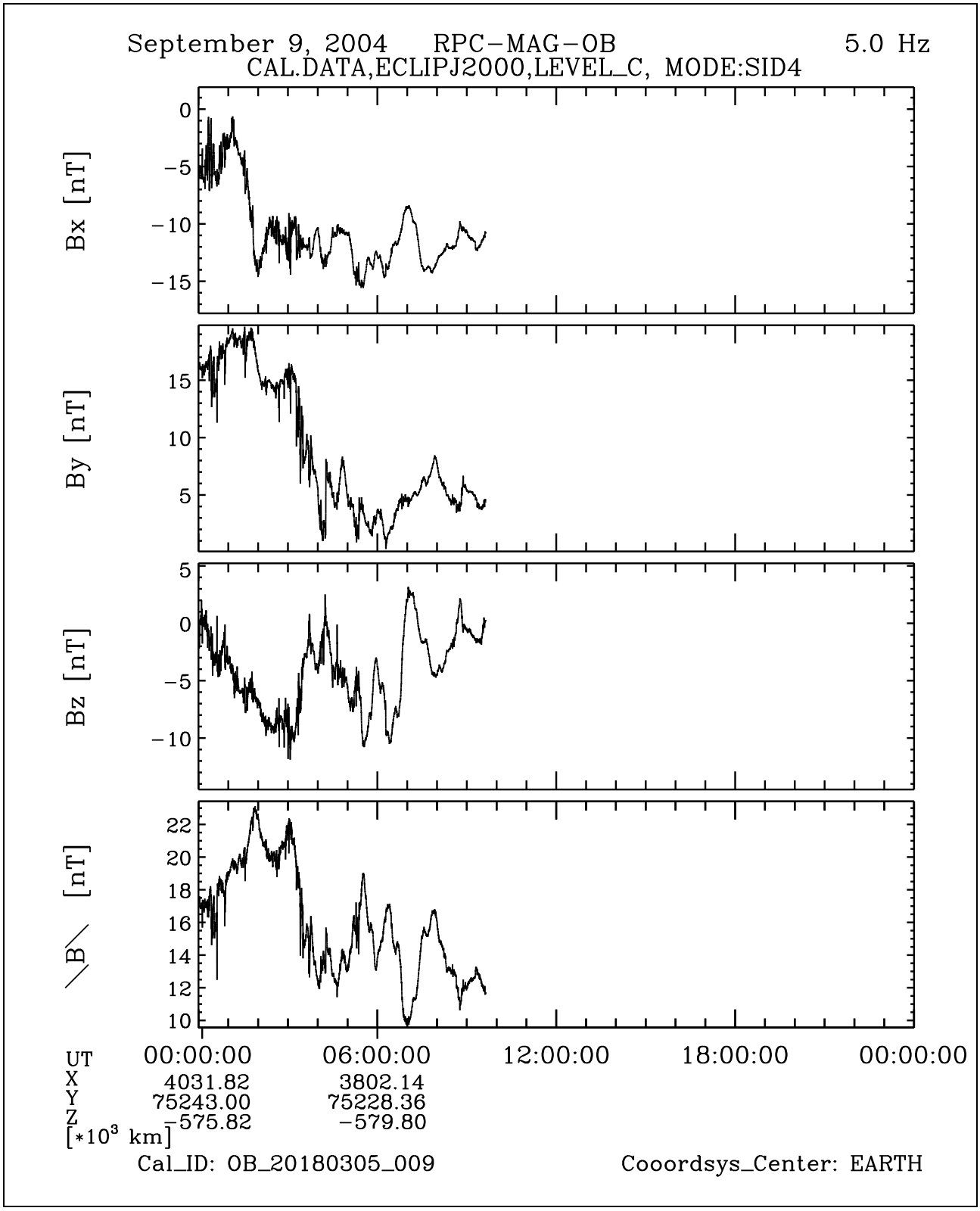

Figure 60: File: RPCMAG040909T0000_CLC_OB_M4_T0000_2400_009

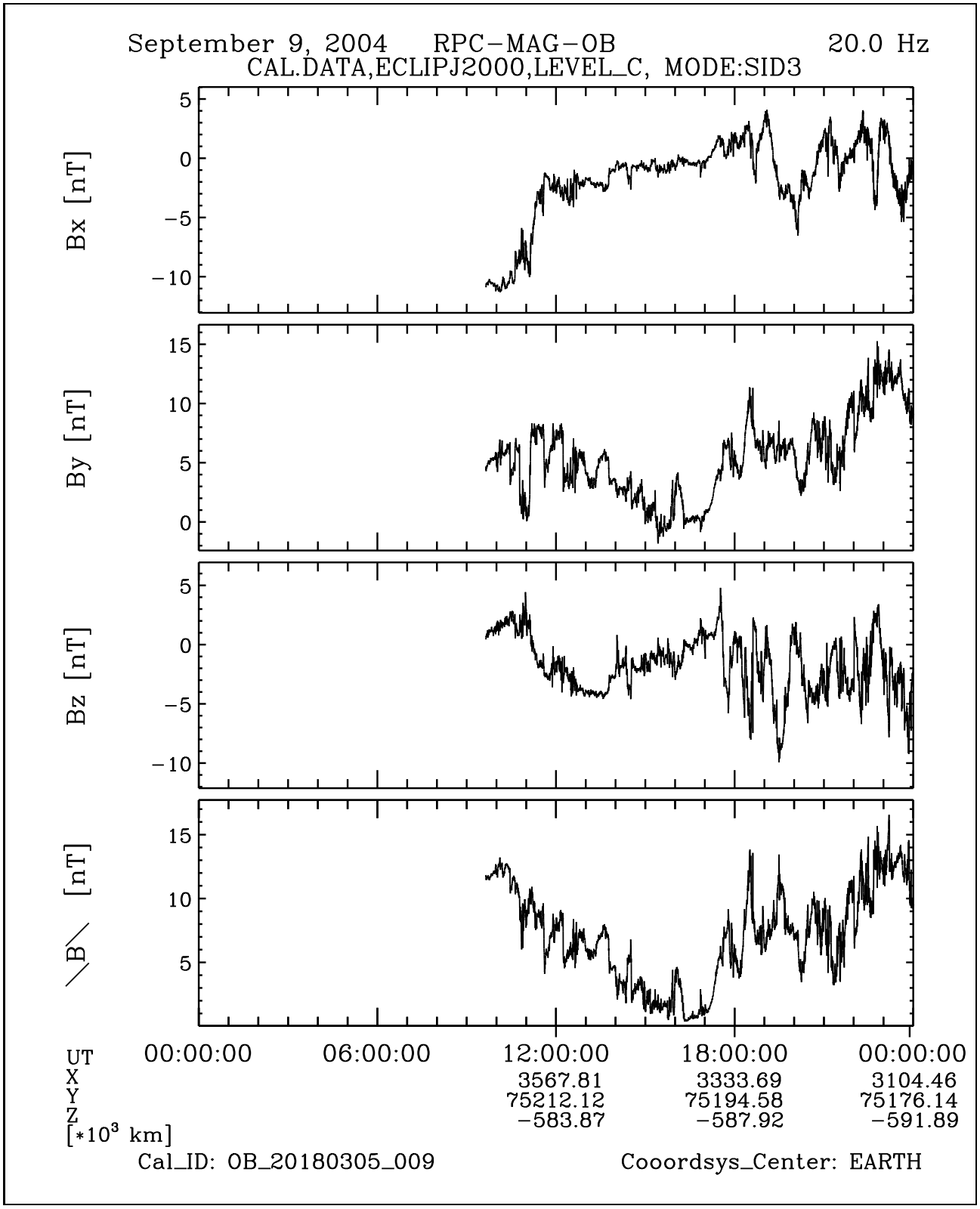

Figure 61: File: RPCMAG040909T0938_CLC_OB_M3_T0000_2400_009

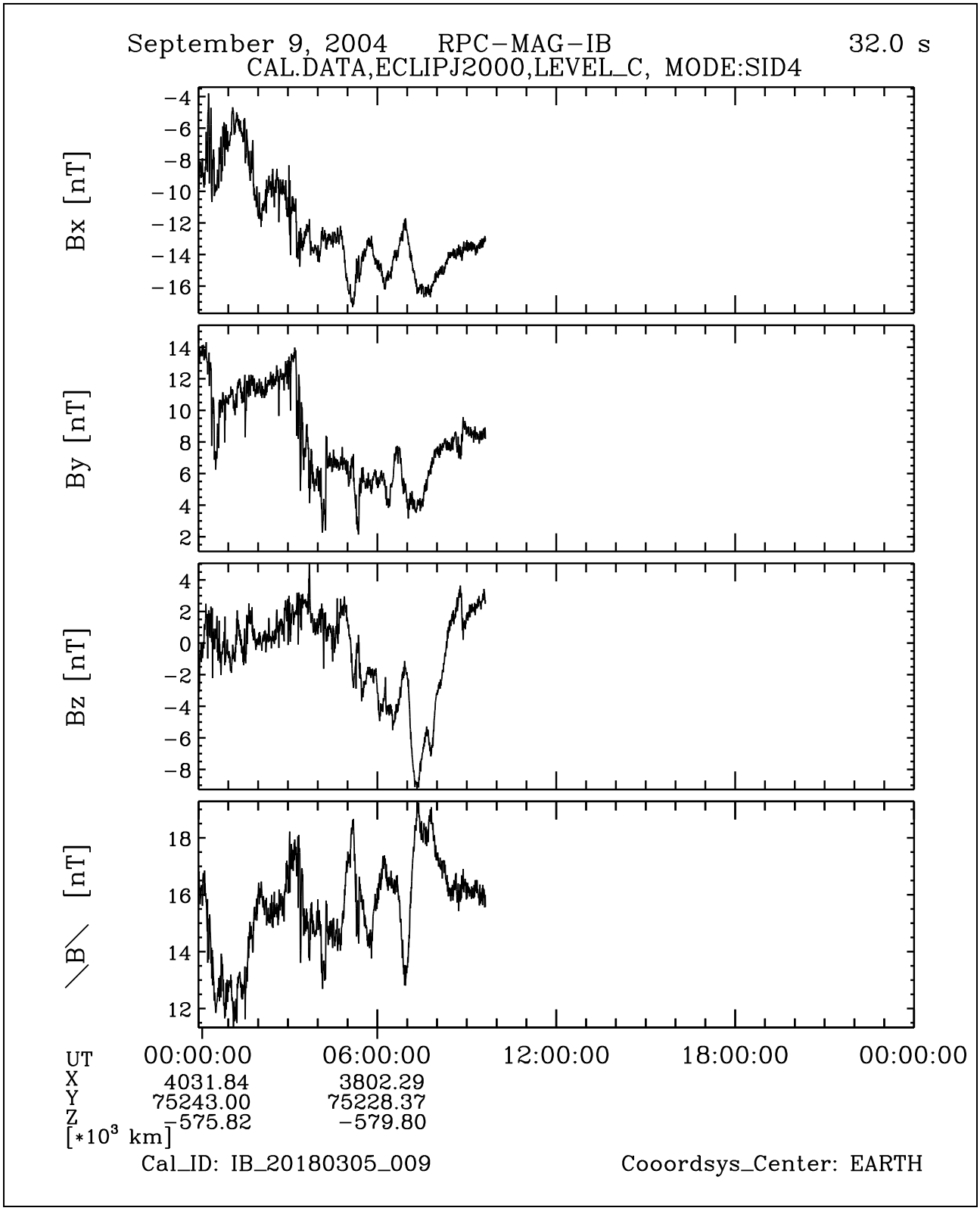

Figure 62: File: RPCMAG040909T0000_CLC_IB_M4_T0000_2400_009

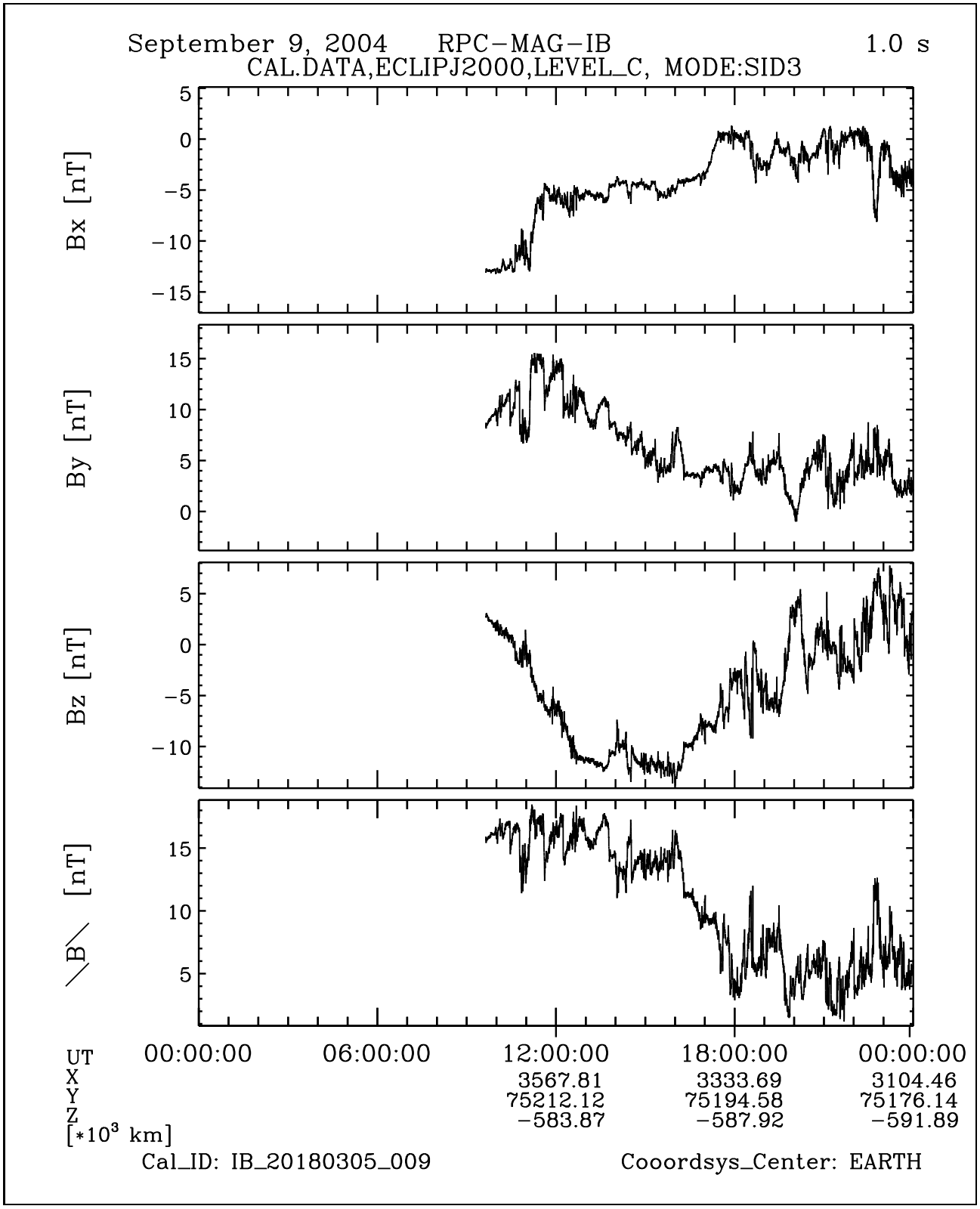

Figure 63: File: RPCMAG040909T0938_CLC_IB_M3_T0000_2400_009

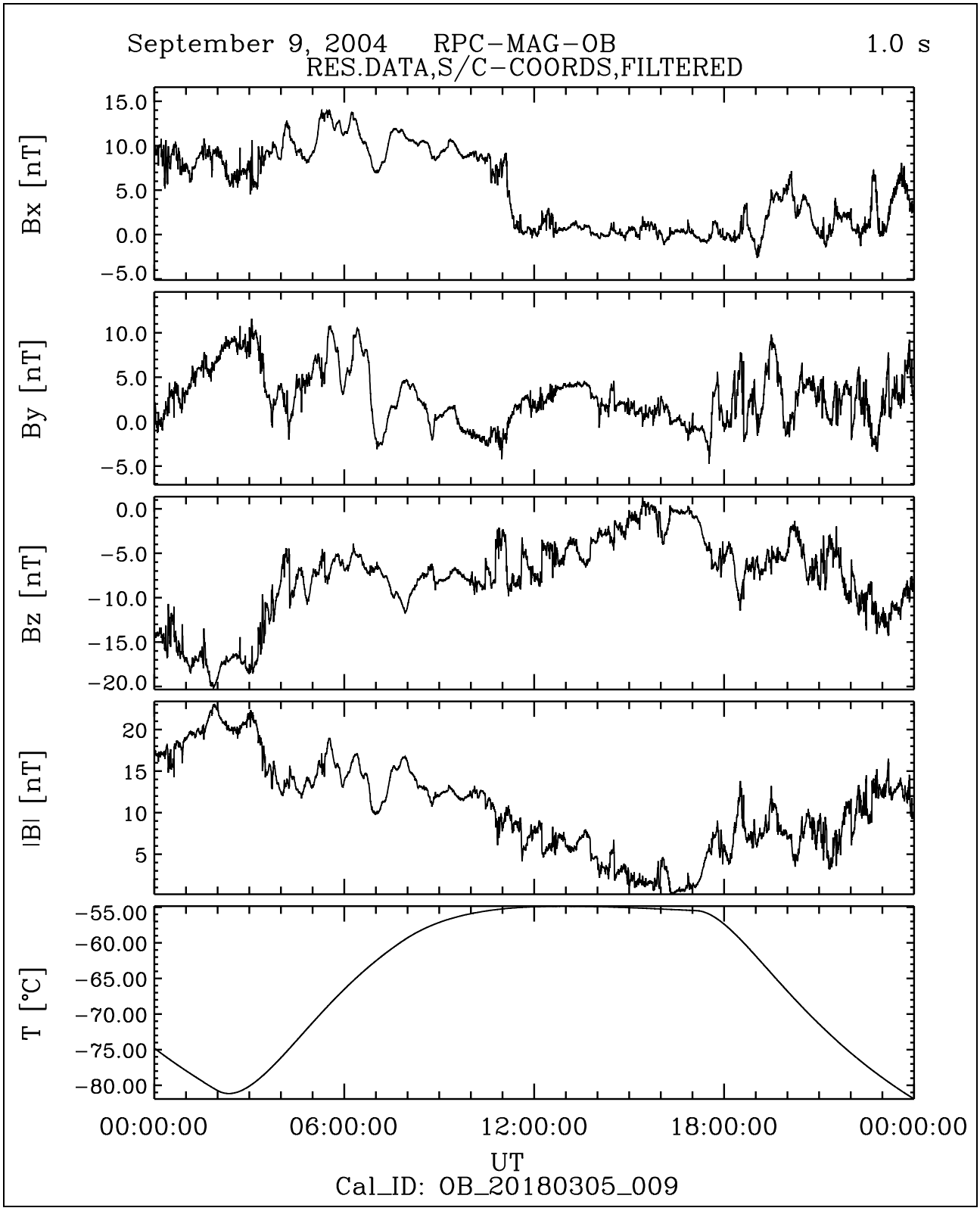

Figure 64: File: RPCMAG040909_CLF_OB_A1_T0000_2400_009

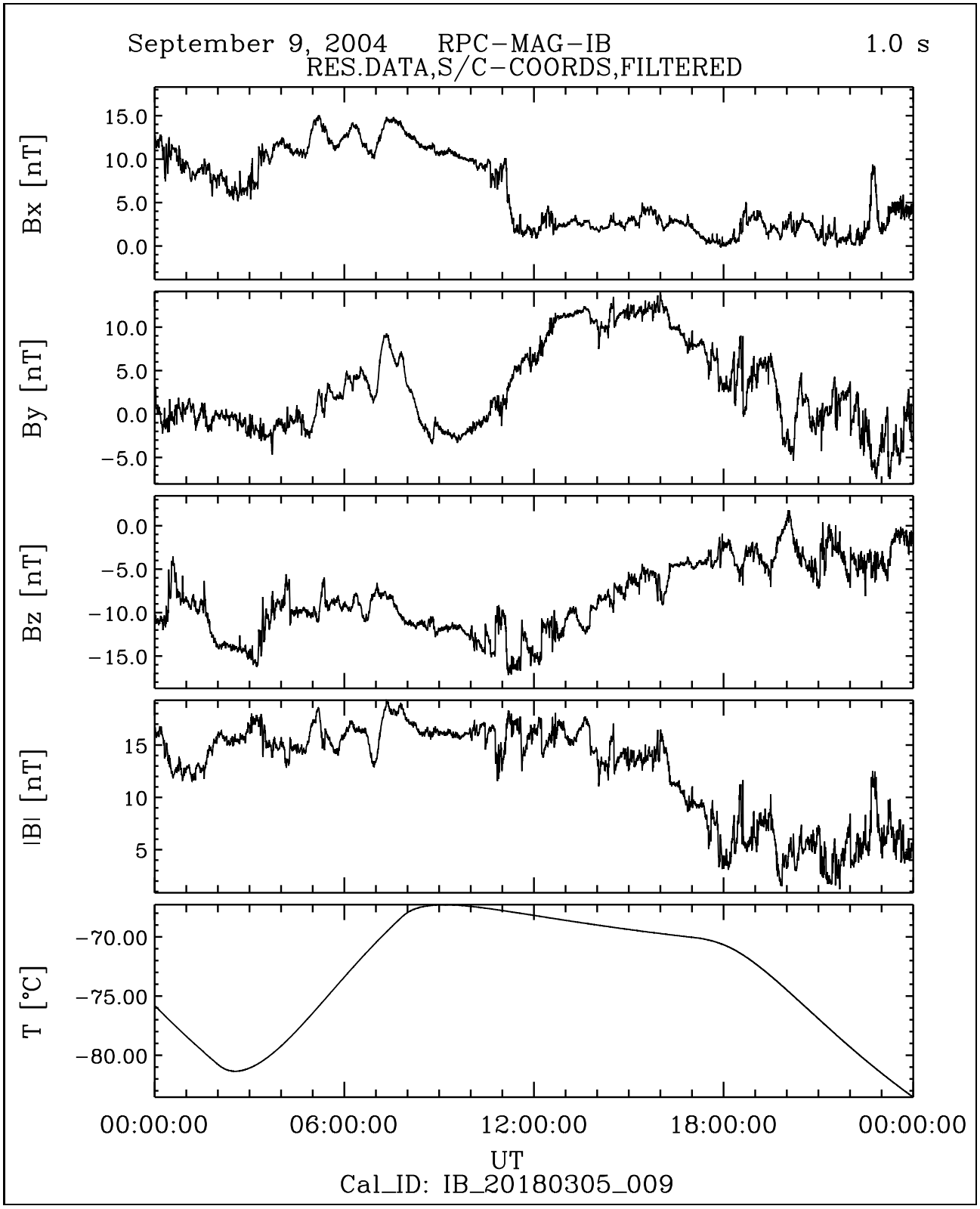

Figure 65: File: RPCMAG040909_CLF_IB_A1_T0000_2400_009

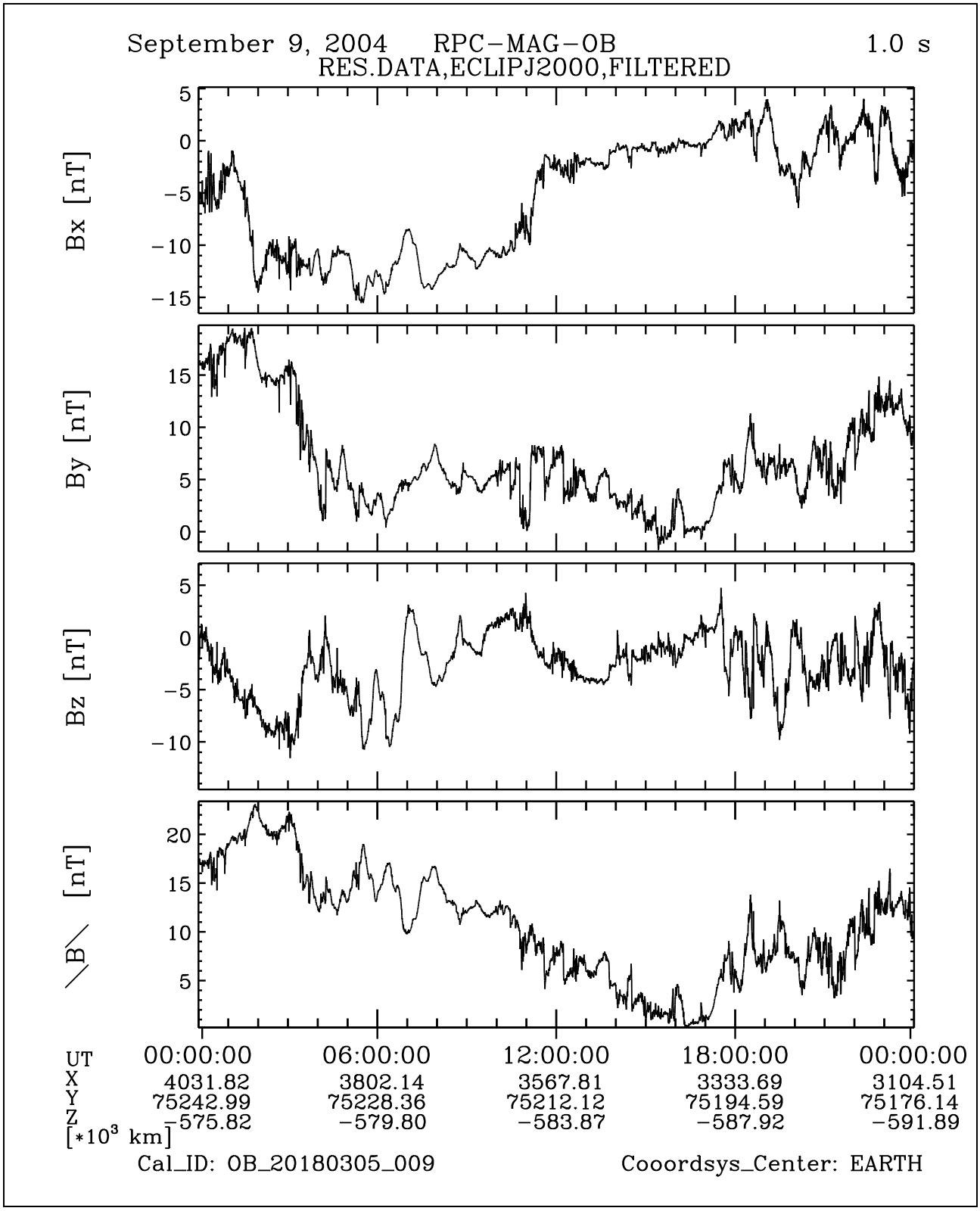

Figure 66: File: RPCMAG040909_CLG_OB_A1_T0000_2400_009

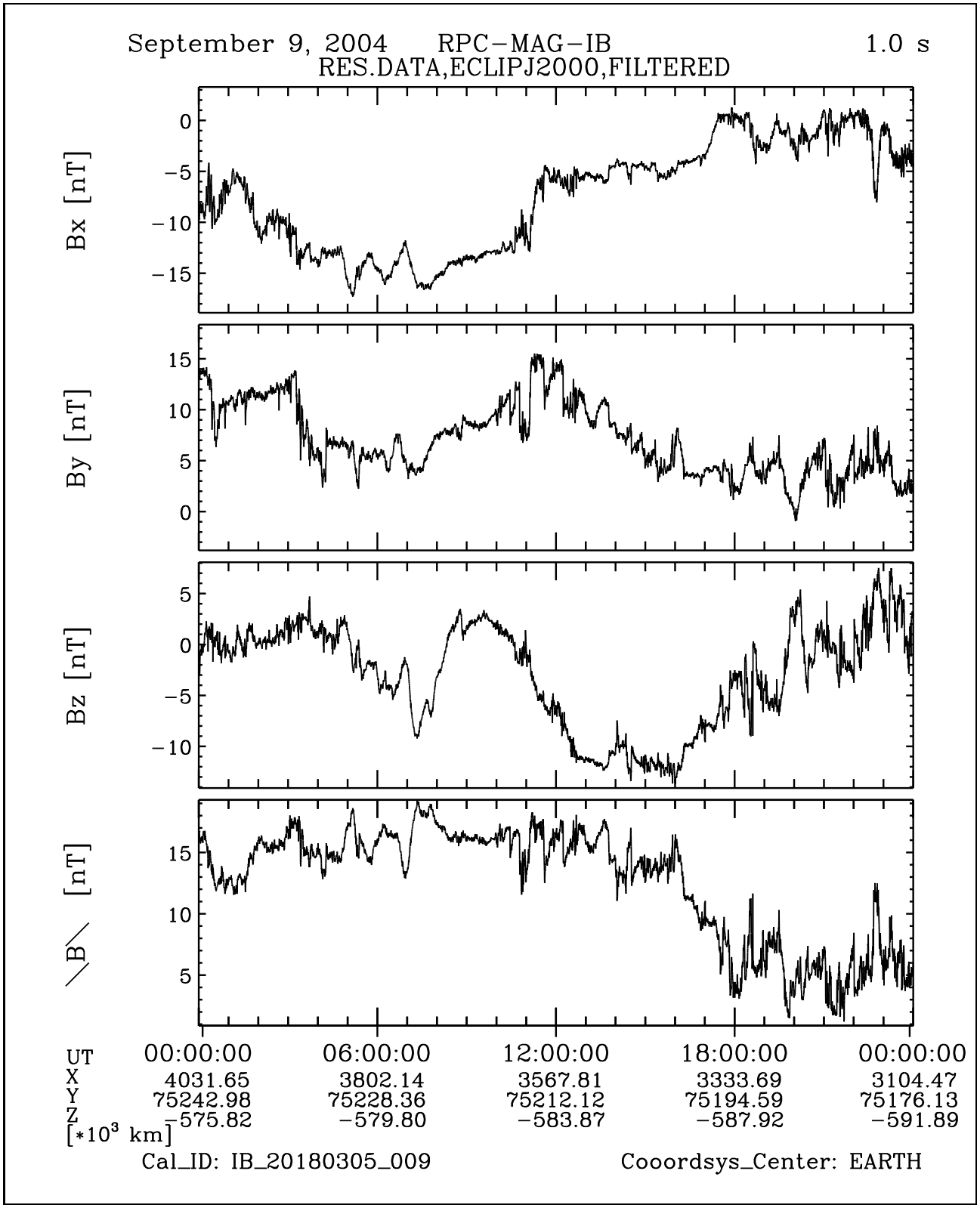

Figure 67: File: RPCMAG040909_CLG_IB_A1_T0000_2400_009

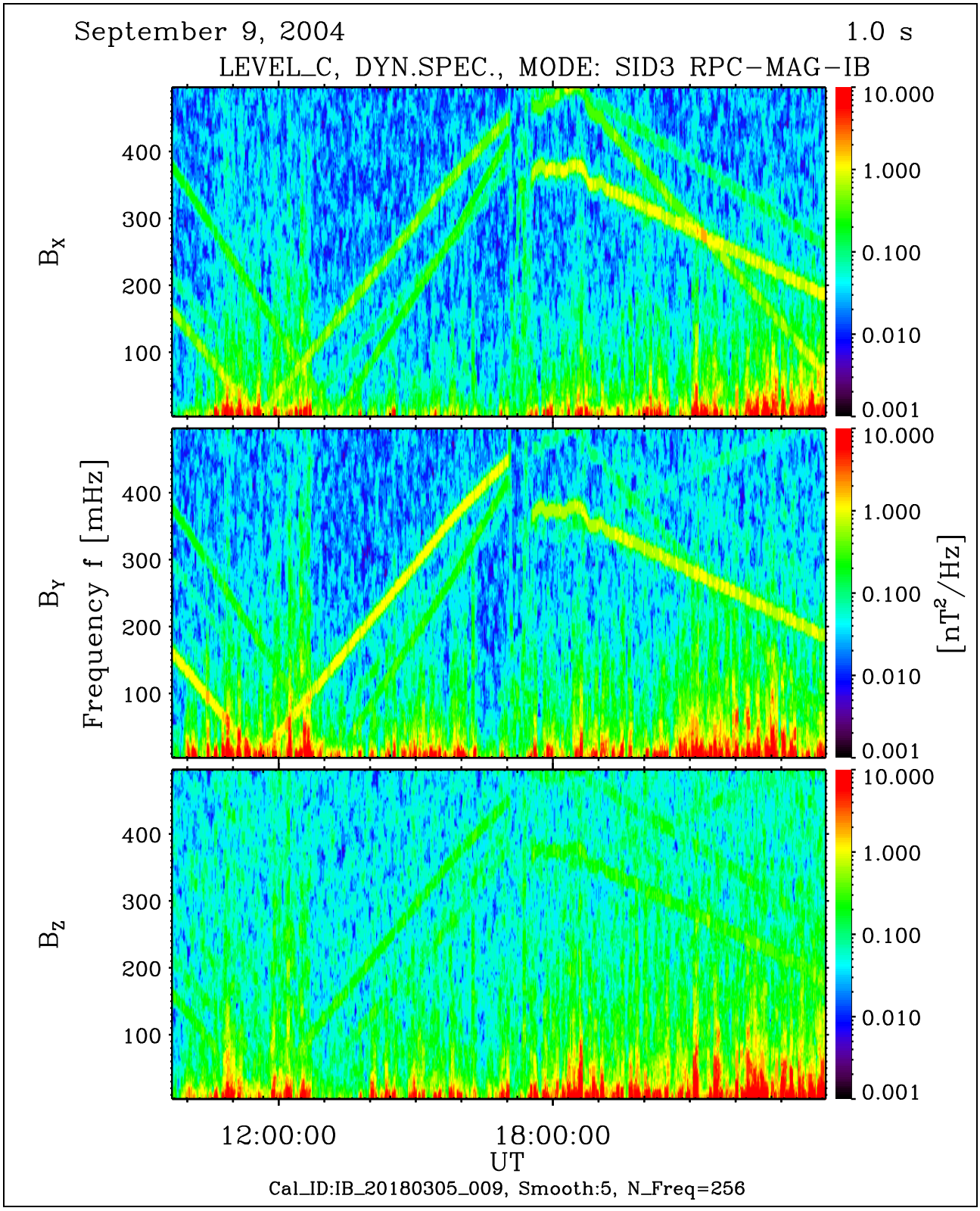

Figure 68: File: RPCMAG040909T0938_CLC_IB_M3_DS0_500_009

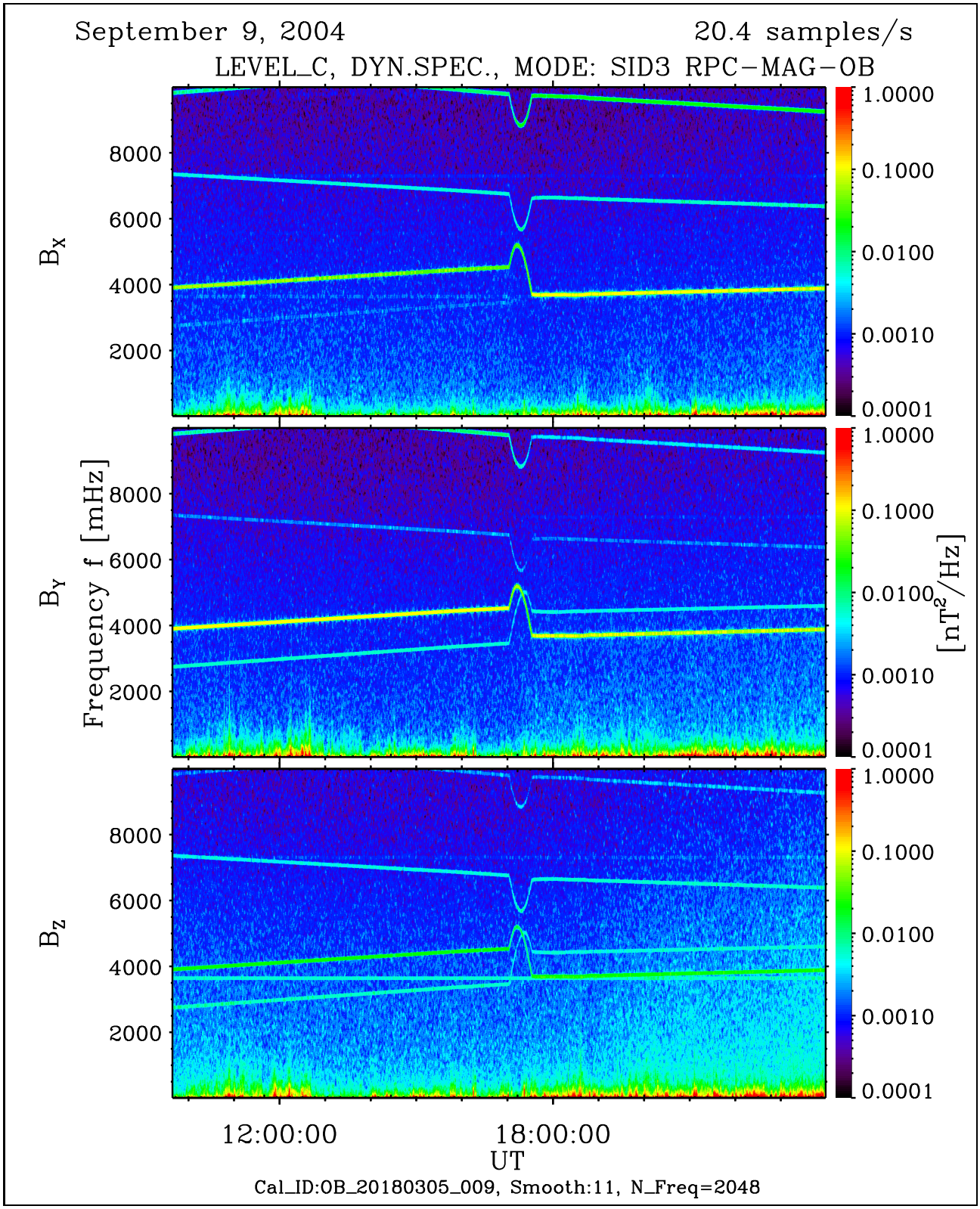

Figure 69: File: RPCMAG040909T0938_CLC_OB_M3_DS0_10000_009

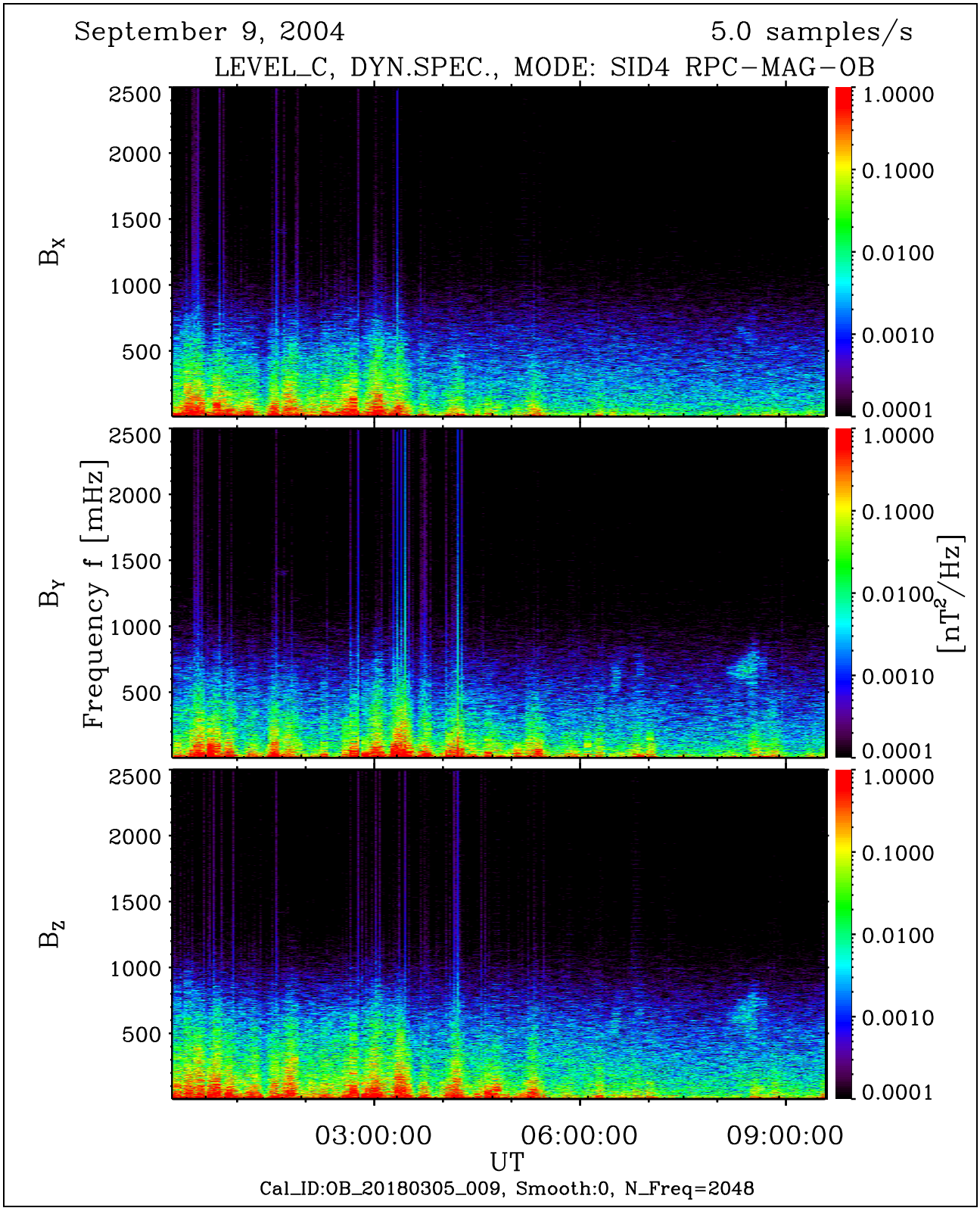

Figure 70: File: RPCMAG040909T0000_CLC_OB_M4_DS0_10000_009

5.3 Plots of ROSETTA's Reaction Wheels Speeds

The following plots show the time series of the revolutions of the 4 reaction wheels. Two kinds of data are shown:

- The original reaction wheel data as they are stored in the DDS.
- The theoretical response of the wheels impact seen by an instrument sampling with different frequencies. Here the response in the at 20 Hz and 1 Hz sampling frequency is plotted.

A comparison with the dynamic spectra of the MAG data gives an impressive accordance between the reaction wheel frequencies and the spectral lines observed in the dynamic MAG spectra.

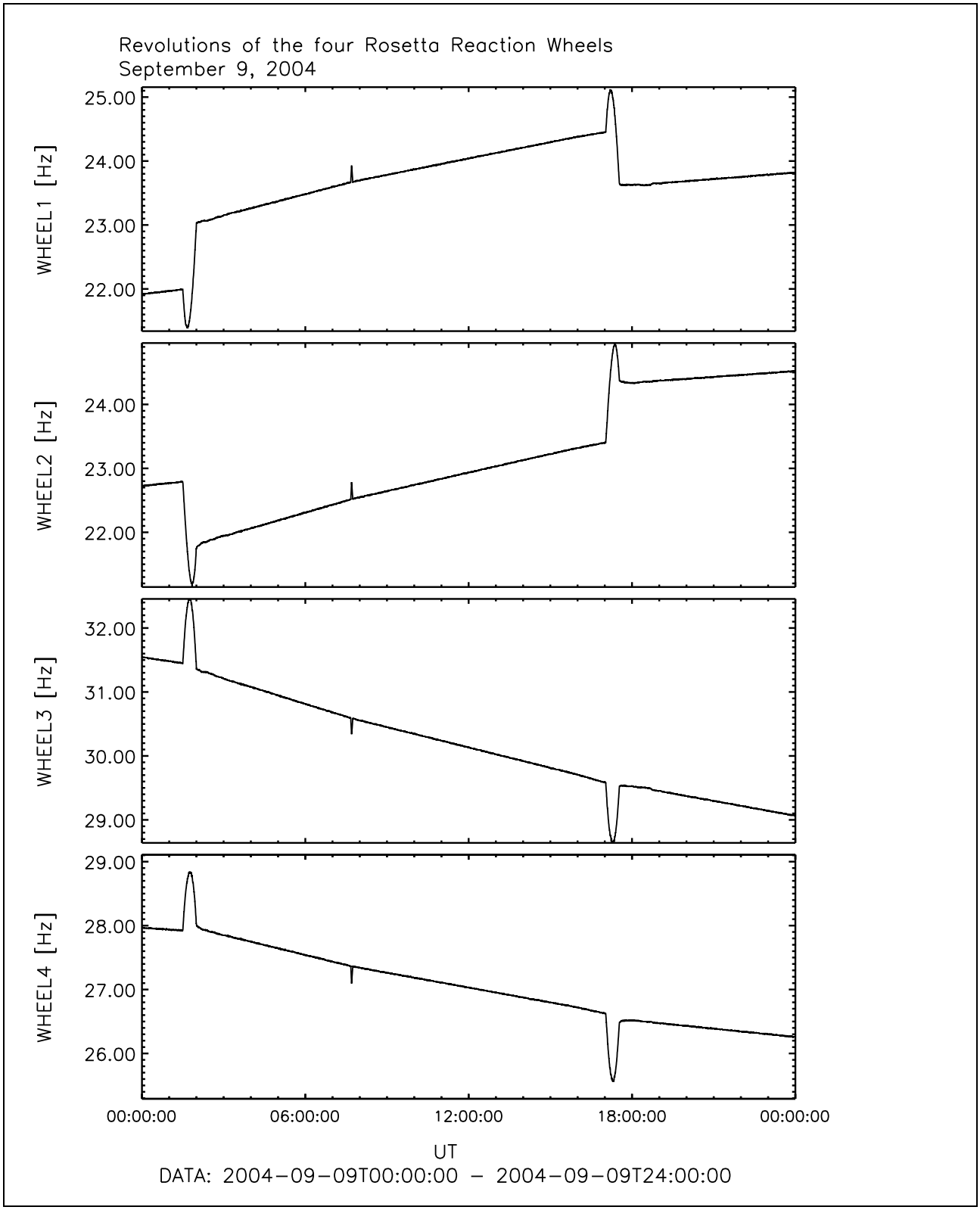

Figure 71: File: wheels_Hz2004-09-09T00-00

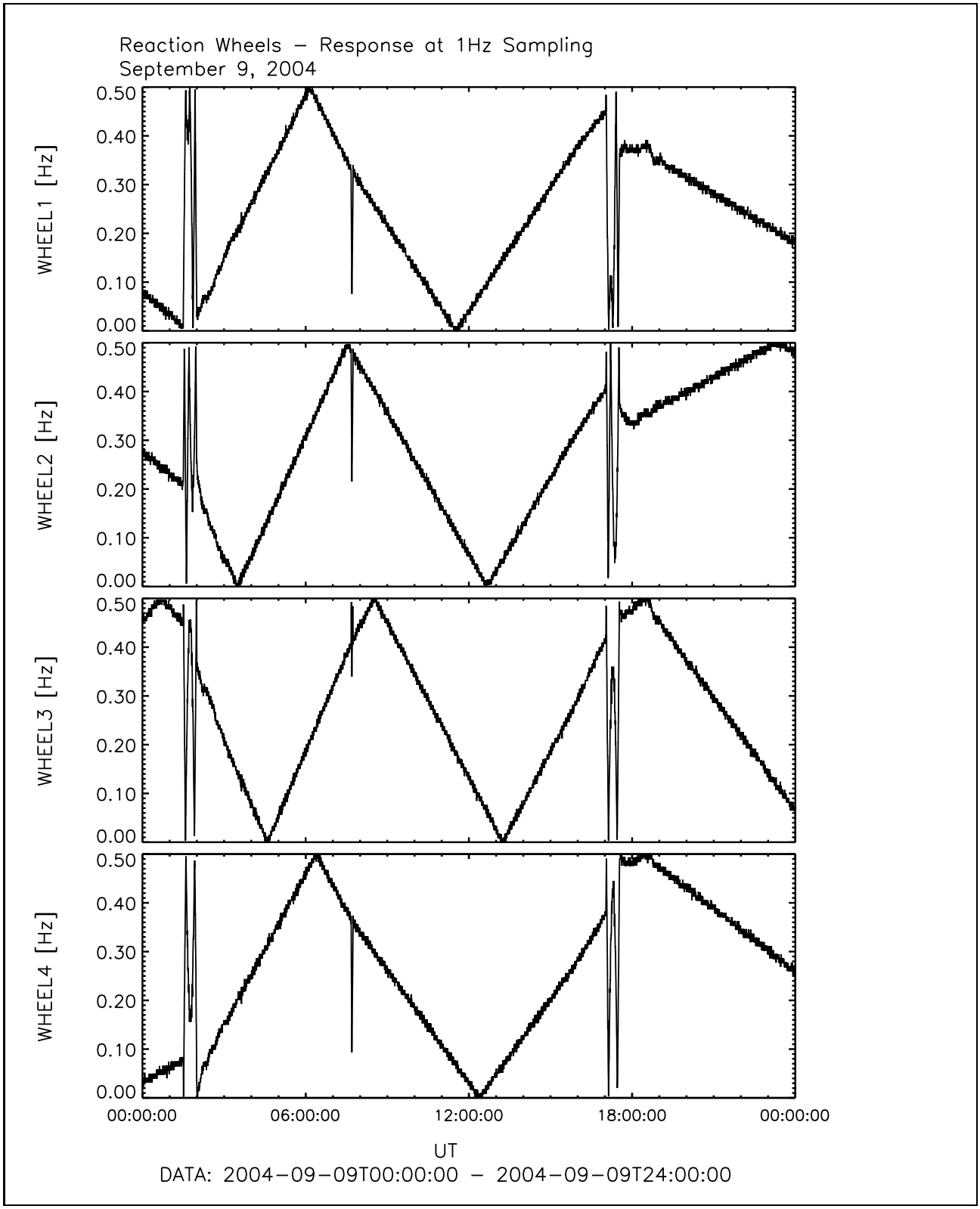

Figure 72: File: wheels_1Hz_Sampling2004-09-09T00-00

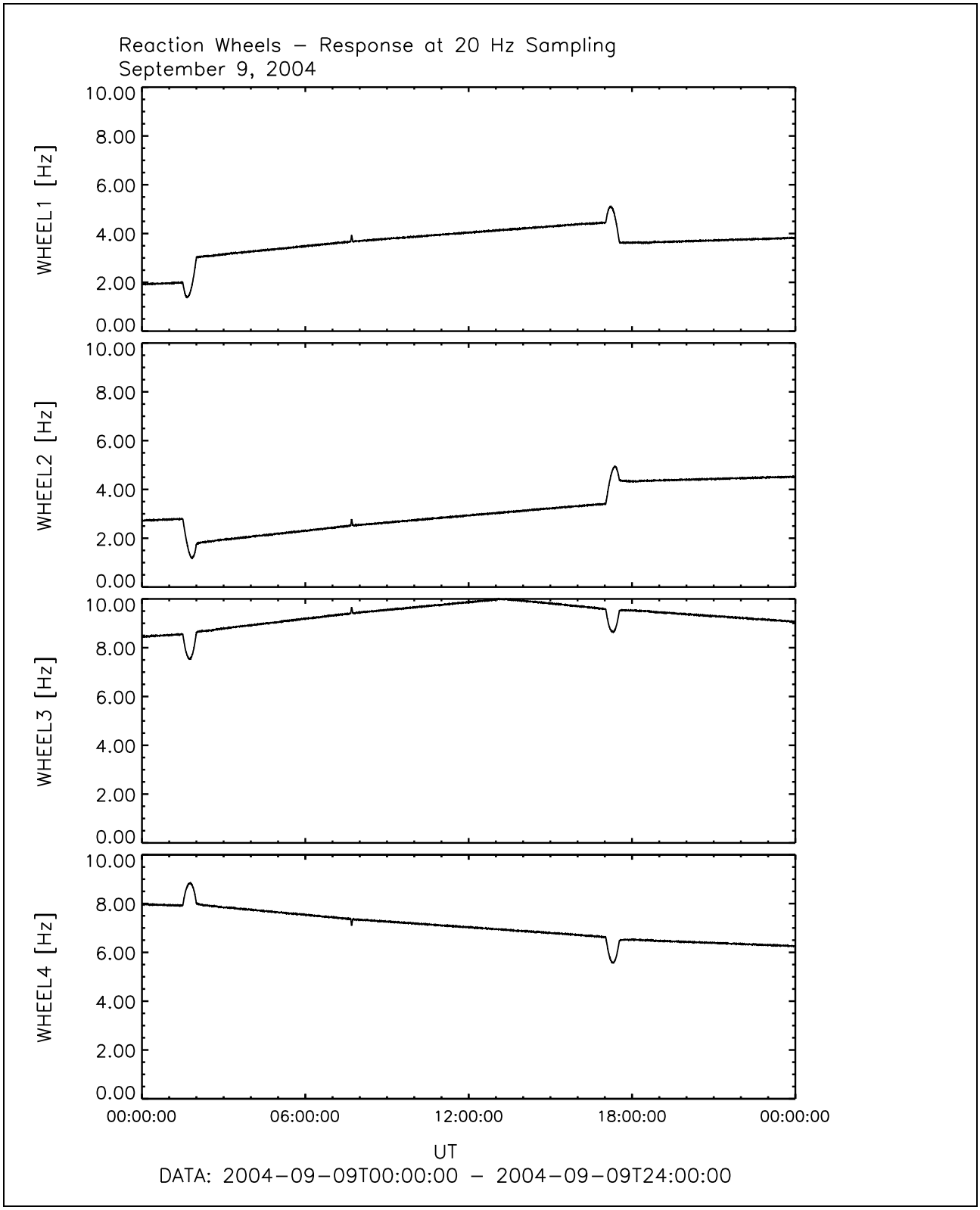

Figure 73: File: wheels_20Hz_Sampling2004-09-09T00-00

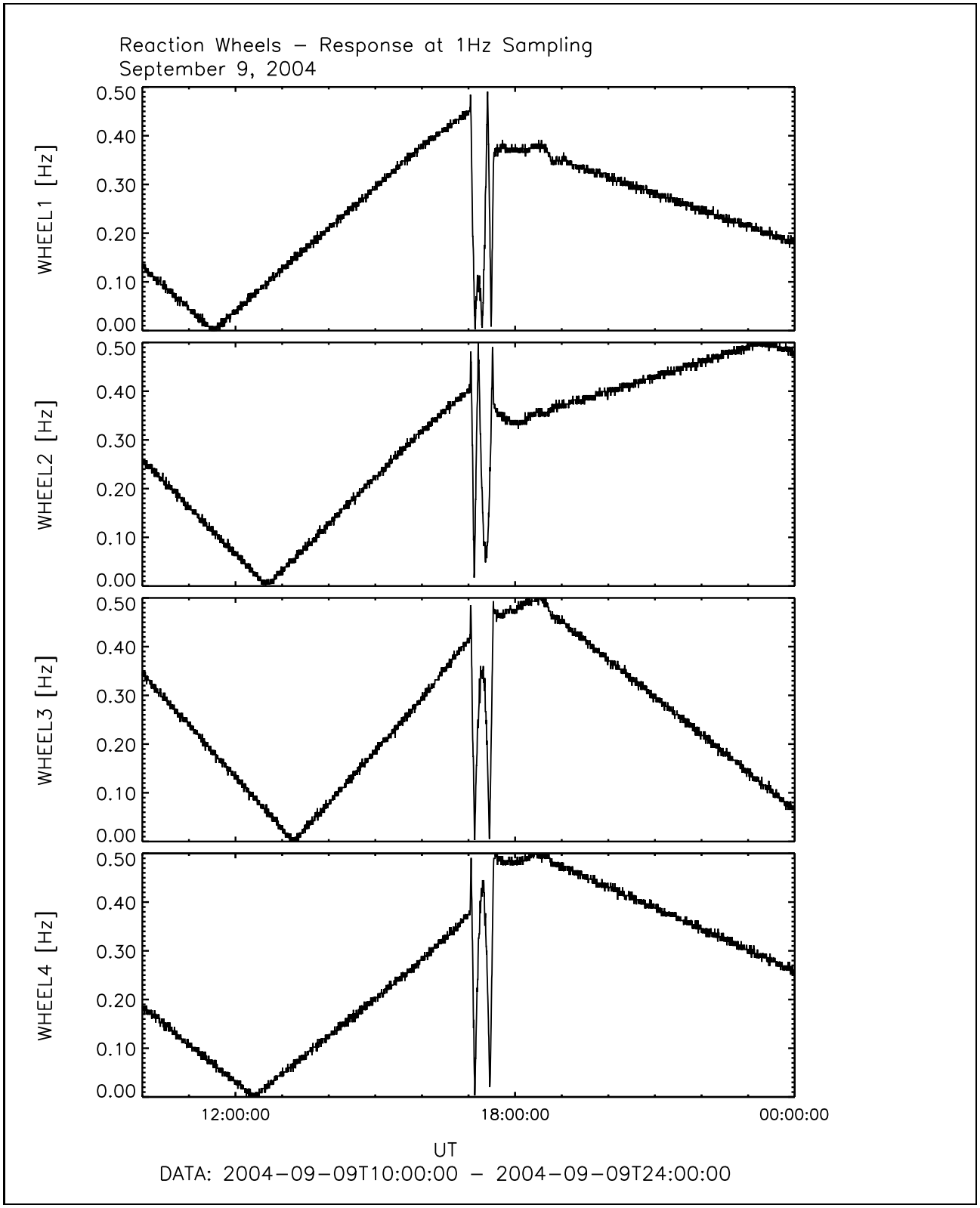

Figure 74: File: wheels_1Hz_Sampling2004-09-09T10-00

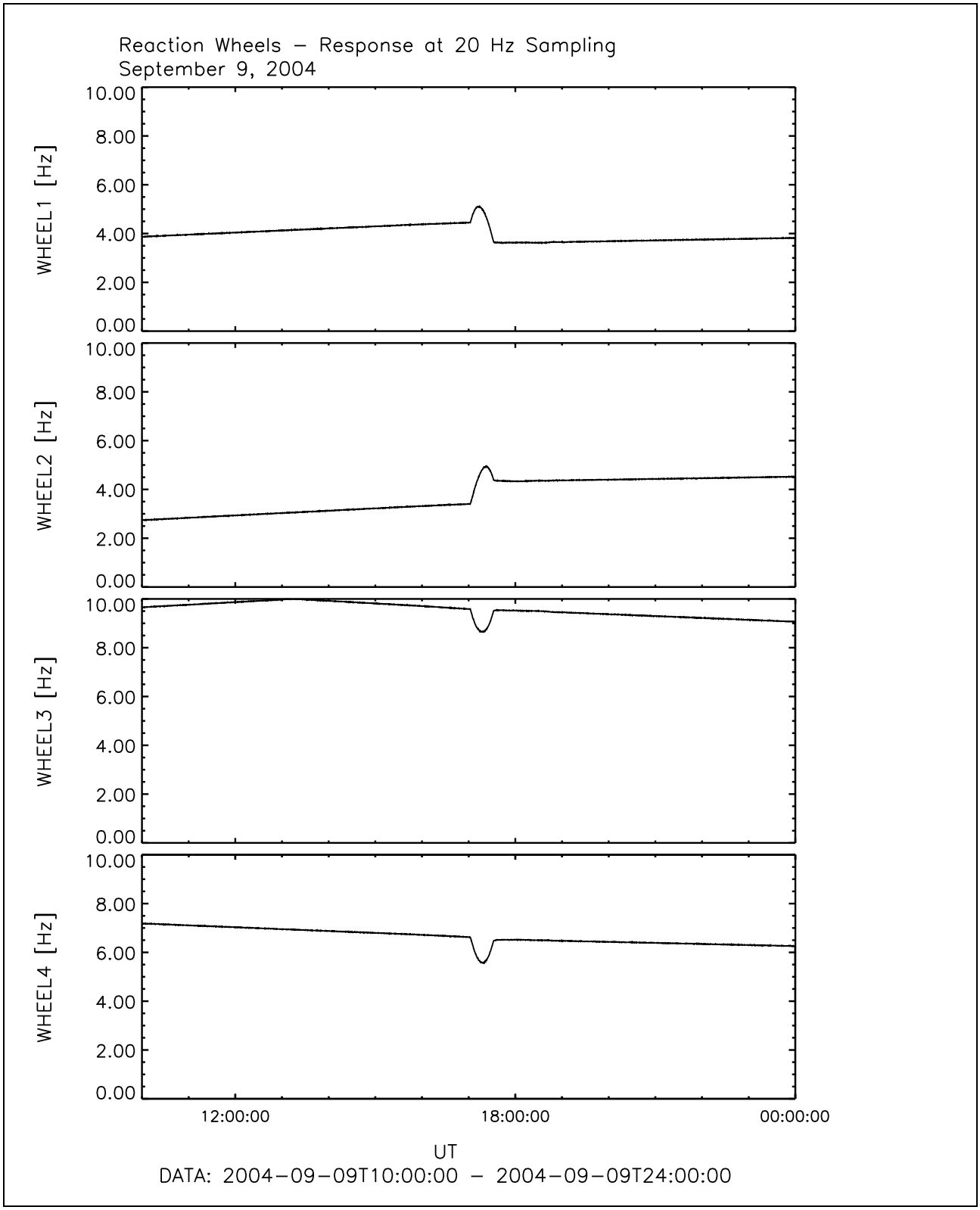

Figure 75: File: wheels_20Hz_Sampling2004-09-09T10-00

5.4 Plots of Reaction Wheel and LAP Disturbance corrected Data

The following plots show the dynamic spectra of the LEVEL_H data. These data have been purged from ROSETTAs reaction wheel disturbance and also from the disturbance of the LAP instrument. Plots are only shown for the primary sensor.

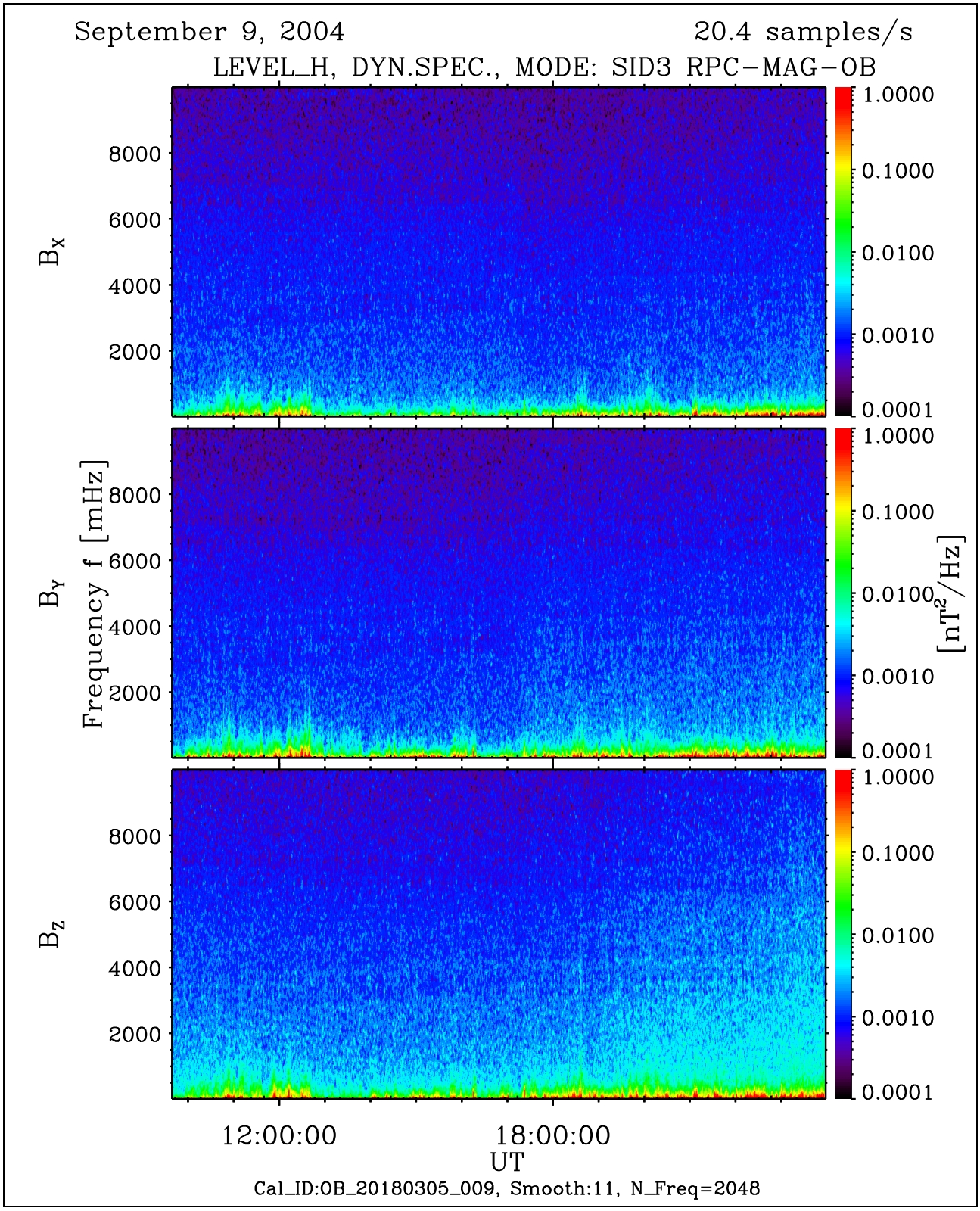

Figure 76: File: RPCMAG040909T0938_CLH_OB_M3_DS0_10000_009

6 September 10, 2004:

6.1 Actions

Time	Stage A, Stage B,Filter cfg	Stage 1, Stage 2, Stage3	Mode
00:00 – 01:21	0 0 0	0 0 0	SID3
01:21 – 01:31	1 2 0	1 2 0	SID2

6.2 Plots of Calibrated Data using the new Temperature Model

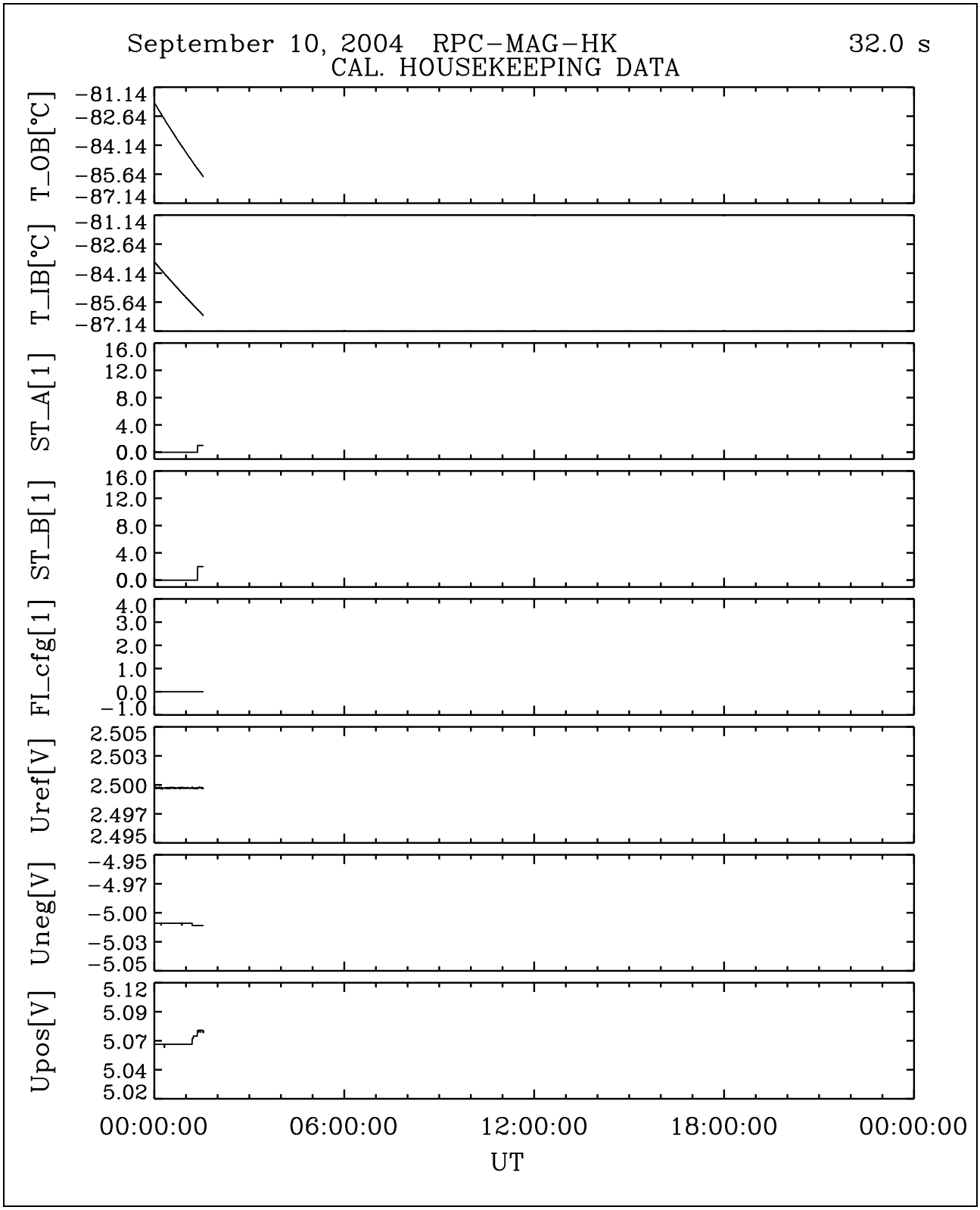

Figure 77: File: RPCMAG040910T0000_CLA_HK_P0000_2400

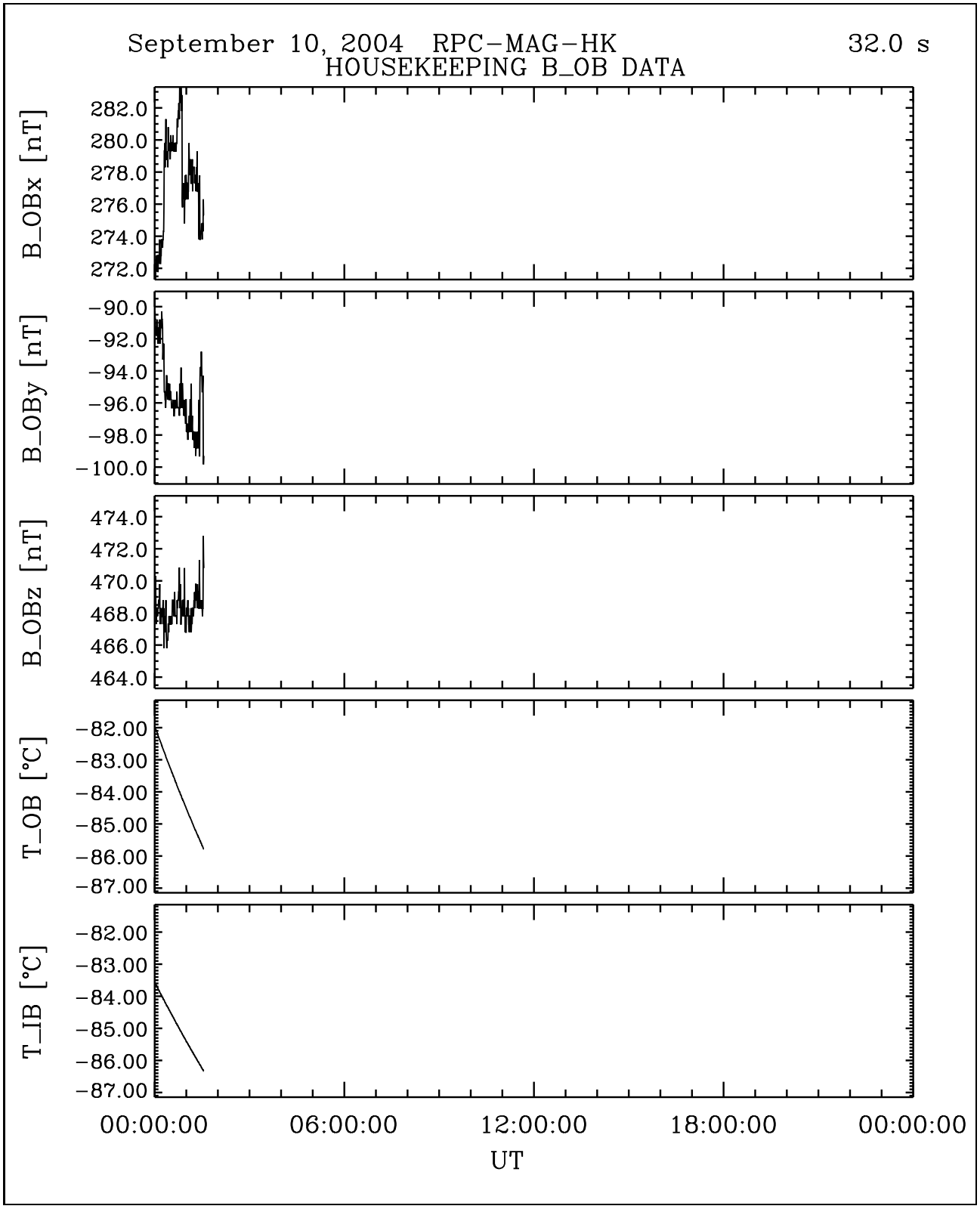

Figure 78: File: RPCMAG040910T0000_CLA_HK_B_P0000_2400

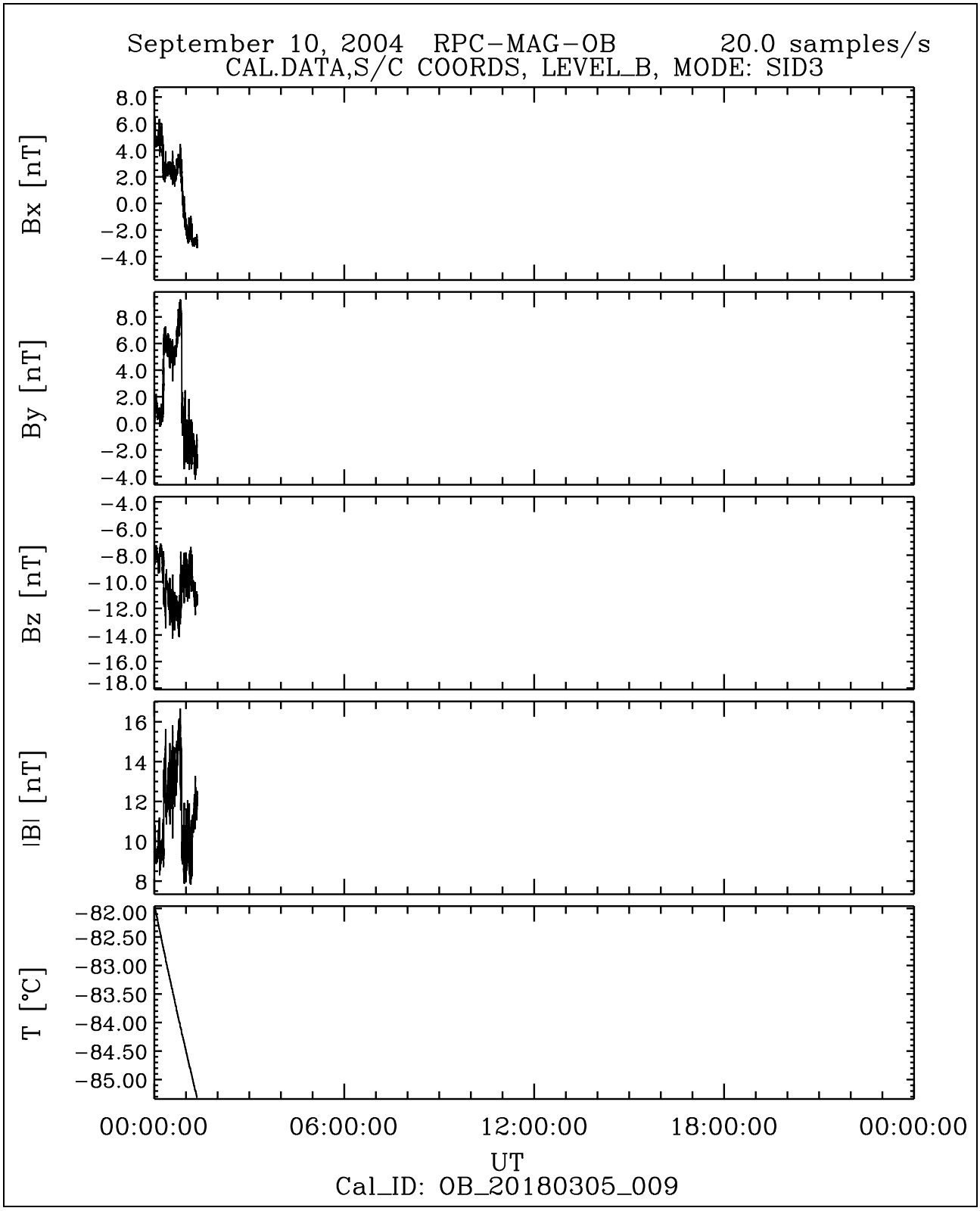

Figure 79: File: RPCMAG040910T0000_CLB_OB_M3_T0000_2400_009

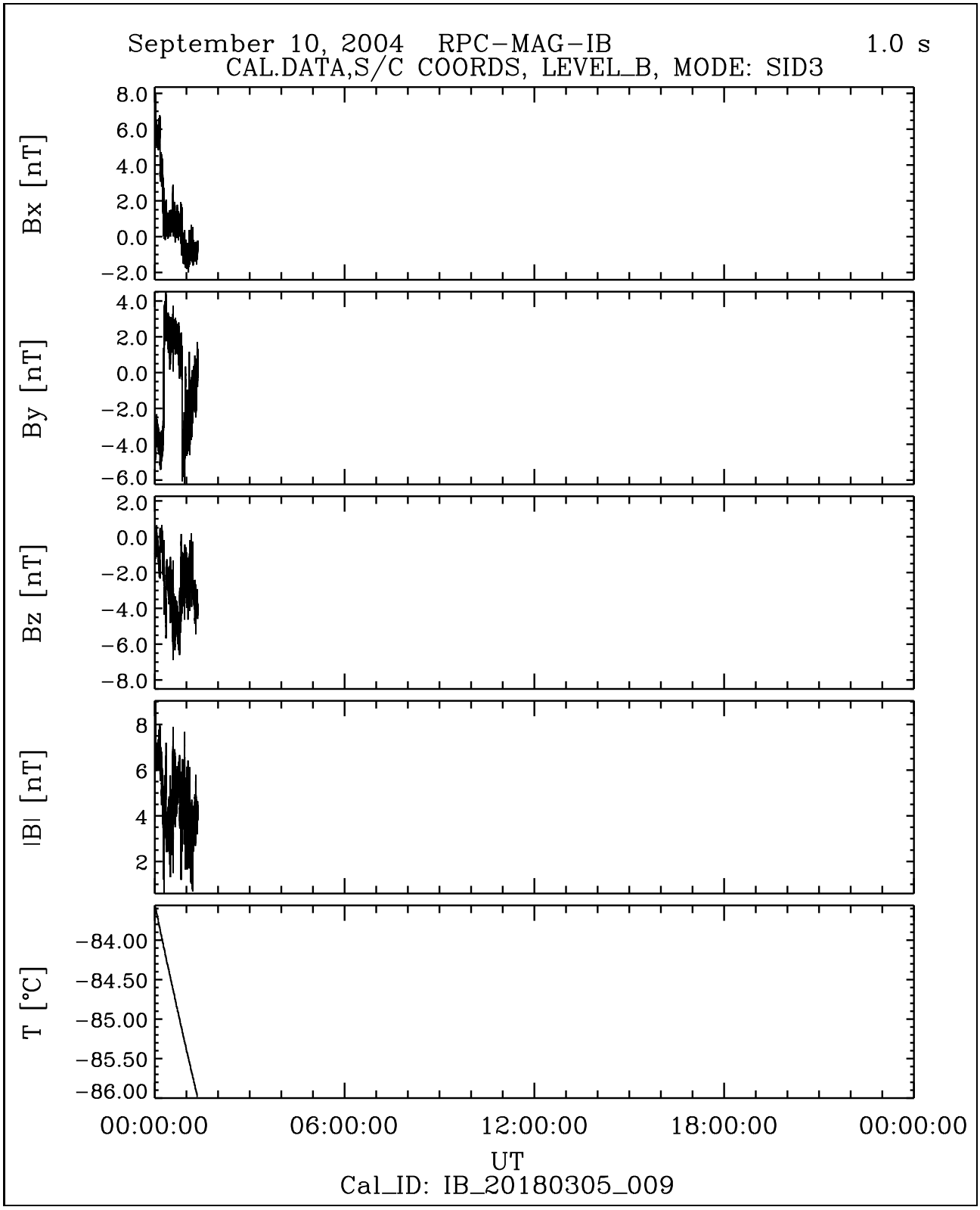

Figure 80: File: RPCMAG040910T0000_CLB_IB_M3_T0000_2400_009

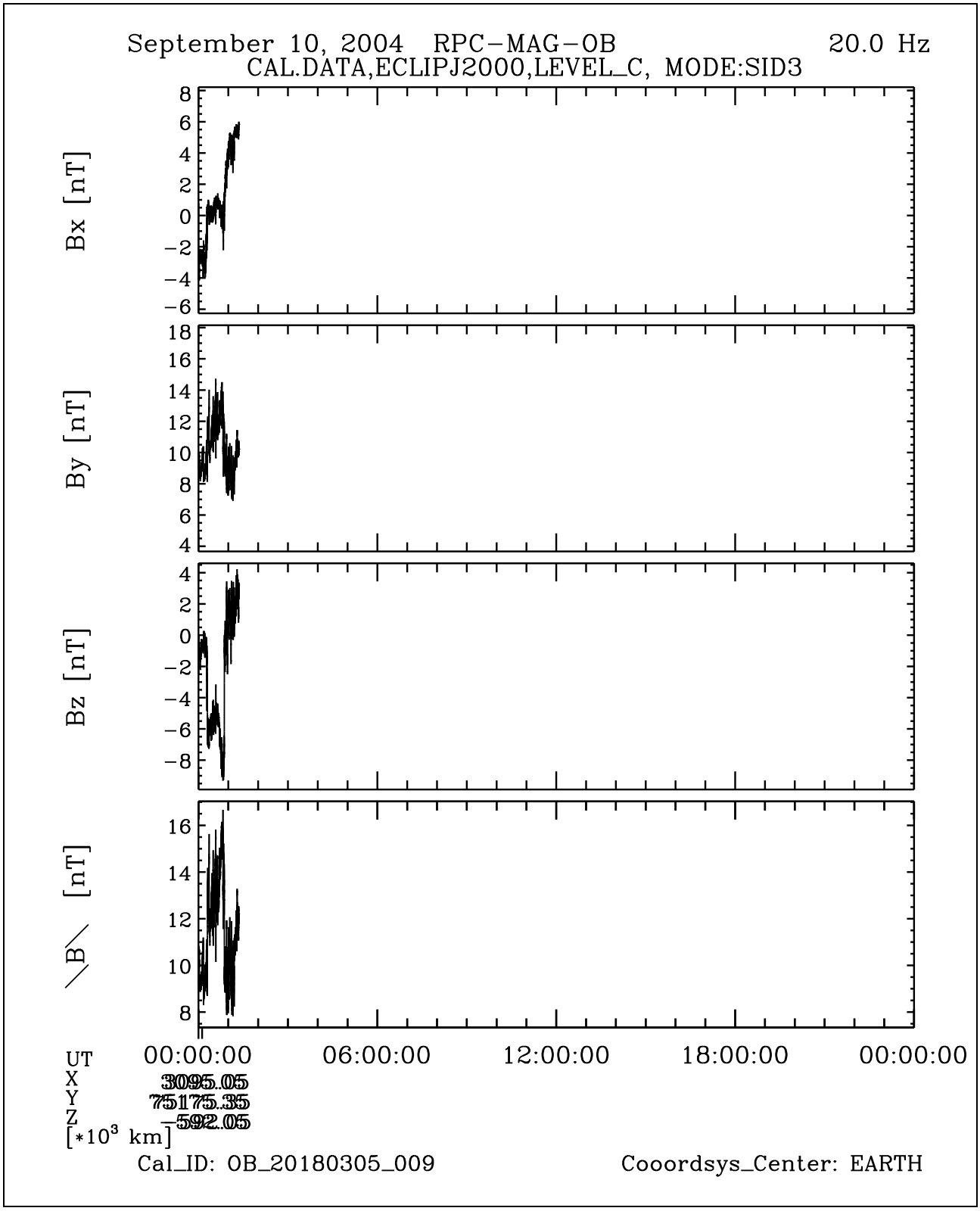

Figure 81: File: RPCMAG040910T0000_CLC_OB_M3_T0000_2400_009

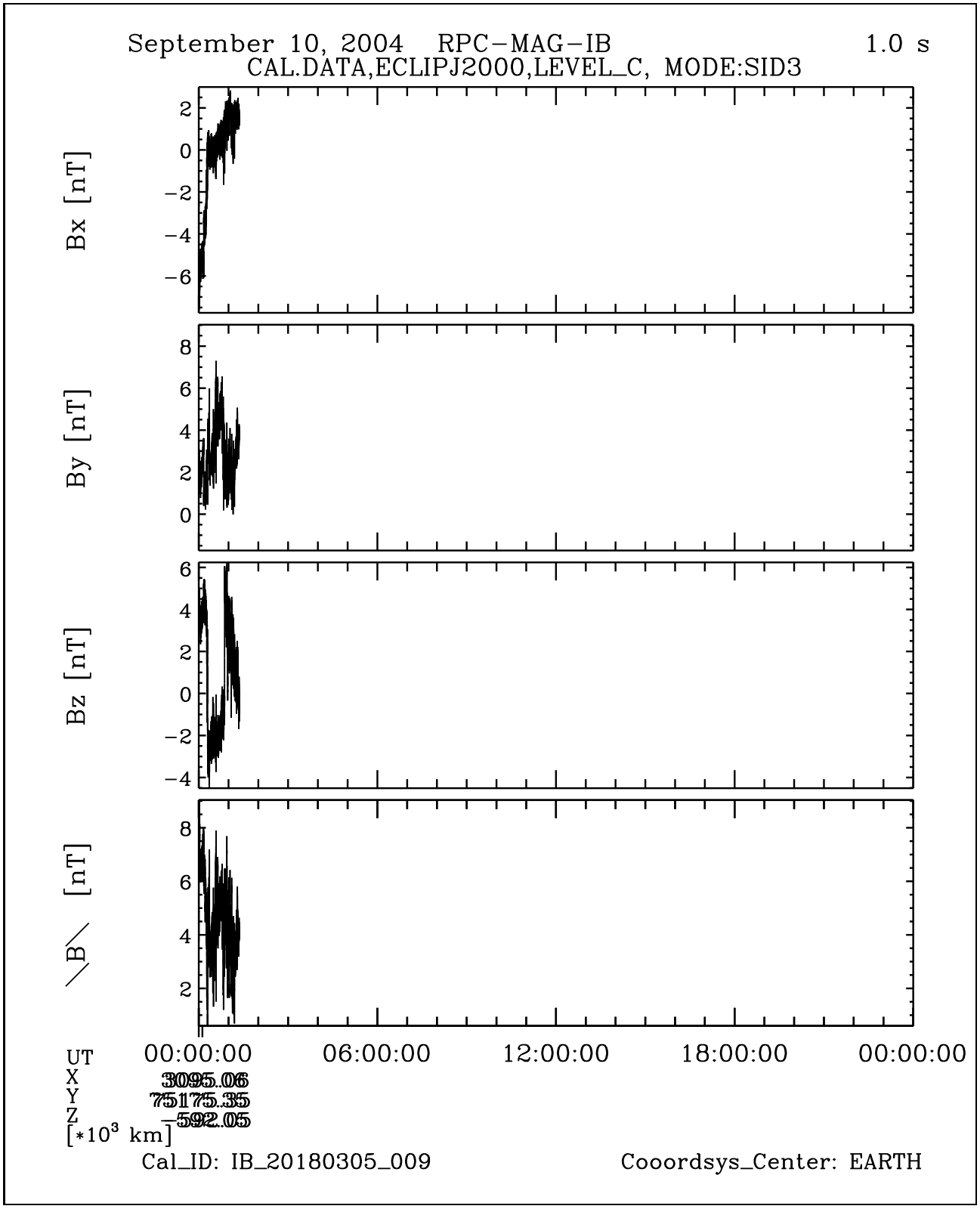

Figure 82: File: RPCMAG040910T0000_CLC_IB_M3_T0000_2400_009

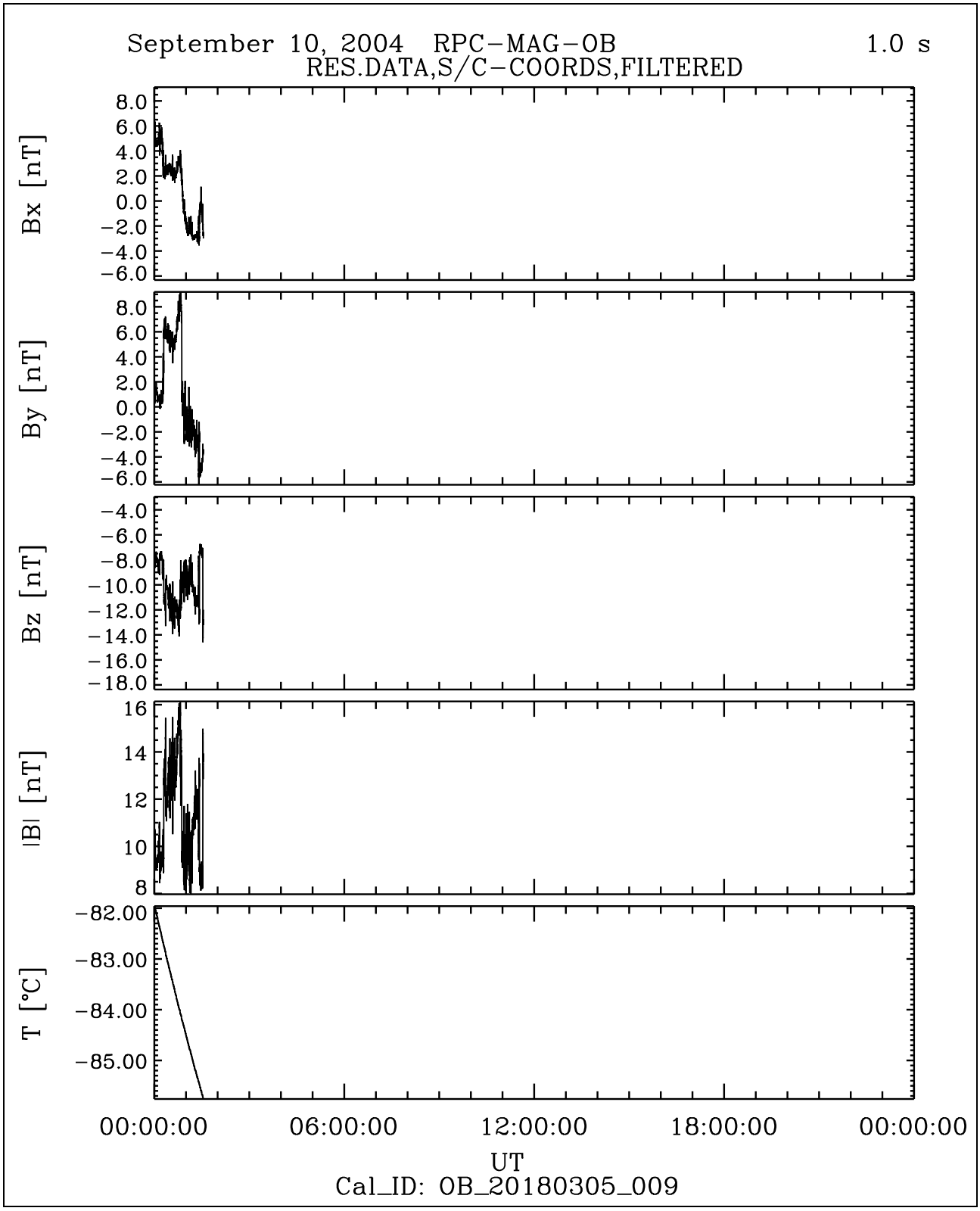

Figure 83: File: RPCMAG040910_CLF_OB_A1_T0000_2400_009

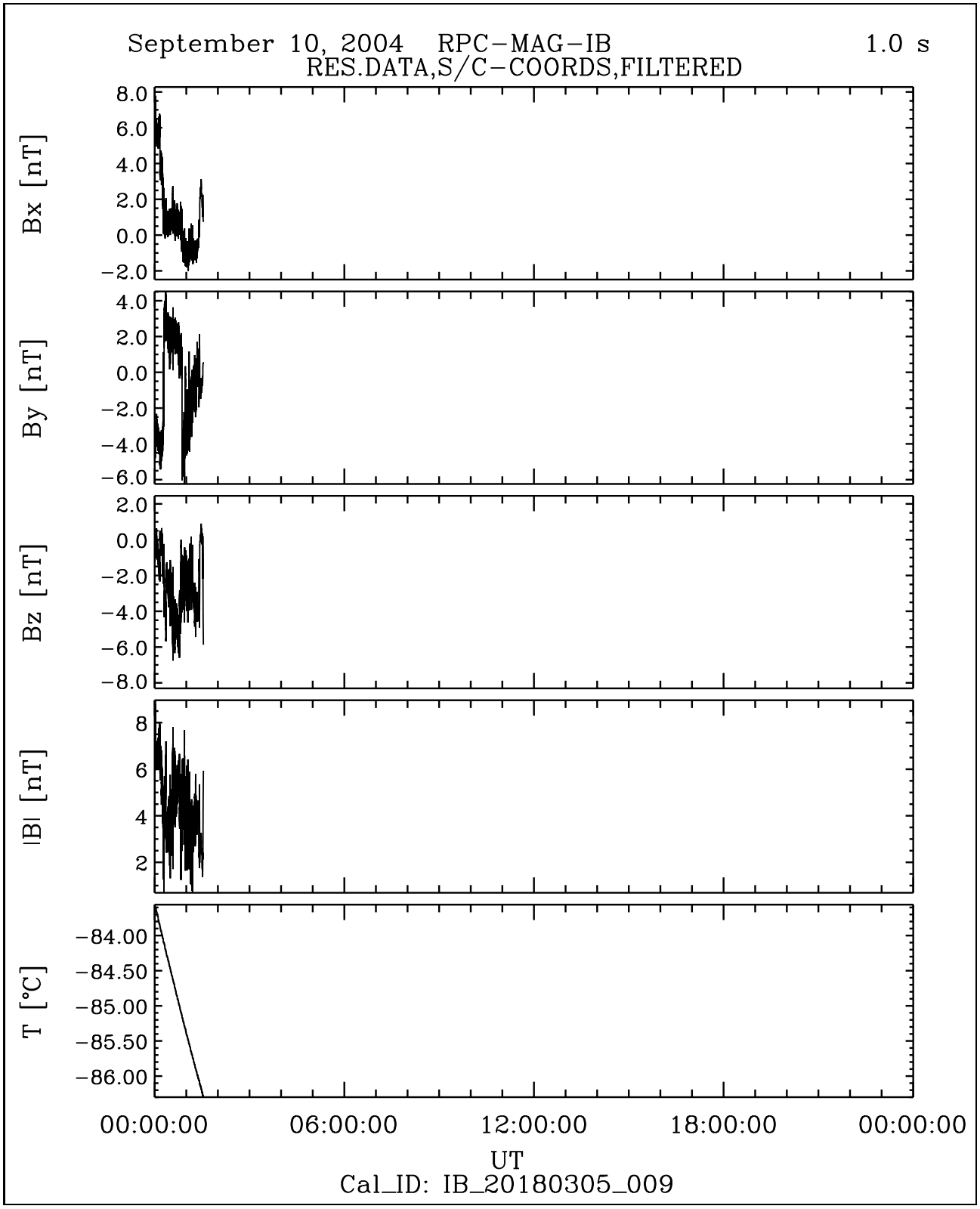

Figure 84: File: RPCMAG040910_CLF_IB_A1_T0000_2400_009

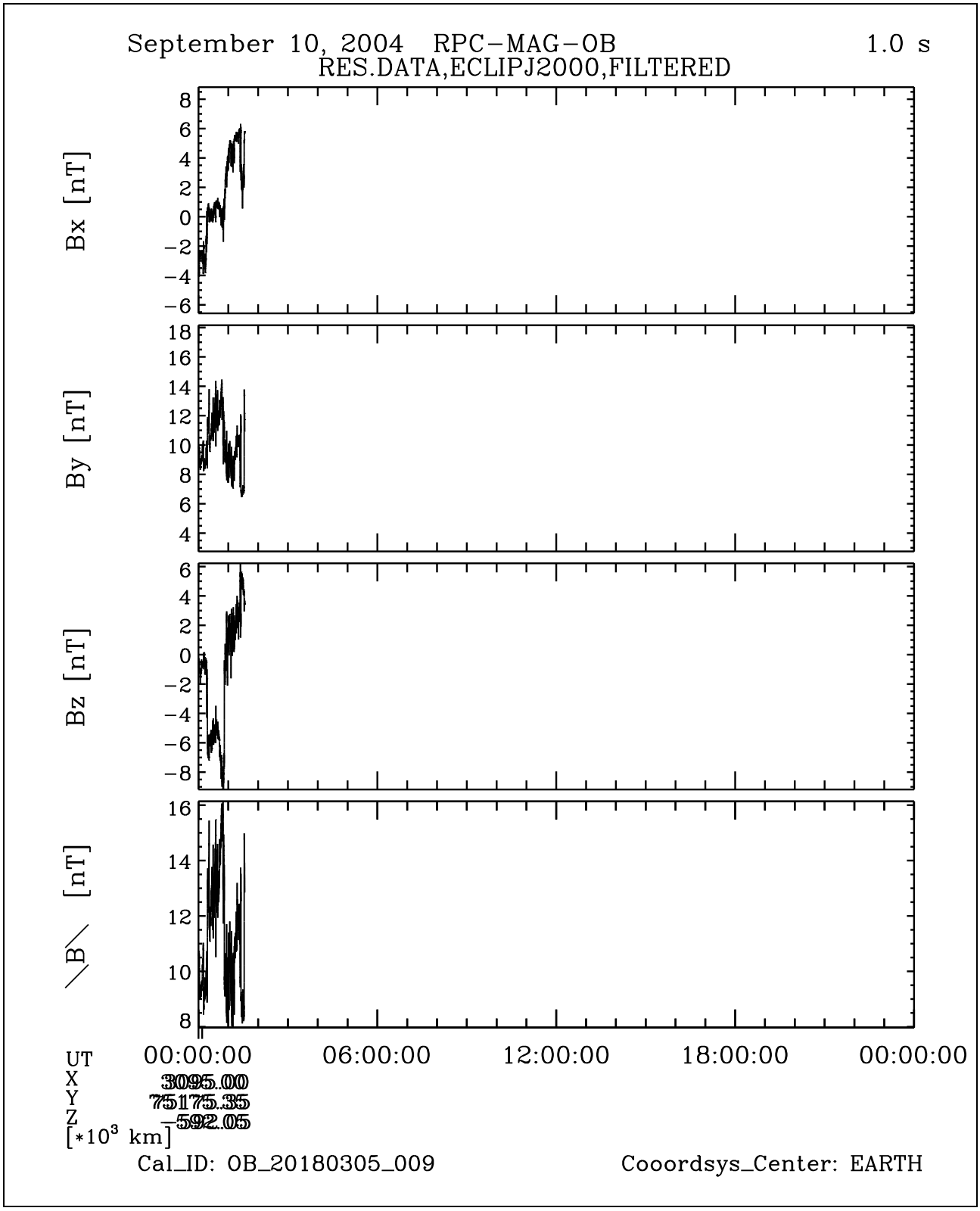

Figure 85: File: RPCMAG040910_CLG_OB_A1_T0000_2400_009

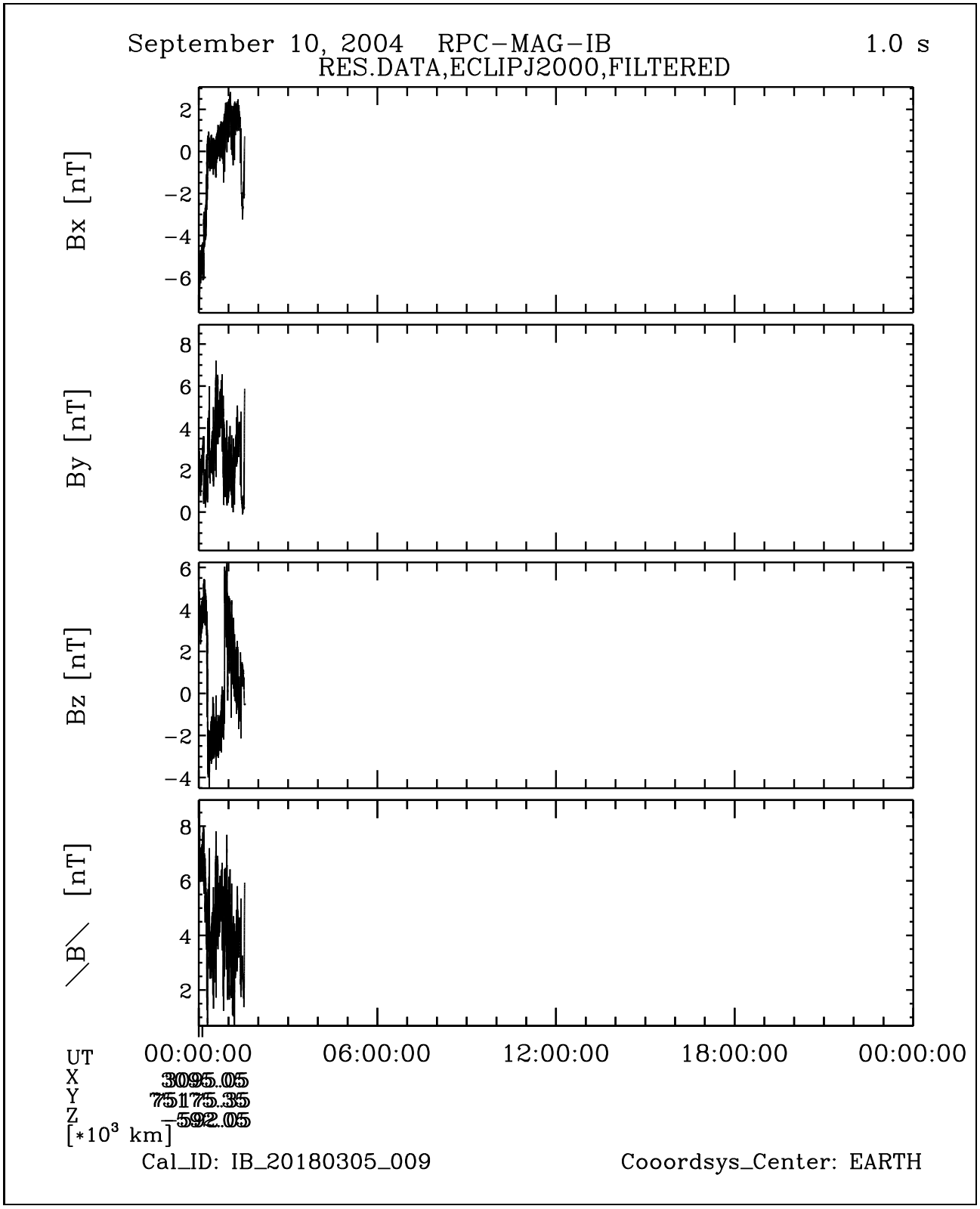

Figure 86: File: RPCMAG040910_CLG_IB_A1_T0000_2400_009

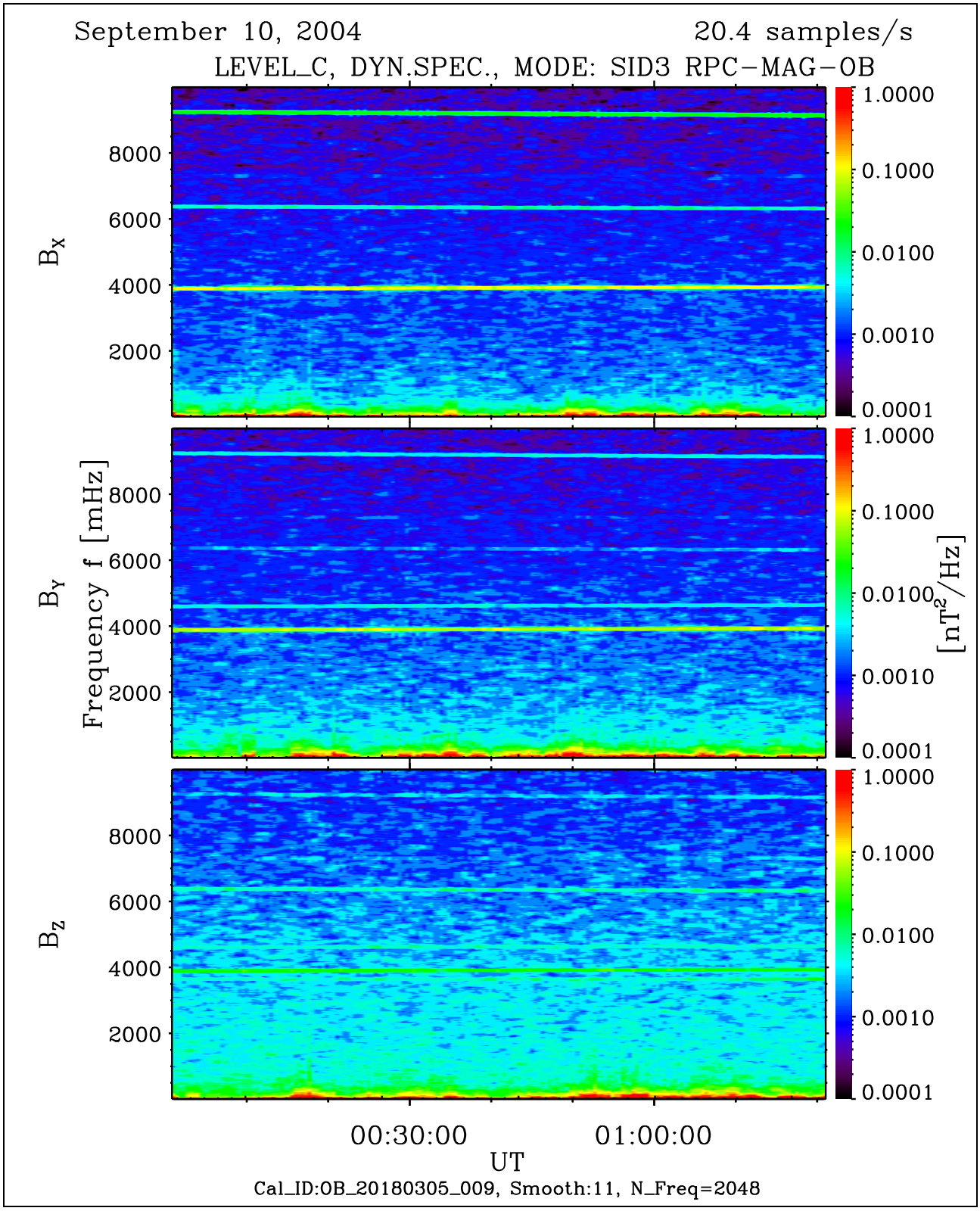

Figure 87: File: RPCMAG040910T0000_CLC_OB_M3_DS0_10000_009

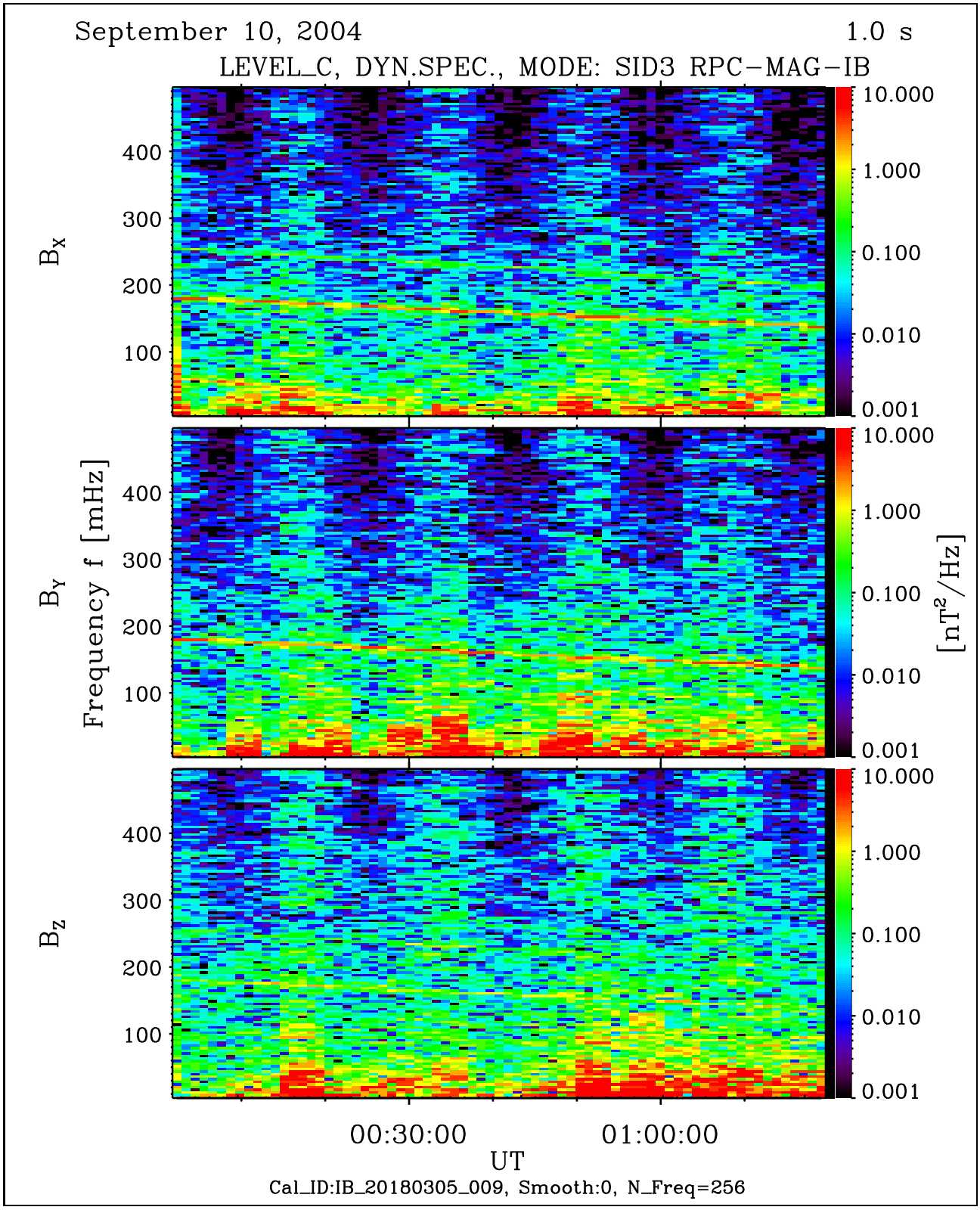

Figure 88: File: RPCMAG040910T0000_CLC_IB_M3_DS0_500_009

6.3 Plots of ROSETTA's Reaction Wheels Speeds

The following plots show the time series of the revolutions of the 4 reaction wheels. Two kinds of data are shown:

- The original reaction wheel data as they are stored in the DDS.
- The theoretical response of the wheels impact seen by an instrument sampling with different frequencies. Here the response in the at 20 Hz and 1 Hz sampling frequency is plotted.

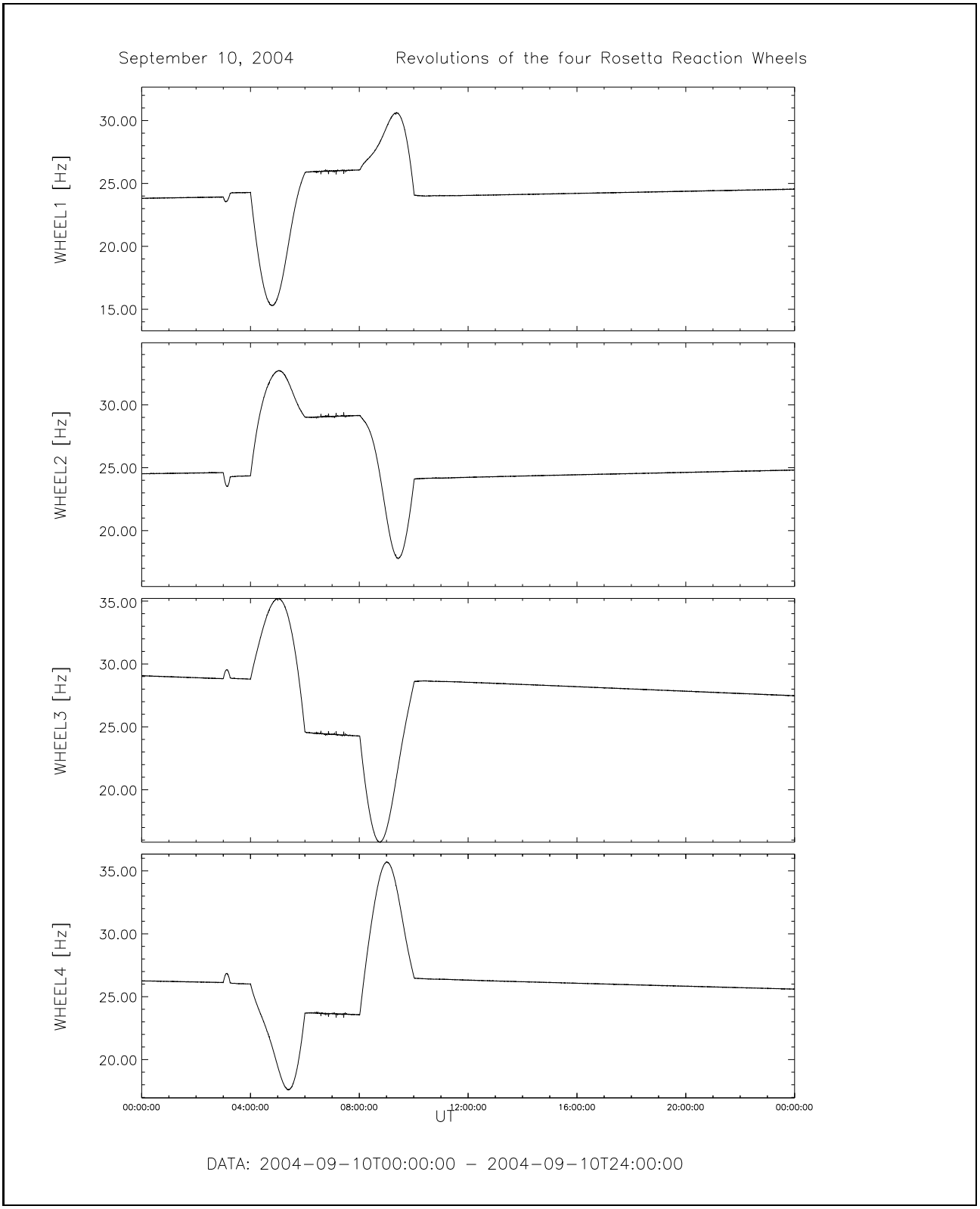

Figure 89: File: wheels_Hz2004-09-10T00-00

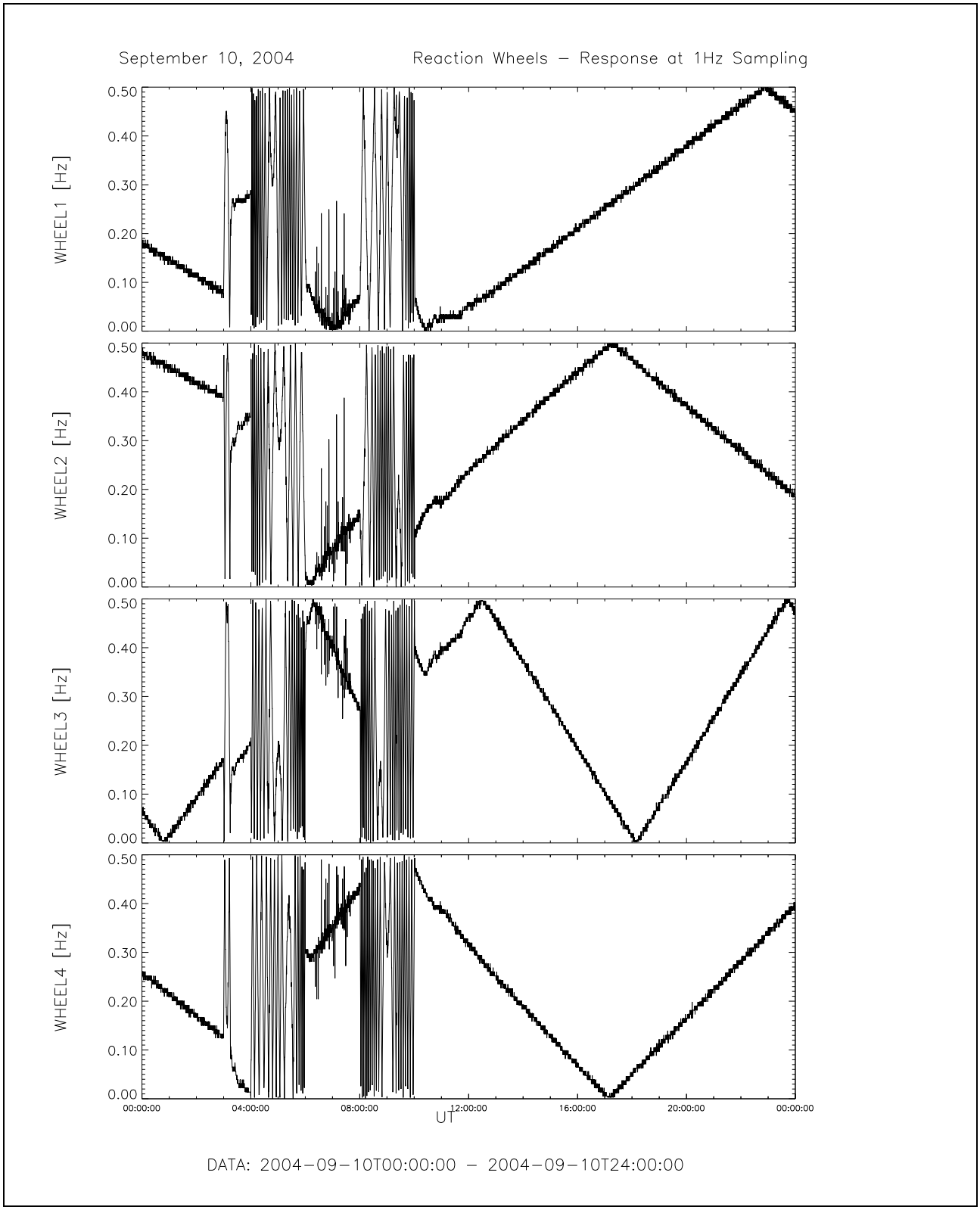

Figure 90: File: wheels_1Hz_Sampling2004-09-10T00-00

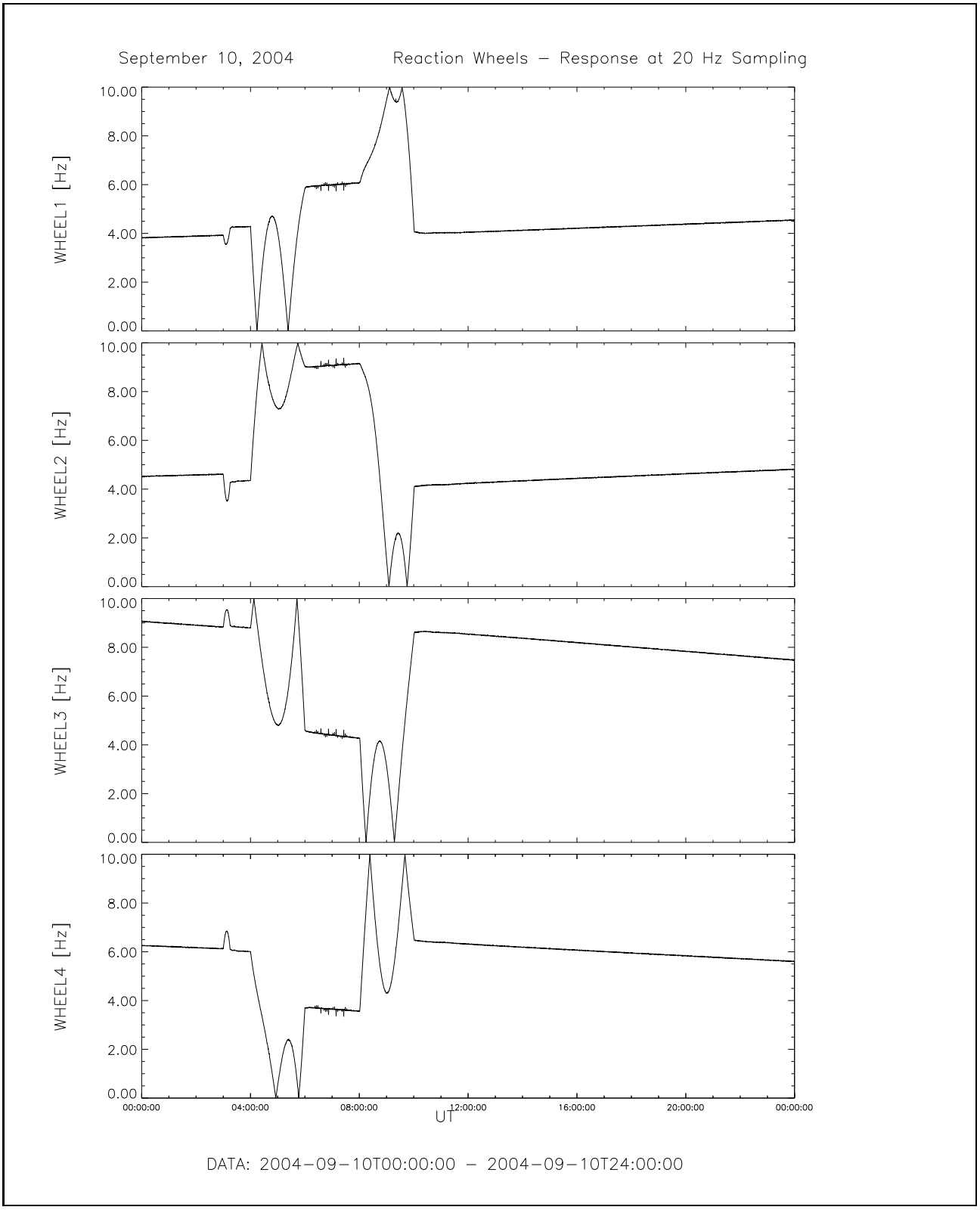

Figure 91: File: wheels_20Hz_Sampling2004-09-10T00-00

6.4 Plots of Reaction Wheel and LAP Disturbance corrected Data

The following plots show the dynamic spectra of the LEVEL_H data. These data have been purged from ROSETTAs reaction wheel disturbance and also from the disturbance of the LAP instrument. Plots are only shown for the primary sensor.

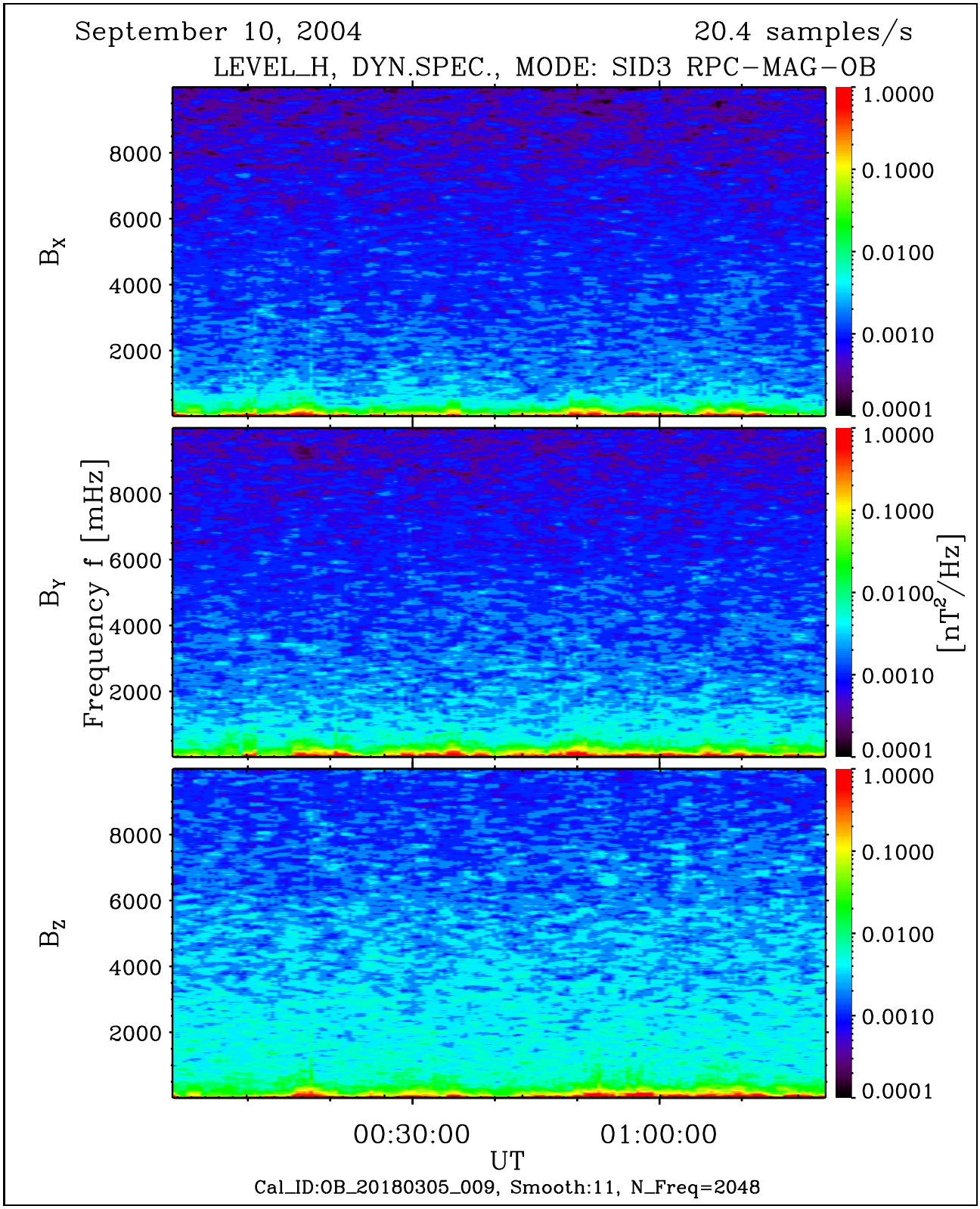

Figure 92: File: RPCMAG040910T0000_CLH_OB_M3_DS0_10000_009