Harvard Forest Data Archive HF004−01

Data File:

Name = hf004−01−final.csv
Description = final data
Rows = 282072 Columns = 58
MD5 checksum = c5ca432e874874751ebaf1e36d7a2fb0

Variables:

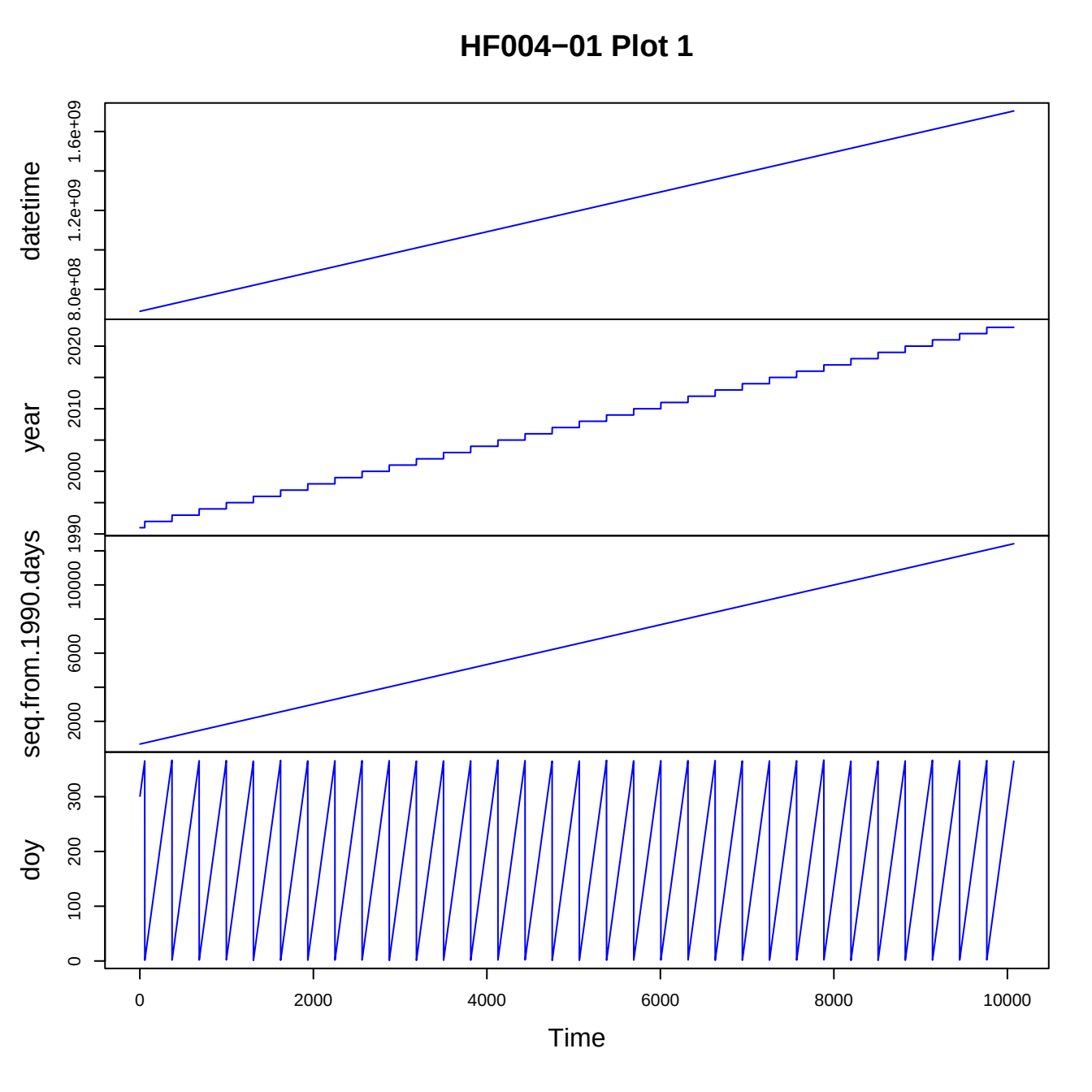
datetime = date and time for data point
year = year for data point
seq.from.1990.days = data point time given as sequential day
   starting at Jan 1, 1990 (EST noon on 1/1/90 = 1.5). Time given at start of
   hourly intervals. (nominalDay)
doy = day of year (nominalDay)
wind.sp = wind speed measured by sonic anemometer at 29m
   (metersPerSecond)
wind.dir = wind direction measured by sonic anemometer at 29m
   (degree)
eddy.t = temperature sonic anmemomometer speed of sound measuremnet
   (celsius)
eddy.q = water vapor concentration at 29 m determined by Licor
   CO2/H2O sensor (millimolePerMole)
o3.mlb = inferred concentration from fast response ozone detector
   (partsPerBillion)
no.y = total nitrogen oxides concentration (partsPerTrillion)
s.no.y = standard deviation of NOy concentration in the hour
   (partsPerTrillion)
co = CO concentration at 29m (partsPerBillion)
s.co = standard deviaion of CO concentraition in the hour
   (partsPerBillion)
f.co2 = observed CO2 eddy covariance fluxes at 29m
   (micromolePerMeterSquaredPerSecond)
f.mom = covariance of vertical and horizontal windspeed (number)
f.heat = sensible heat flux at 29 m (wattPerMeterSquared)
f.h20 = water vapor eddy covariance flux
   (millimolePerMeterSquaredPerSecond)
f.o3 = ozone eddy covariance flux (micromolePerMeterSquaredPerHour)
f.no.y = NOy covariance flux (micromolePerMeterSquaredPerHour)
r.net = net radiation measured by net radiation sensor at 29m
   (wattPerMeterSquared)
par.12.7 = photosynthetically active photon flux at 12.7m, just
   below main canopy (microeinsteinPerMeterSquaredPerSecond)
par.29 = photosynthetically active photon flux at 29m, which is
   above the canopy (microeinsteinPerMeterSquaredPerSecond)
rh.27.9m = relative humidity at top level 27.9 m (measured in
   aspirated shield) (dimensionless)
rh.22.6m = relative humidity at second level 22.6 m (dimensionless)
rh.15.4m = Relative humidity at third level 15.4 m (dimensionless)

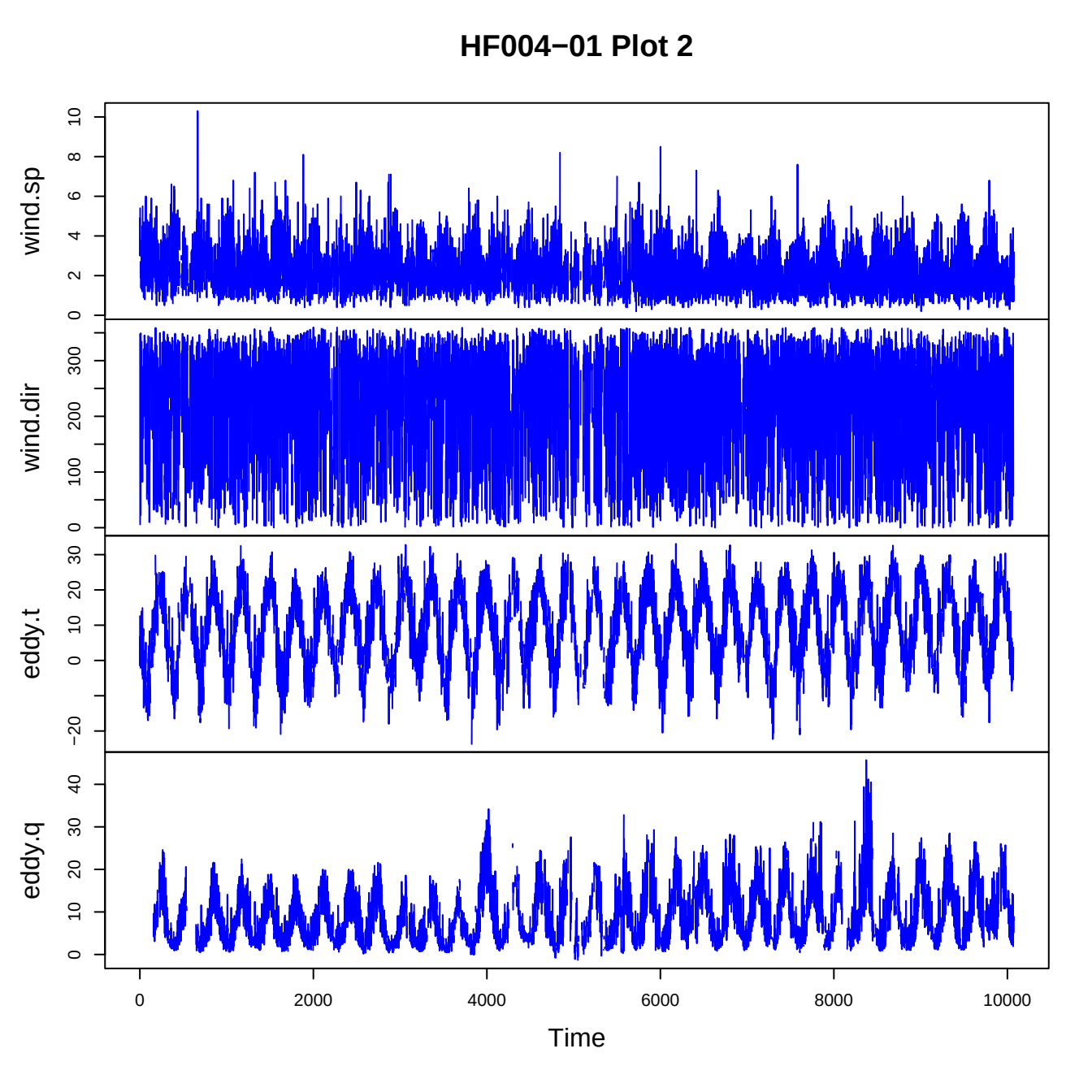
rh.7.6m = relative humidity at fourth level 7.6 m (dimensionless)
rh.2.5m = relative humidity at ground level 2.5m (dimensionless)
ta.27.9m = ambient air temperatures at 27.9m (measured in aspirated shield by precision thermistor) (celsius)
ta.22.6m = ambient air temperature at 22.6m (celsius)
ta.15.4m = ambient air temperature at 15.4m (celsius)
ta.7.6m = ambient air temperature at 7.6m (celsius)
ta.2.5m = ambient air temperature above ground at 2.5m (celsius)
ts.srfm = mean temperature at the soil surface (litter−soil interface) average of multiple measurement points (celsius)
ts.50m = soil temperature at 50cm (single point) (celsius)
ts.20m = soil temperature at 20cm (celsius)
ts.a1.05cm = soil temperature measured at a depth of 5 cm at position A of an array of soil temperature probes (celsius)
ts.a2.10cm = soil temperature measured at a depth of 10 cm at position A of an array of soil temperature probes (celsius)
ts.a3.20cm = soil temperature measured at a depth of 20 cm at position A of an array of soil temperature probes (celsius)
ts.a4.50cm = soil temperature measured at a depth of 50 cm at position A of an array of soil temperature probes (celsius)
ts.b1.05cm = soil temperature measured at a depth of 5 cm at position B of an array of soil temperature probes (celsius)
ts.b2.20cm = soil temperature measured at a depth of 20 cm at position B of an array of soil temperature probes (celsius)
ts.b3.50cm = soil temperature measured at a depth of 50 cm at position B of an array of soil temperature probes (celsius)
ts.c1.05cm = soil temperature measured at a depth of 5 cm at position C of an array of soil temperature probes (celsius)
ts.c2.05cm = soil temperature measured at a depth of 5 cm at position C of an array of soil temperature probes (celsius)
ts.c3.20cm = soil temperature measured at a depth of 20 cm at position C of an array of soil temperature probes (celsius)
ts.c4.50cm = soil temperature measured at a depth of 50 cm at position C of an array of soil temperature probes (celsius)
co2 = ambient CO2 concentration from continuous fast−response analyzer 29m (partsPerMillion)
co2.stg = CO2 storage term d/dt (integrated column concentration 0−29m) (micromolePerMeterSquaredPerSecond)
p.amb = ambient atmospheric pressure (pascal)
ts.srf.adj = adjusted soil surface accounting for changing sensor response beneath accumulating litter. Not computed after 2000 − sensor position adjusted for annual litter accumulation. (celsius)
par.dir.ue.m2.s = total PAR at 29 meters (microeinsteinPerMeterSquaredPerSecond)
par.dfs.ue.m2.s = diffuse component of PAR at 29 meters (microeinsteinPerMeterSquaredPerSecond)
par.ref.ue.m2.s = PAR reflected from surface at 29 meters (microeinsteinPerMeterSquaredPerSecond)
fco2.7200 = observed CO2 eddy covariance fluxes at 29m from secondary enclosed−path Licor−7200 sensor (micromolePerMeterSquaredPerSecond)
fh2o.7200 = water vapor eddy covariance flux from secondary enclosed−path Licor−7200 sensor (millimolePerMeterSquaredPerSecond)

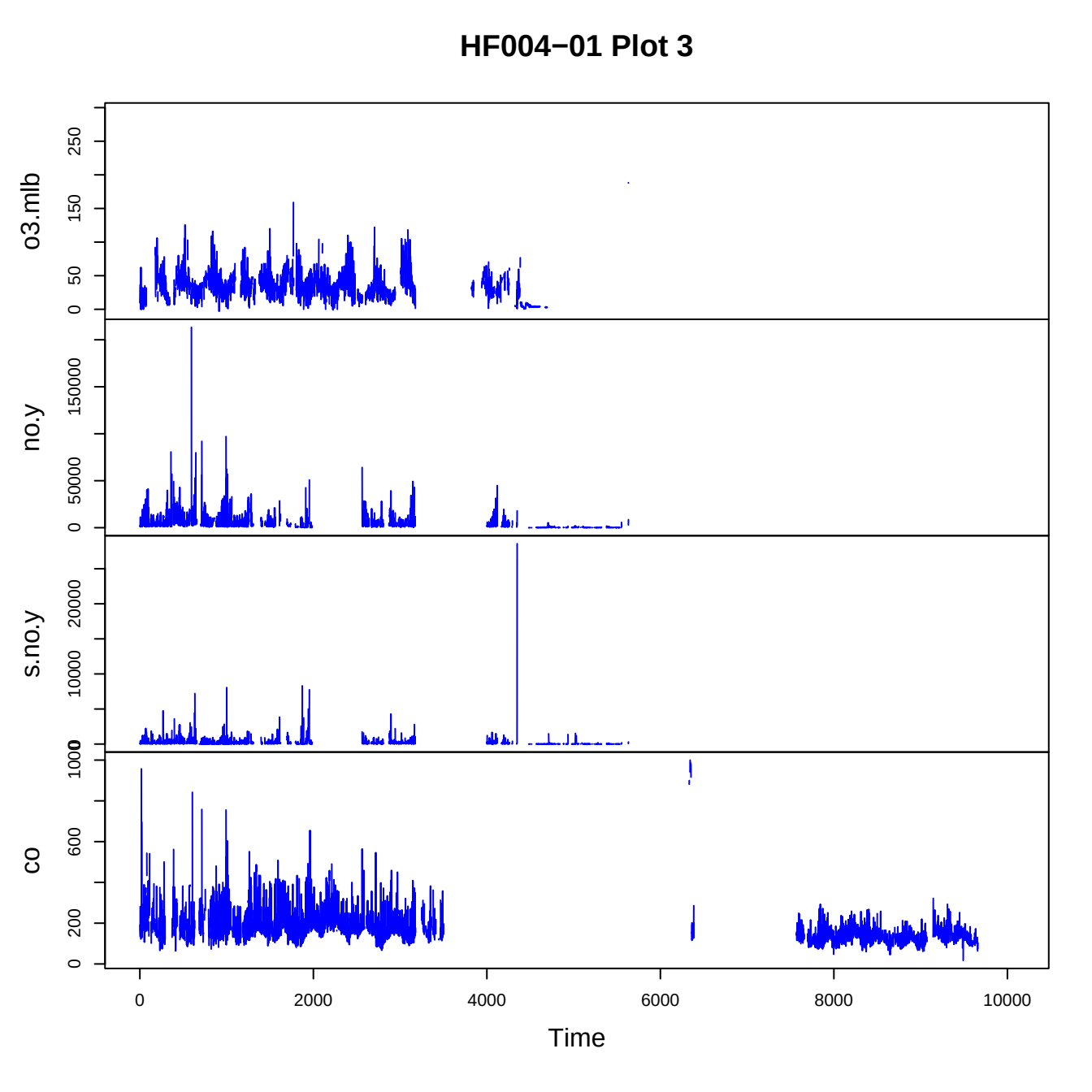
co2.7200 = ambient CO2 concentration at 29 m from secondary
   enclosed−path Licor−7200 sensor (partsPerMillion)
eddy.q.7200 = water vapor concentration at 29 m from secondar
   enclosed−path Licor−7200 sensor (millimolePerMole)

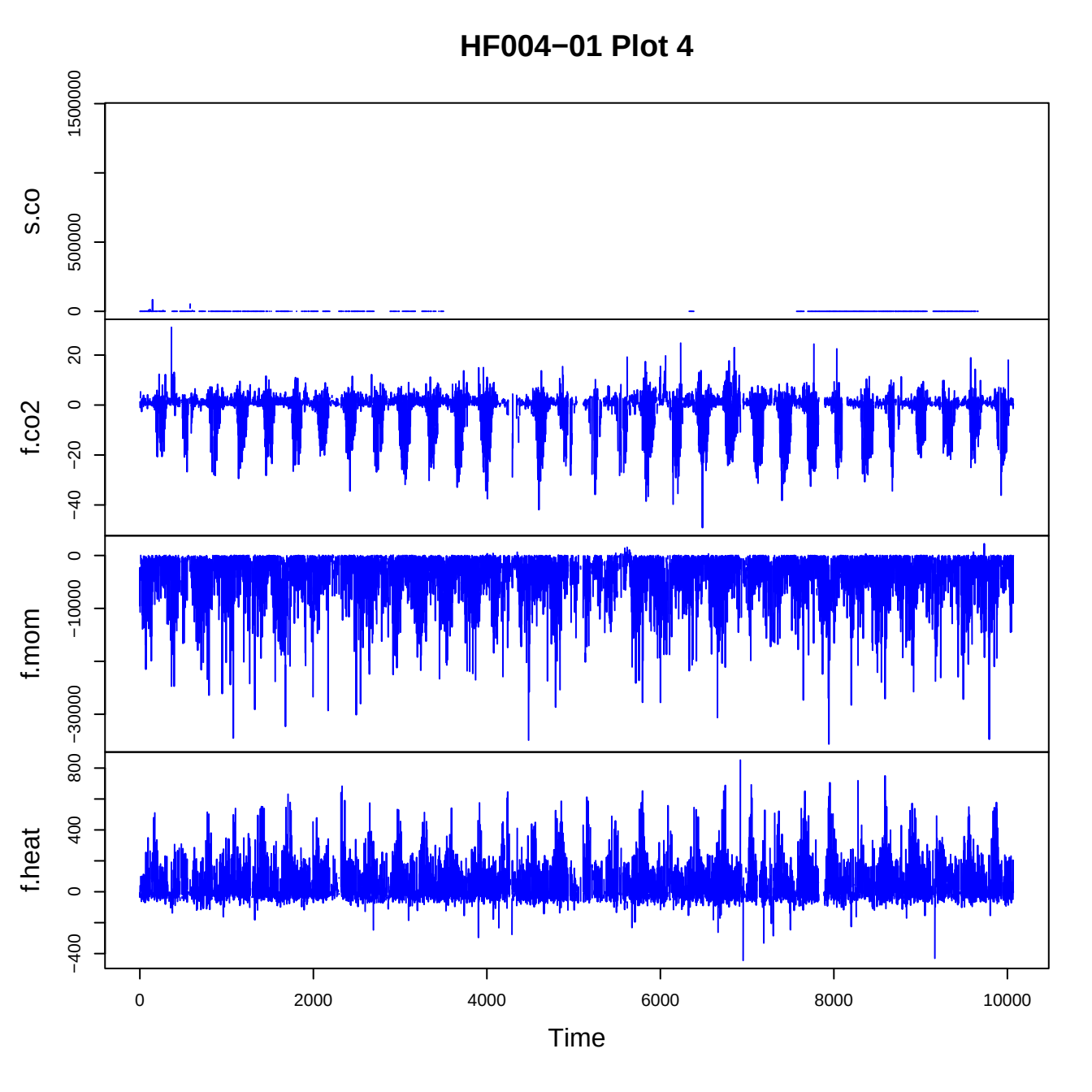
Variable	Min	Median	Mean	Max	NAs
datetime	1991-10-28T00:00			2023-12-31T23:00	0
year	1991.000	2007.000	2007.408	2023.000	0
seq.from.199	666.000	6542.479	6542.479	12418.958	0
doy	1.000	184.625	184.433	366.958	0
wind.sp	0.000	2.000	2.178	12.300	38288
wind.dir	0.000	229.000	218.415	359.900	58396
eddy.t	-27.300	10.000	9.380	34.700	58711
eddy.q	-16.000	7.500	9.029	52.600	67871
o3.mlb	-13.000	32.000	33.337	295.000	212427
no.y	-10.000	2328.000	5047.346	259161.000	218144
s.no.y	0.000	80.000	256.499	59268.000	214664
co	2.800	155.000	171.970	1198.000	149784
s.co	0	1	1140	24153720	170481
f.co2	-49.100	0.700	-1.218	106.900	91804
f.mom	-48800.000	-2150.000	-3585.193	45800.000	66467
f.heat	-492.200	-5.200	33.623	991.300	69917
f.h20	-5.476	0.149	0.885	20.783	95388
f.o3	-735.000	-6.300	-11.171	577.000	219292
f.no.y	-220.000	-1.000	-2.485	263.000	247777
r.net	-118.130	-3.000	77.745	1330.000	59860
par.12.7	-50.900	12.800	106.763	2134.900	86906
par.29	-20.000	16.000	306.094	2381.000	20768
rh.27.9m	0.000	75.600	73.069	110.800	31281
rh.22.6m	2.800	75.600	73.135	110.800	48739
rh.15.4m	2.200	77.200	73.697	100.000	72901
rh.7.6m	0.100	82.900	77.714	100.000	80591
rh.2.5m	0.400	86.000	80.477	100.000	74961
ta.27.9m	-27.700	8.900	8.486	35.000	33940
ta.22.6m	-27.200	8.200	8.021	32.900	56918
ta.15.4m	-27.200	8.100	7.892	33.000	72749
ta.7.6m	-27.500	7.800	7.650	32.700	57258
ta.2.5m	-27.800	7.600	7.337	32.200	66966
ts.srfm	-5.000	8.200	8.374	30.000	128383
ts.50m	0.500	7.100	7.272	20.100	226322
ts.20m	-1.100	8.200	8.375	20.500	183156
ts.a1.05cm	-0.800	9.300	9.372	26.200	223422
ts.a2.10cm	-0.600	9.000	9.271	23.800	229810
ts.a3.20cm	0.100	7.900	8.560	20.600	227455
ts.a4.50cm	1.500	8.200	8.812	17.500	226484
ts.b1.05cm	-1.000	8.000	8.454	21.900	226959
ts.b2.20cm	1.100	8.900	5487.831	101312.000	224226
ts.b3.50cm	2.200	9.100	9.326	18.700	223388
ts.c1.05cm	-1.000	8.300	8.640	22.500	225048
ts.c2.05cm	-0.700	9.400	9.256	22.900	225334
ts.c3.20cm	0.700	9.100	9.150	21.000	245548
ts.c4.50cm	2.100	8.800	9.015	17.700	223532
co2	310.500	395.500	394.667	483.700	95126
co2.stg	-21.200	0.000	0.015	26.300	119423
p.amb	93826.700	98593.600	98559.614	103021.000	40017

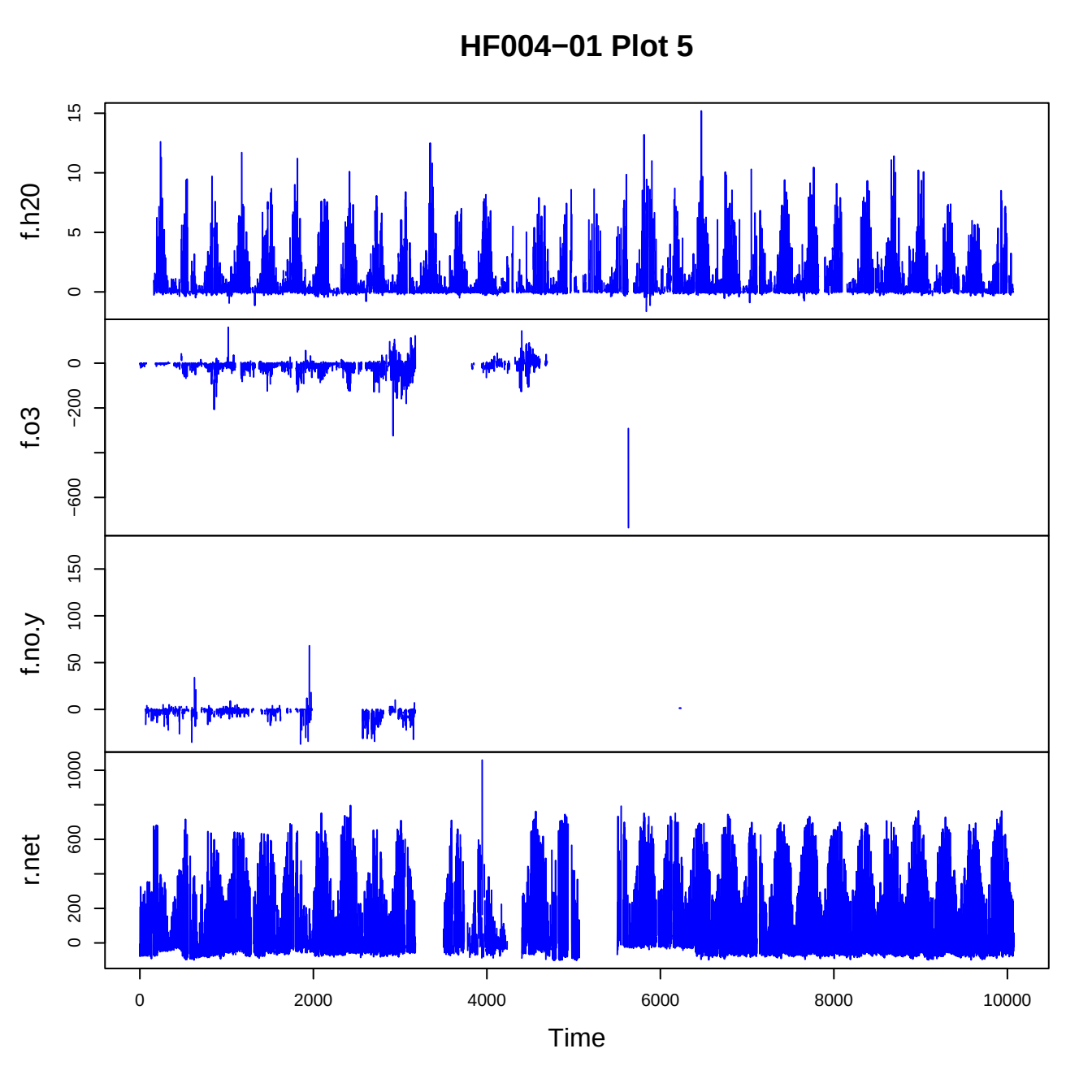
Variable	Min	Median	Mean	Max	NAs
ts.srf.adj	0.300	8.800	8.886	20.900	215130
par.dir.ue.m	−2.000	1.800	170.179	1760.800	187109
par.dfs.ue.m	0.000	19.000	142.596	1120.000	187109
par.ref.ue.m	−4.542	1.000	20.356	274.154	237135
fco2.7200	−40.570	0.225	−2.193	42.210	244277
fh2o.7200	−2.574	0.161	1.003	16.460	242681
co2.7200	376.700	419.800	418.510	476.200	232989
eddy.q.7200	−0.225	8.926	10.425	31.380	228068

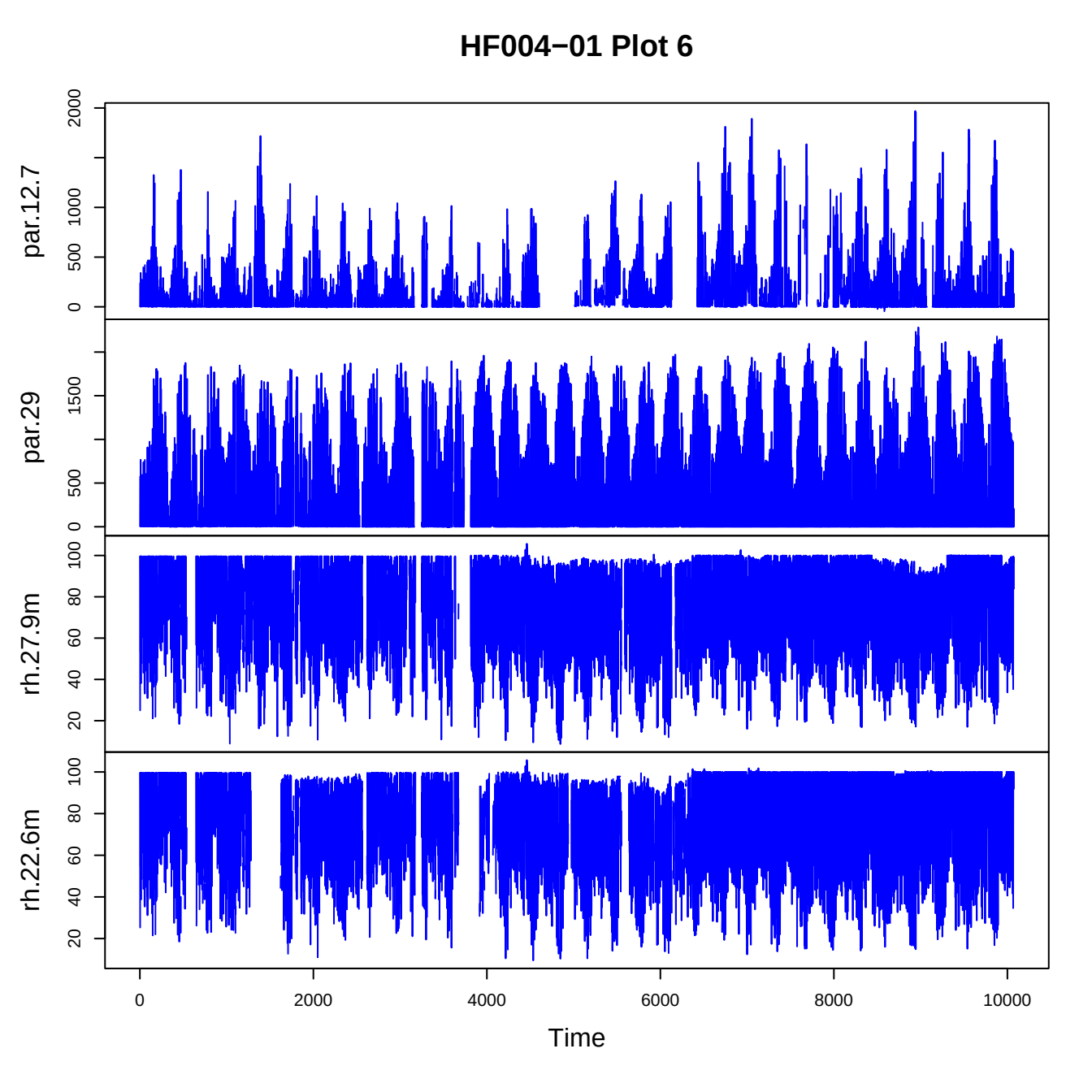

HF004−01 Plot 1
datetime
8.0e+08
1.2e+09
1.6e+09
year
2000
2010
2020
seq.from.1990.days
2000
6000
10000
doy
0
100
200
300
0
2000
4000
6000
8000
10000
Time

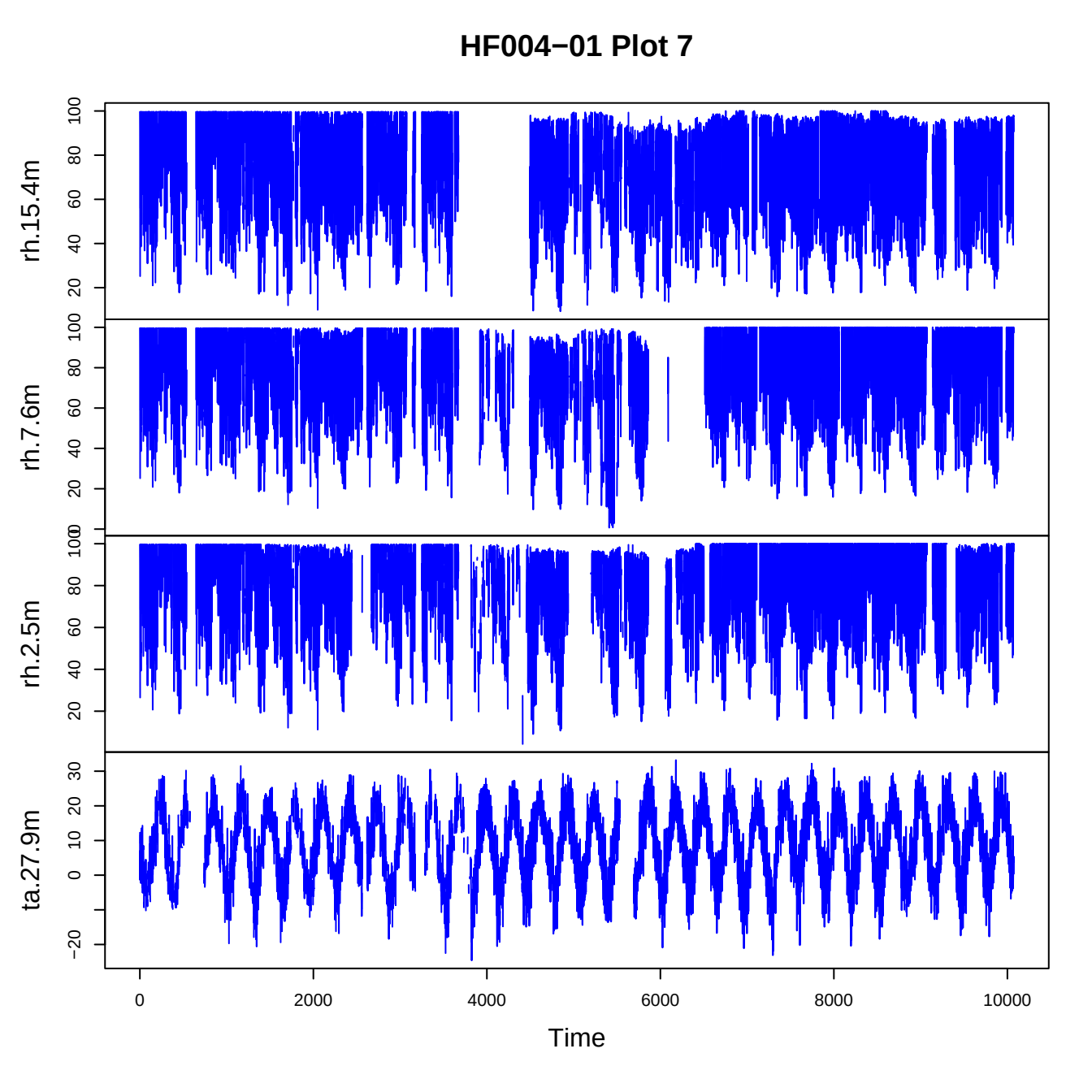

HF004−01 Plot 2
wind.sp
wind.dir
eddy.t
eddy.q
Time
0
2000
4000
6000
8000
10000

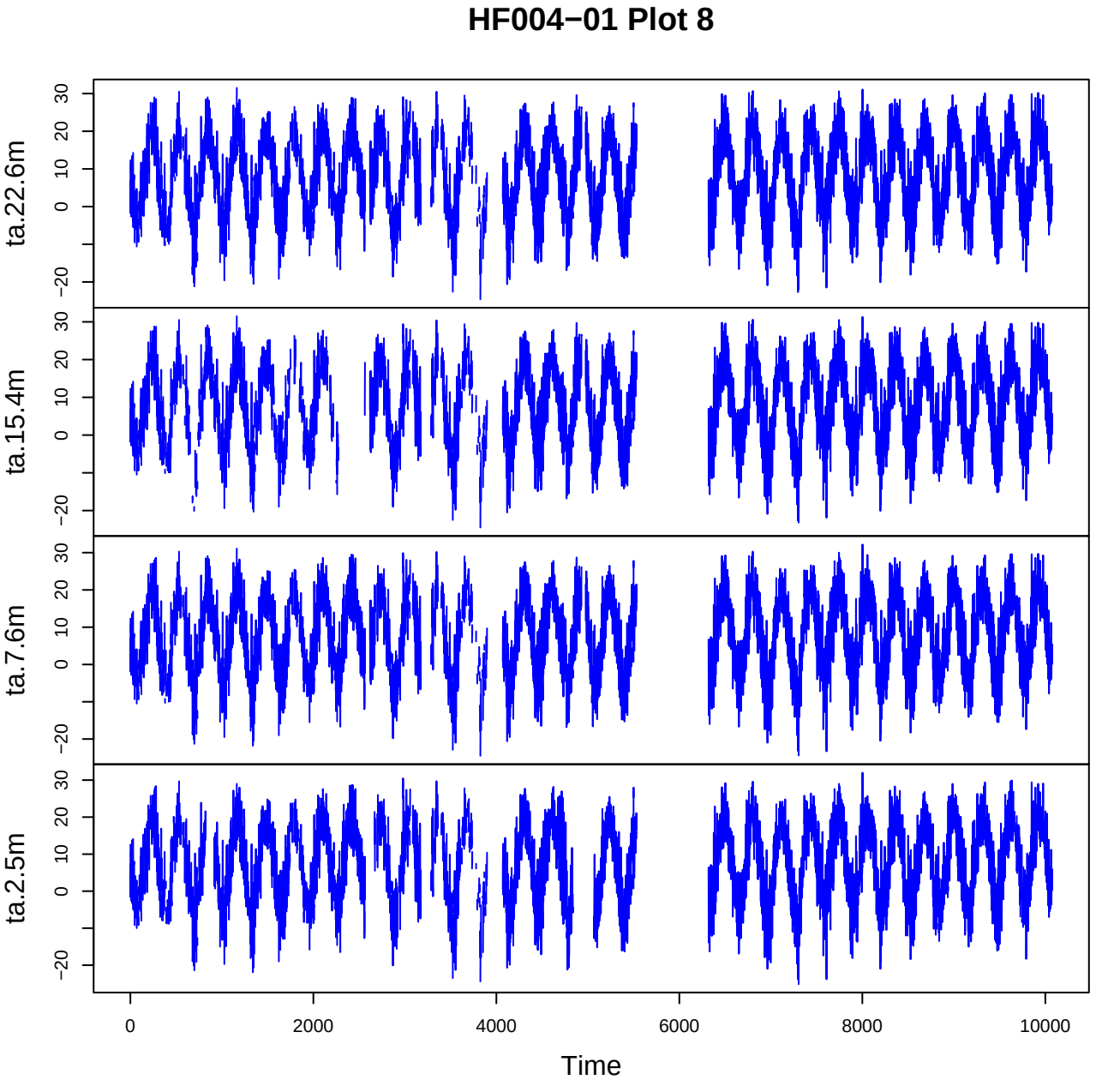

HF004−01 Plot 3
o3.mlb
0
50
150
250
no.y
0
50000
150000
s.no.y
0
10000
20000
co
0
200
600
1000
0
2000
4000
6000
8000
10000
Time

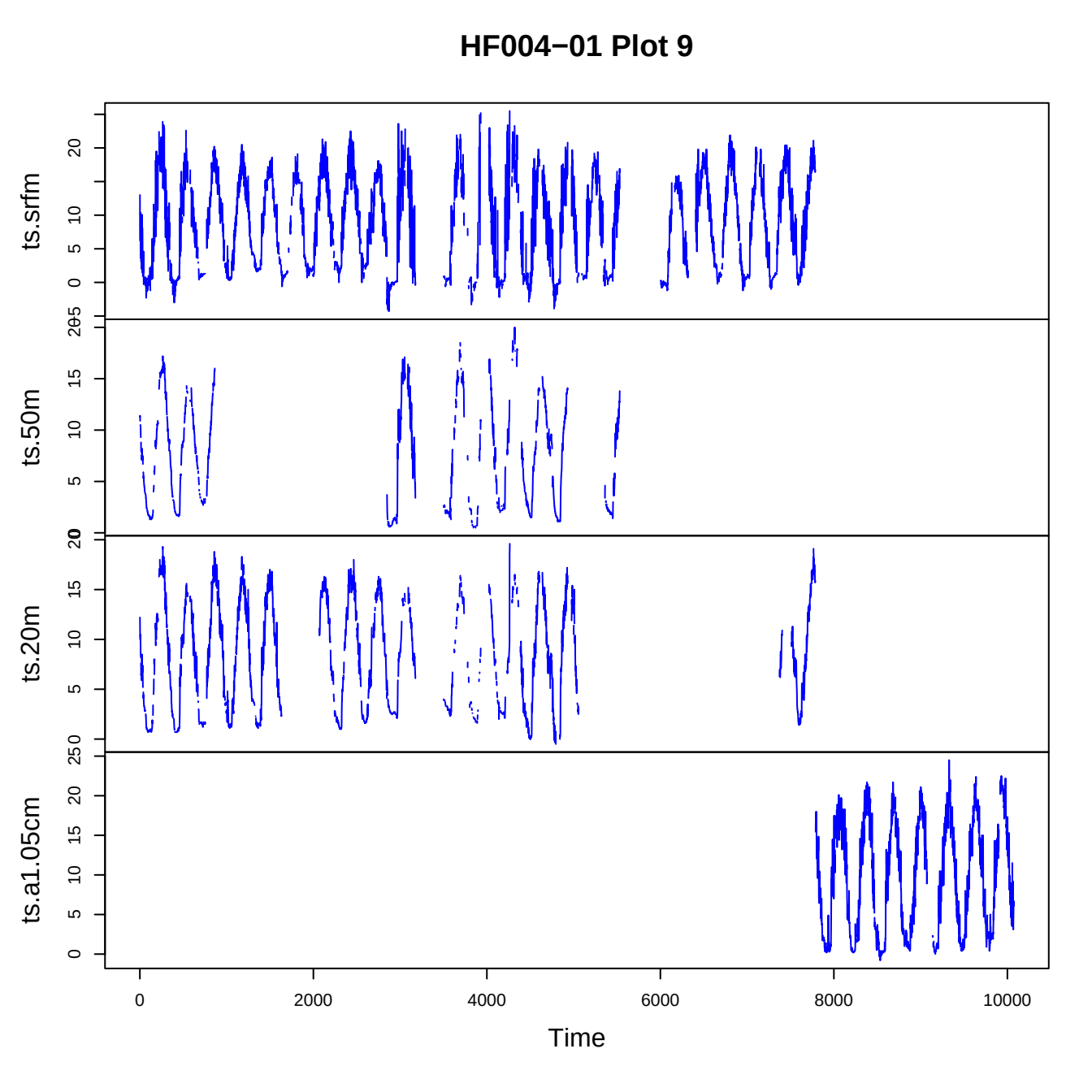

HF004−01 Plot 4
s.co
f.co2
f.mom
f.heat
1500000
500000
0
20
0
−20
−40
0
−10000
−30000
800
400
0
−400
0
2000
4000
6000
8000
10000
Time

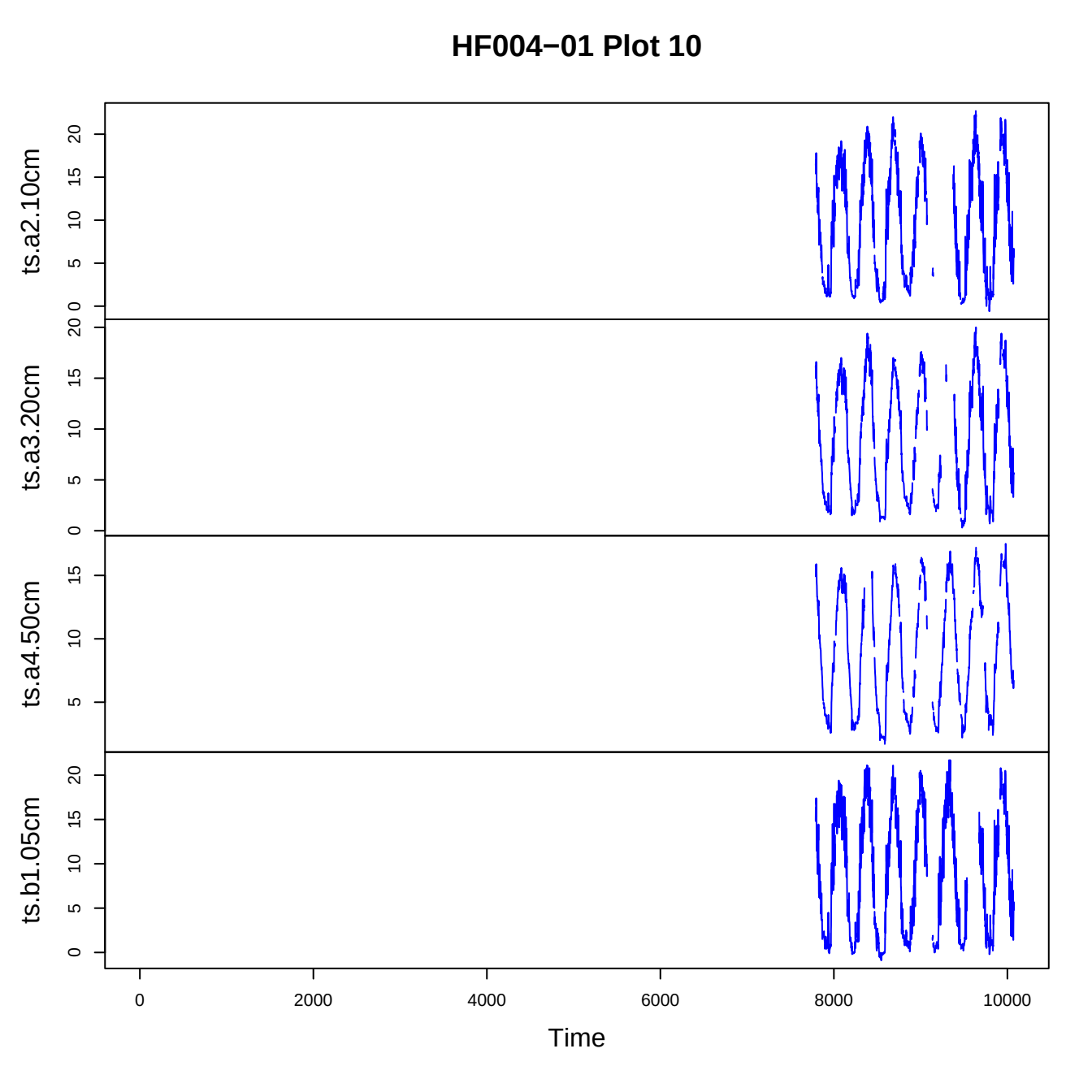

HF004−01 Plot 5
f.h20
f.o3
f.no.y
r.net
0
5
10
15
−600
−200
0
50
100
150
200
600
1000
0
2000
4000
6000
8000
10000
Time

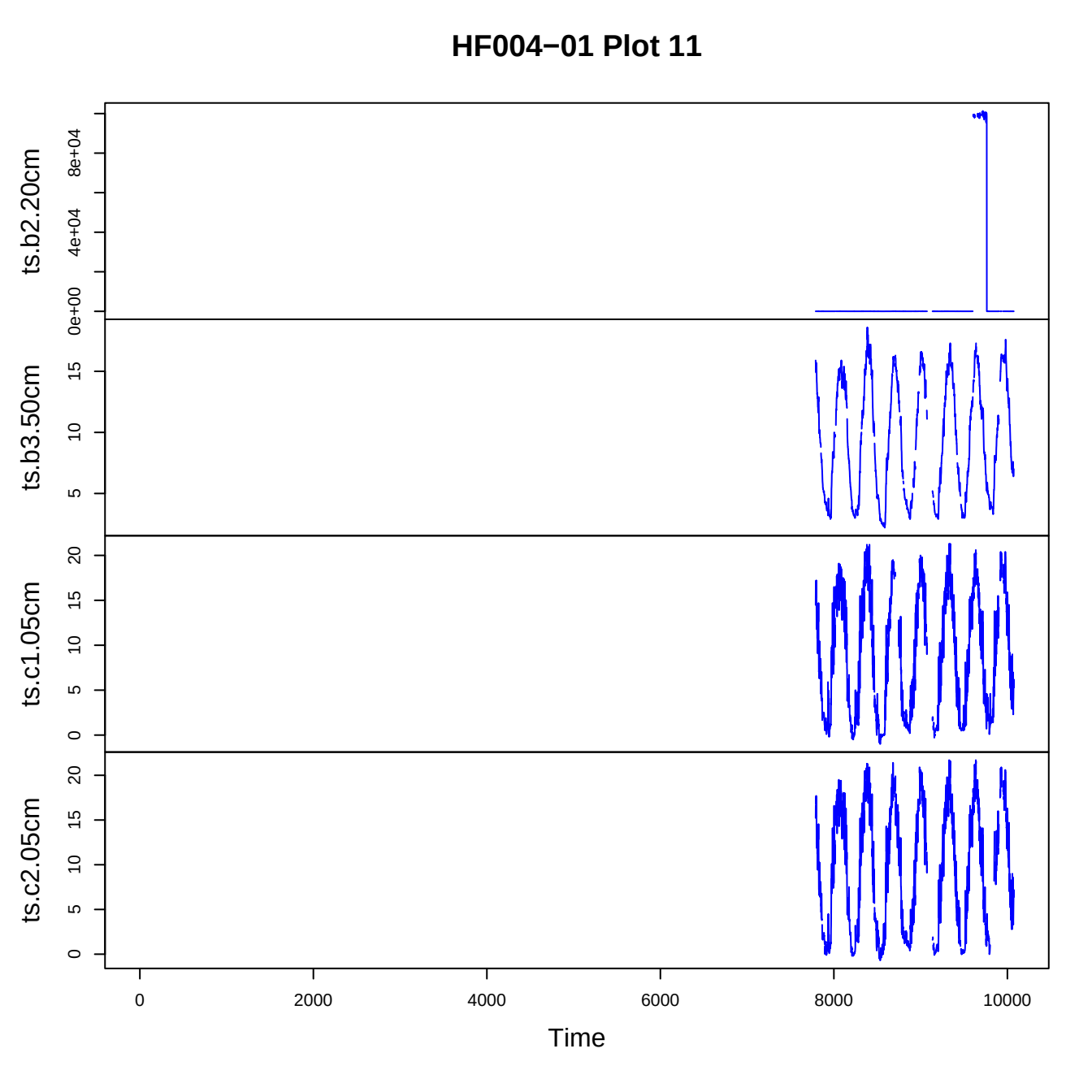

HF004−01 Plot 6
par.12.7
0
500
1000
2000
par.29
0
500
1500
rh.27.9m
20
40
60
80
100
rh.22.6m
20
40
60
80
100
0
2000
4000
6000
8000
10000
Time


HF004−01 Plot 7
rh.15.4m
rh.7.6m
rh.2.5m
ta.27.9m
Time
0
2000
4000
6000
8000
10000


HF004−01 Plot 8
ta.22.6m
ta.15.4m
ta.7.6m
ta.2.5m
30
20
10
0
−20
0
2000
4000
6000
8000
10000
Time


HF004−01 Plot 9
ts.srfm
ts.50m
ts.20m
ts.a1.05cm
0
5
10
15
20
0
2000
4000
6000
8000
10000
Time


HF004−01 Plot 10
ts.a2.10cm
ts.a3.20cm
ts.a4.50cm
ts.b1.05cm
0
5
10
15
20
0
2000
4000
6000
8000
10000
Time


HF004−01 Plot 11
ts.b2.20cm
ts.b3.50cm
ts.c1.05cm
ts.c2.05cm
0e+00
4e+04
8e+04
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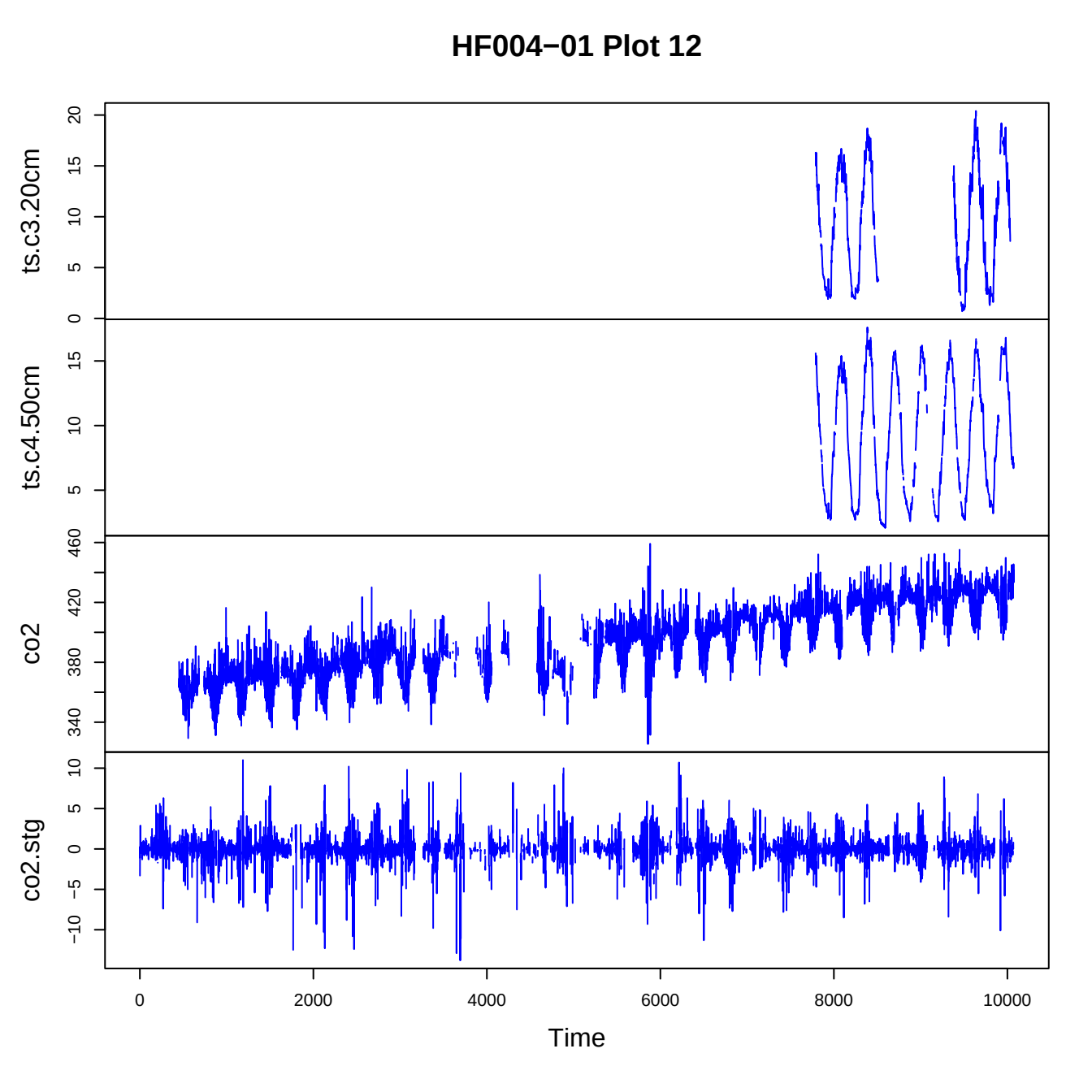
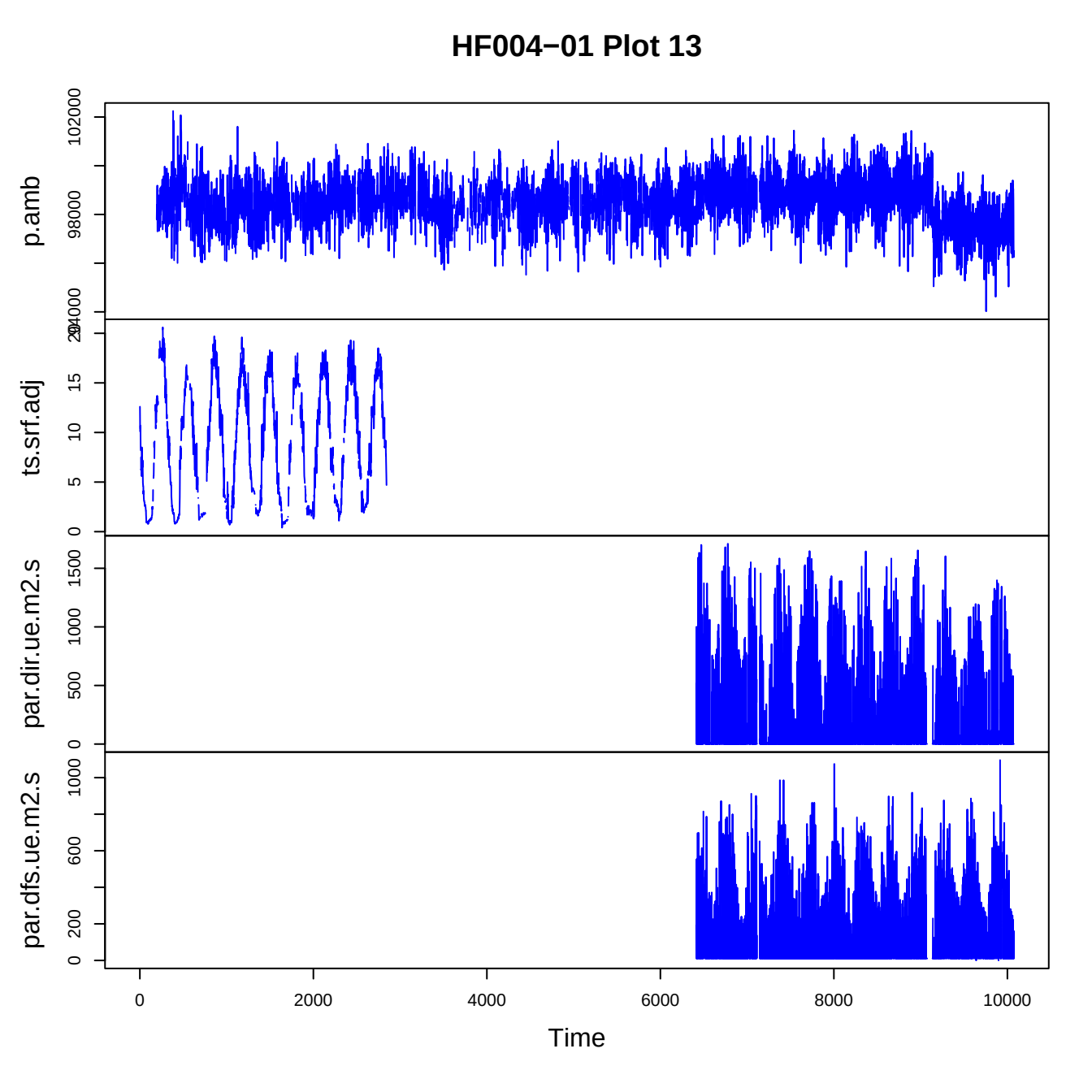
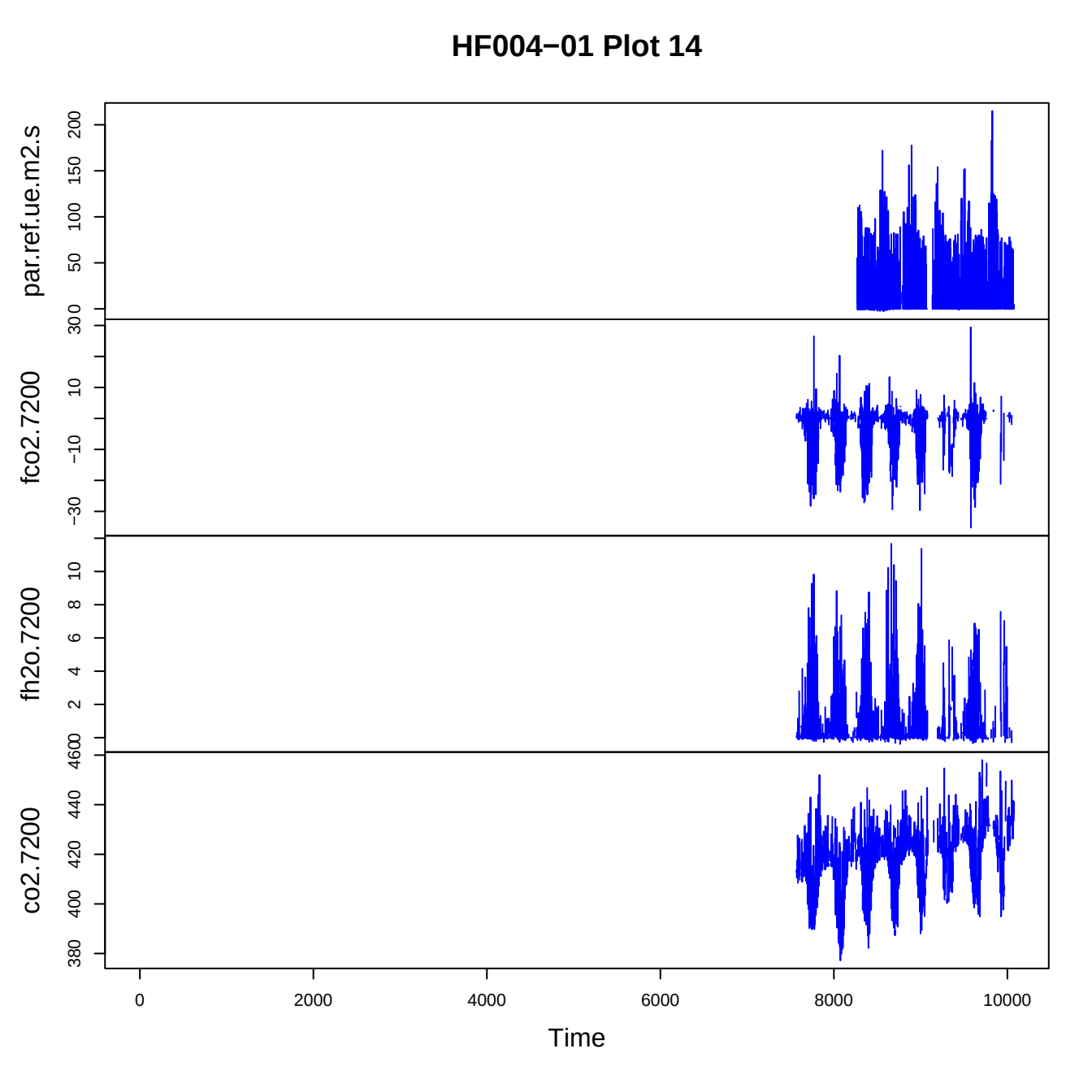
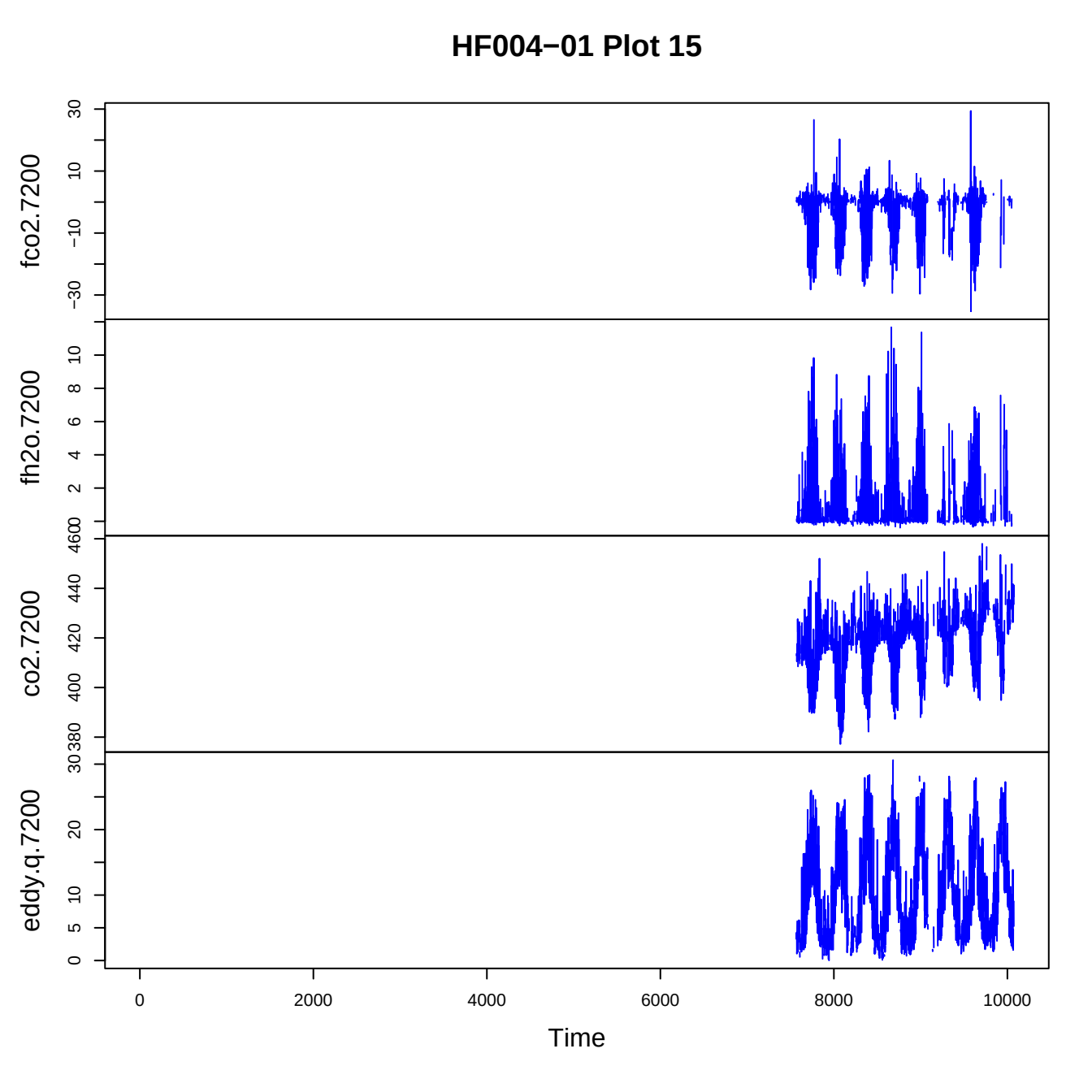
5
10
15
20
0
2000
4000
6000
8000
10000
Time


HF004−01 Plot 12
ts.c3.20cm
ts.c4.50cm
co2
co2.stg
Time
0
2000
4000
6000
8000
10000


HF004−01 Plot 13
p.amb
ts.srf.adj
par.dir.ue.m2.s
par.dfs.ue.m2.s
Time
0
2000
4000
6000
8000
10000


HF004−01 Plot 14
par.ref.ue.m2.s
fco2.7200
fh2o.7200
co2.7200
Time
0
2000
4000
6000
8000
10000


HF004−01 Plot 15
fco2.7200
30
10
−10
−30
fh2o.7200
10
8
6
4
2
0
co2.7200
460
440
420
400
380
eddy.q.7200
30
20
10
5
0
0
2000
4000
6000
8000
10000
Time