

Harvard Forest Data Archive HF249-01

Data File:

Name = hf249-01-radiometric.csv
Description = radiometric and meteorological data
Rows = 97436 Columns = 64
MD5 checksum = 3a282efd91f98419022e163f26deca68

Variables:

datetime = end of half hour
timestamp = timestamp date
doy = day of year (nominalDay)
batt.volt.min = minimum battery voltage (volt)
logger.temp = panel temperature of logger (celsius)
short.up = incident shortwave radiation, from upward looking

pyranometer (wattPerMeterSquared)
short.dn = reflected shortwave radiation, from downward looking

pyranometer (wattPerMeterSquared)
long.up = incident longwave radiation, from upward looking

pyrgeometer (wattPerMeterSquared)
long.dn = outgoing longwave radiation, from downward looking

pyrgeometer (wattPerMeterSquared)
cnr4.tc = temperature of 4-channel radiometer (celsius)
cnr4.tk = temperature of 4-channel radiometer (kelvin)
long.up.corr = incident longwave radiation, corrected for
instrument
temperature (wattPerMeterSquared)
long.dn.corr = outgoing longwave radiation, corrected for
instrument
temperature (wattPerMeterSquared)
rs.net = net shortwave radiation (wattPerMeterSquared)
rl.net = net longwave radiation (wattPerMeterSquared)
albedo = albedo (dimensionless)
rn = net radiation (wattPerMeterSquared)
incident.ppfd = incident photosynthetic photon flux density
(micromolePerMeterSquaredPerSecond)
reflected.ppfd = reflected photosynthetic photon flux density
(micromolePerMeterSquaredPerSecond)
tpar.0 = below-canopy (Transmitted) photosynthetic photon flux
density, micromoles
PAR m-2 s-1 (sensor 1 of 4)
(micromolePerMeterSquaredPerSecond)
tpar.1 = below-canopy (Transmitted) photosynthetic photon flux
density, micromoles
PAR m-2 s-1 (sensor 2 of 4)
(micromolePerMeterSquaredPerSecond)
tpar.2 = below-canopy (Transmitted) photosynthetic photon flux
density, micromoles
PAR m-2 s-1 (sensor 3 of 4)
(micromolePerMeterSquaredPerSecond)
tpar.3 = below-canopy (Transmitted) photosynthetic photon flux
density, micromoles
PAR m-2 s-1 (sensor 4 of 4)
(micromolePerMeterSquaredPerSecond)
total = total (=sum of direct and diffuse components) incident
photosynthetic
photon flux density, micromoles PAR m-2 s-1
(micromolePerMeterSquaredPerSecond)

```

diffuse = diffuse incident photoynthetic photon flux density
          (micromolePerMeterSquaredPerSecond)
direct = direct-beam incident photoynthetic photon flux
          density
          (micromolePerMeterSquaredPerSecond)
diam.1 = automated band dendrometer measurement (tree 1 of
4)
          (millivolt)
diam.2 = automated band dendrometer measurement (tree 2 of
4)
          (millivolt)
diam.3 = automated band dendrometer measurement (tree 3 of
4)
          (millivolt)
diam.4 = automated band dendrometer measurement (tree 4 of
4)
          (millivolt)
in.530 = incident solar radiation at 530 nm (millivolt)
in.570 = incident solar radiation at 570 nm (millivolt)
in.655 = incident solar radiation at 655 nm (millivolt)
in.860 = incident solar radiation at 860 nm (millivolt)
in.470 = incident solar radiation at 470 nm (millivolt)
in.560 = incident solar radiation at 560 nm (millivolt)
in.605 = incident solar radiation at 605 nm (millivolt)
in.750 = incident solar radiation at 750 nm (millivolt)
out.530 = reflected solar radiation at 530 nm (millivolt)
out.570 = reflected solar radiation at 570 nm (millivolt)
out.655 = reflected solar radiation at 655 nm (millivolt)
out.860 = reflected solar radiation at 860 nm (millivolt)
out.470 = reflected solar radiation at 470 nm (millivolt)
out.560 = reflected solar radiation at 560 nm (millivolt)
out.605 = reflected solar radiation at 605 nm (millivolt)
out.750 = reflected solar radiation at 750 nm (millivolt)
r.530 = canopy reflectance at 530 nm, % (dimensionless)
r.570 = canopy reflectance at 570 nm, % (dimensionless)
r.655 = canopy reflectance at 655 nm, % (dimensionless)
r.860 = canopy reflectance at 860 nm, % (dimensionless)
r.470 = canopy reflectance at 470 nm, % (dimensionless)
r.560 = canopy reflectance at 560 nm, % (dimensionless)
r.605 = canopy reflectance at 605 nm, % (dimensionless)
r.750 = canopy reflectance at 750 nm, % (dimensionless)
pri = photochemical reflectance index, calculated using measurements
      at 530 and
      570 nm (dimensionless)
ndvi = normalized difference vegetation index (dimensionless)
pri.r = alternative calculation of PRI (based on
reflectance)
          (dimensionless)
ndvi.r = alternative calculation of NDVI (based on
reflectance)
          (dimensionless)
in.red.led = LED sensor measurements of incident solar radiation,
red
band (millivolt)
in.nir.led = LED sensor measurements of incident solar radiation,
NIR
band (millivolt)
out.red.led = LED sensor measurements of reflected radiation, red
band (millivolt)
out.nir.led = LED sensor measurements of reflected radiation,
NIRband (millivolt)

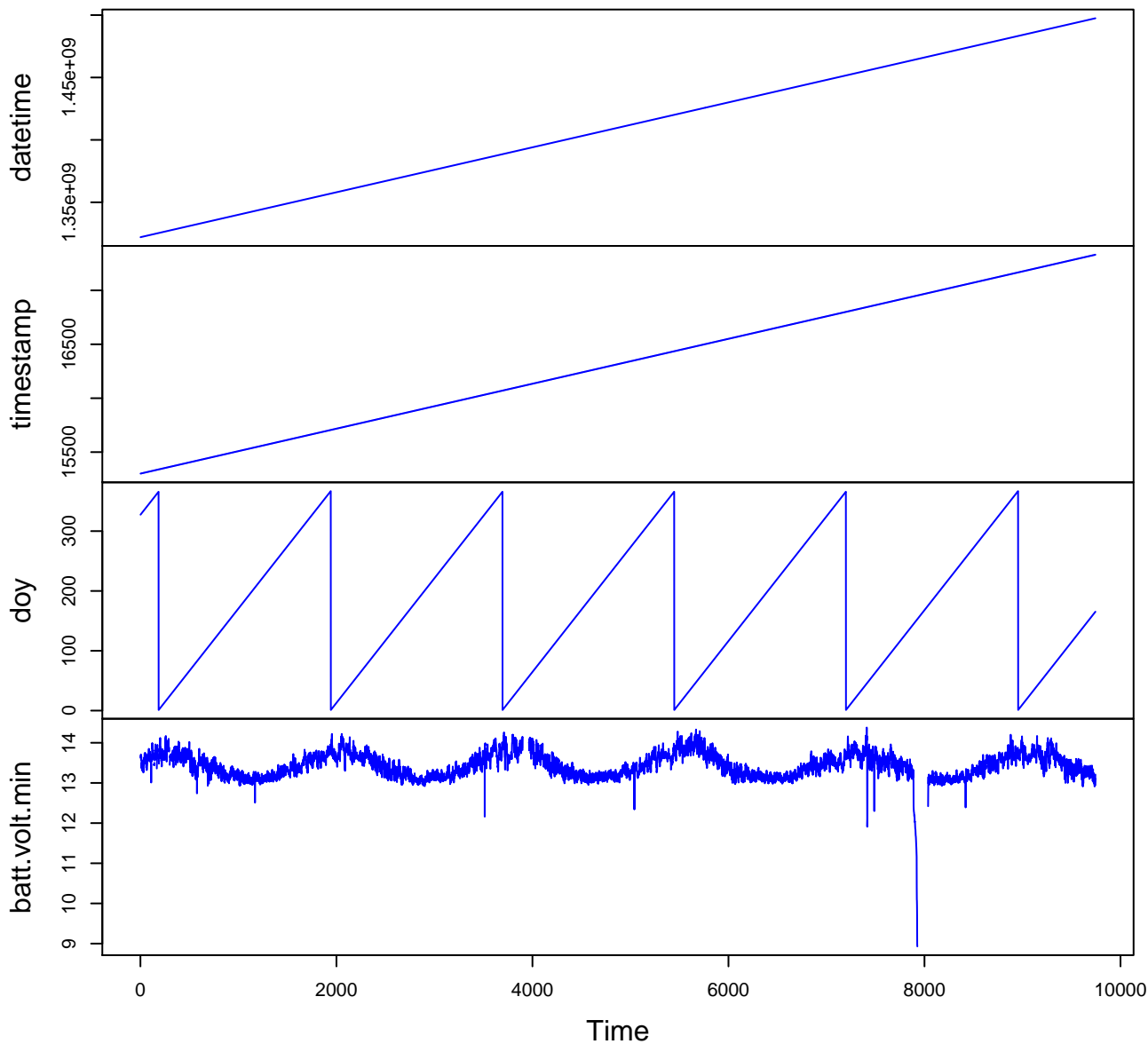
```

```
tair = air temperature (celsius)  
rh = relative humidity, % (dimensionless)
```

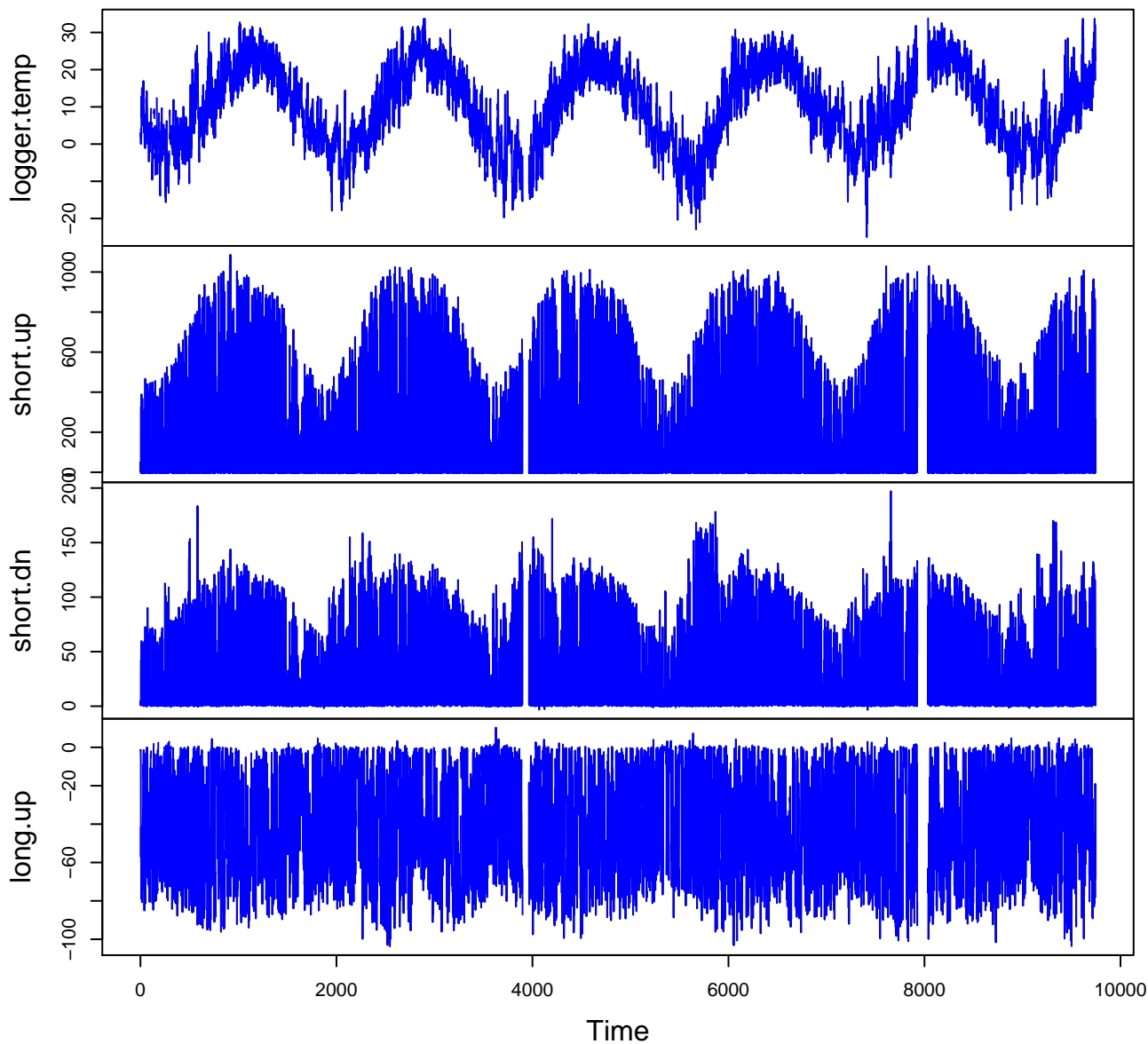
Variable	Min	Median	Mean	Max	NAs
datetime	2011-11-23T11:30		2017-06-14T09:00		0
timestamp	2011-11-23	2014-09-03	2014-09-02	2017-06-14	0
doy	1.000	171.104	178.645	366.979	0
batt.volt.mi	8.820	13.410	13.429	15.650	1971
logger.temp	-25.350	9.950	9.863	34.770	1980
short.up	-7.904	2.800	162.983	1126.892	1984
short.dn	-5.149	2.545	24.950	201.956	1984
long.up	-111.463	-46.125	-41.231	11.180	1984
long.dn	-35.552	-0.567	-1.384	15.990	1984
cnr4.tc	-28.016	8.024	7.974	33.635	1982
cnr4.tk	245.134	281.174	281.124	306.785	1982
long.up.corr	145.912	318.225	315.982	451.651	1984
long.dn.corr	204.866	353.748	355.829	491.455	1984
rs.net	-147.153	1.470	138.033	992.055	1984
rl.net	-115.152	-44.228	-39.847	11.136	1984
albedo	0.016	0.141	0.158	0.825	56754
rn	-93.248	-1.482	98.190	913.686	1986
incident.ppf	-0.786	12.344	324.551	2218.984	7830
reflected.ppf	-3.248	0.406	16.951	274.411	34353
tpar.0	-3.078	0.437	46.561	1415.039	7637
tpar.1	-3.365	2.993	55.834	1623.273	9228
tpar.2	-2.148	0.250	49.137	1722.093	1692
tpar.3	-2.794	0.650	47.934	2000.973	1698
total	2.531	10.810	329.784	2300.210	10908
diffuse	2.658	10.317	143.107	1330.426	10906
direct	-1.485	0.582	186.676	1946.569	10908
diam.1	0.176	0.212	0.210	0.236	19056
diam.2	0.177	0.211	0.210	0.236	18873
diam.3	0.165	0.220	0.220	0.264	26309
diam.4	0.173	0.221	0.244	0.365	34155
in.530	-0.002	0.000	0.035	0.267	10035
in.570	-0.002	0.000	0.042	0.354	10035
in.655	-0.022	0.005	0.330	2.504	10035
in.860	-0.002	0.007	0.367	2.719	10035
in.470	-0.031	0.001	0.072	0.687	13248
in.560	-0.004	0.001	0.109	1.335	13248
in.605	-0.007	0.001	0.153	1.492	13248
in.750	-0.009	0.003	0.217	1.828	13248
out.530	-0.005	0.000	0.008	0.149	17457
out.570	-0.006	0.000	0.010	0.166	8786
out.655	-0.008	0.002	0.065	1.288	8072
out.860	-0.008	0.011	0.384	3.347	8072
out.470	-0.002	0.000	0.009	0.308	7778
out.560	-0.002	0.001	0.034	0.584	16906
out.605	-0.002	0.001	0.037	0.710	7777
out.750	-0.002	0.007	0.250	2.228	7777
r.530	0.000	0.049	0.056	0.876	64286
r.570	0.000	0.051	0.060	0.737	64073
r.655	0.000	0.048	0.056	0.572	63377

Variable	Min	Median	Mean	Max	NAs
r.860	0.000	0.324	0.320	0.996	63381
r.470	0.000	0.024	0.034	0.379	65277
r.560	0.000	0.074	0.086	0.984	65480
r.605	0.000	0.062	0.075	0.530	64126
r.750	0.000	0.313	0.317	0.999	64580
pri	-0.998	0.201	0.240	1.000	68170
ndvi	-0.271	0.645	0.665	0.991	63446
pri.r	-0.998	0.002	0.056	1.000	68092
ndvi.r	-0.240	0.664	0.683	0.992	63445
in.red.led	-5.646	3.368	64.996	590.363	751
in.nir.led	-3.346	3.295	125.562	1043.986	751
out.red.led	-6.107	0.707	5.005	126.651	753
out.nir.led	-4.847	6.053	204.241	1513.214	751
tair	-27.530	9.230	8.578	31.550	23841
rh	9.100	71.770	70.889	100.100	23839

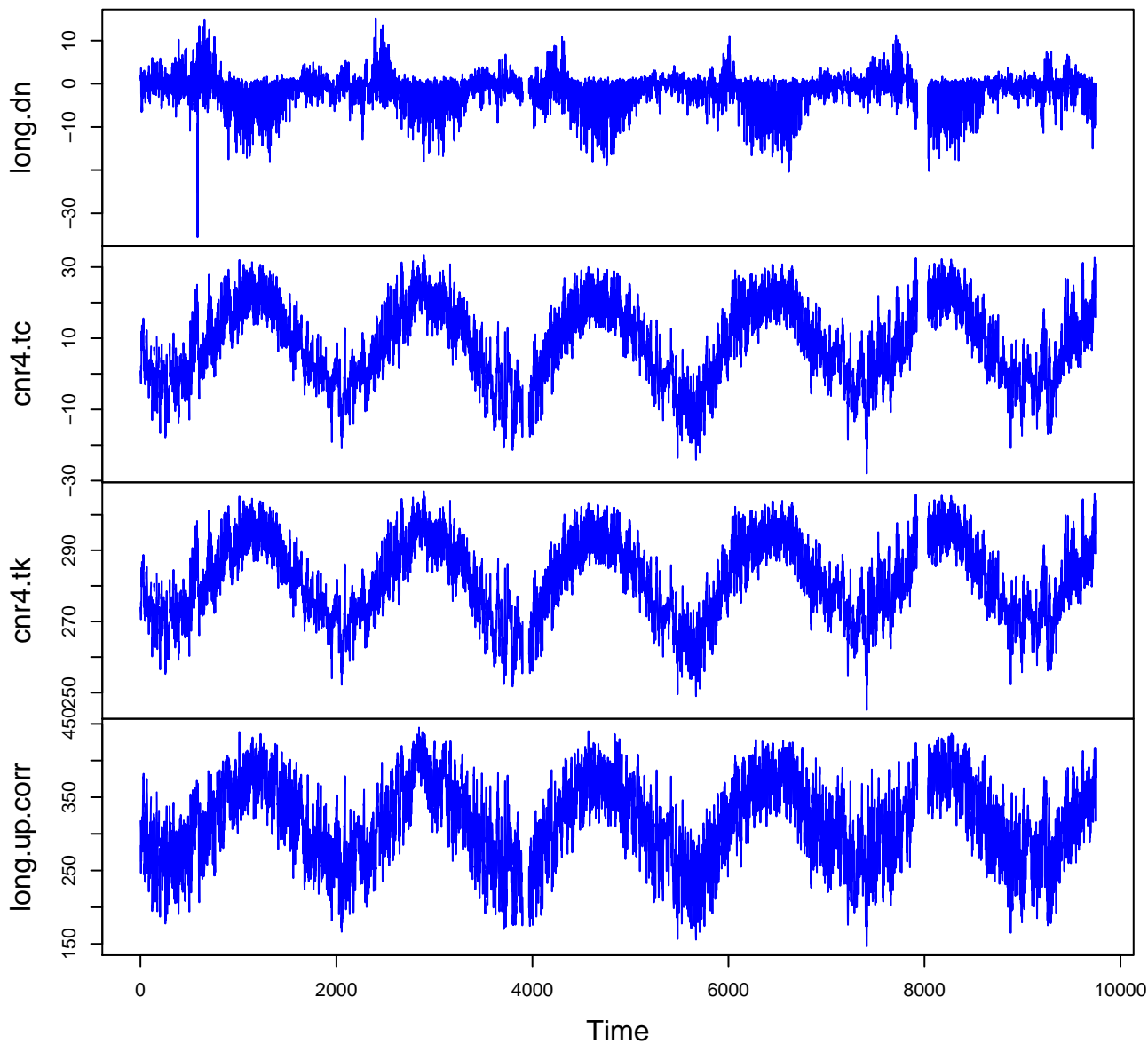
HF249-01 Plot 1



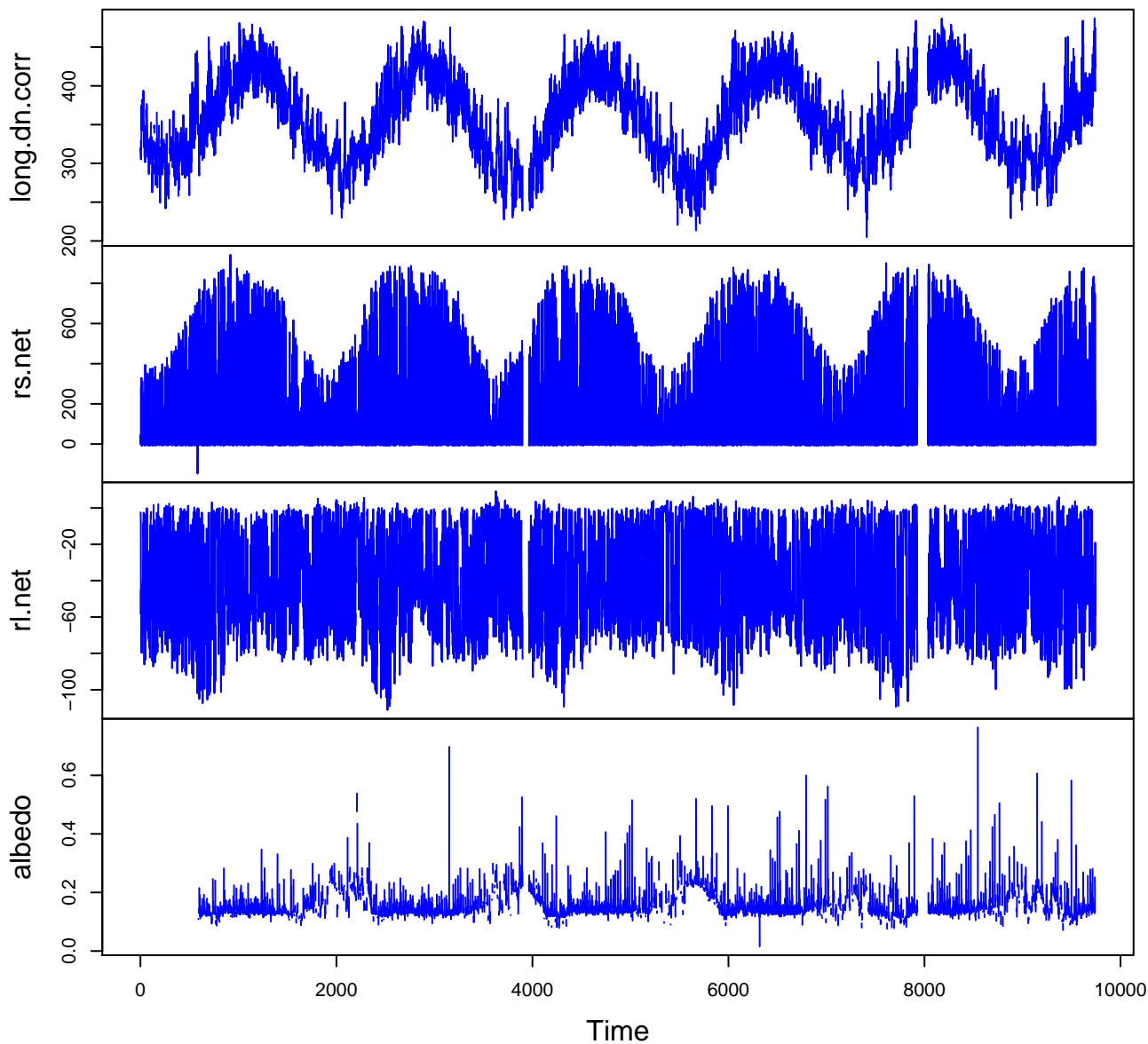
HF249-01 Plot 2



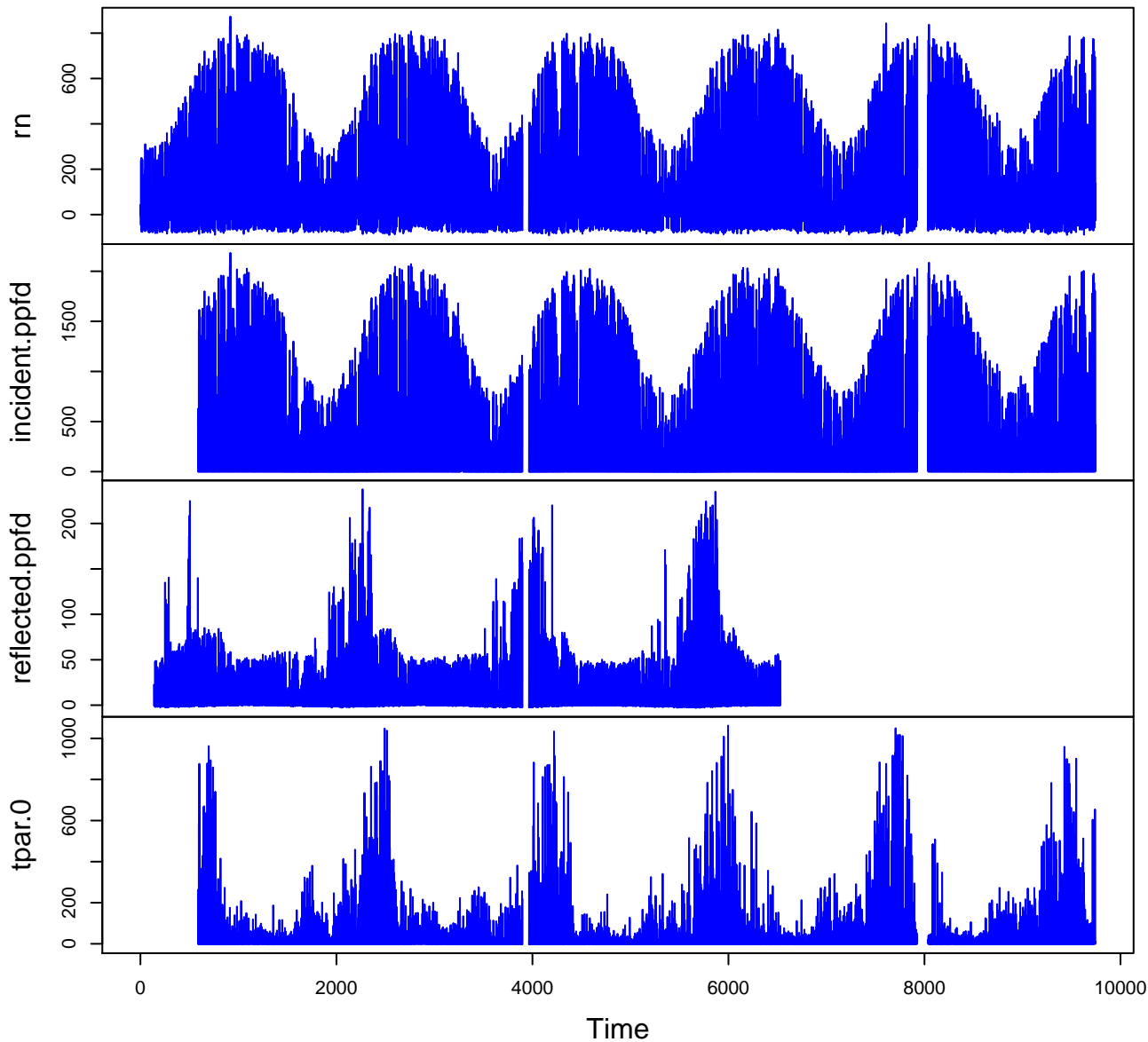
HF249-01 Plot 3



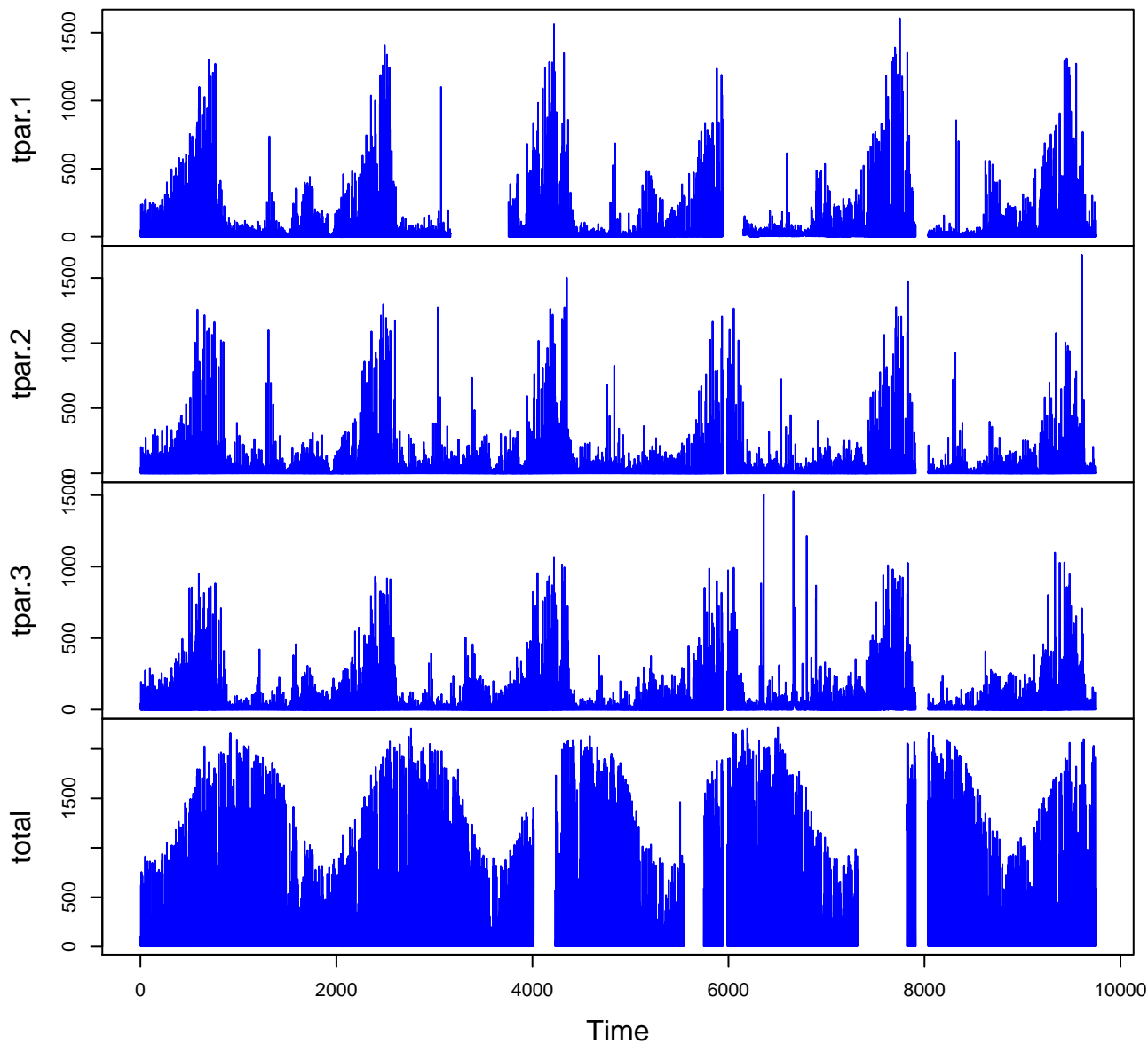
HF249-01 Plot 4



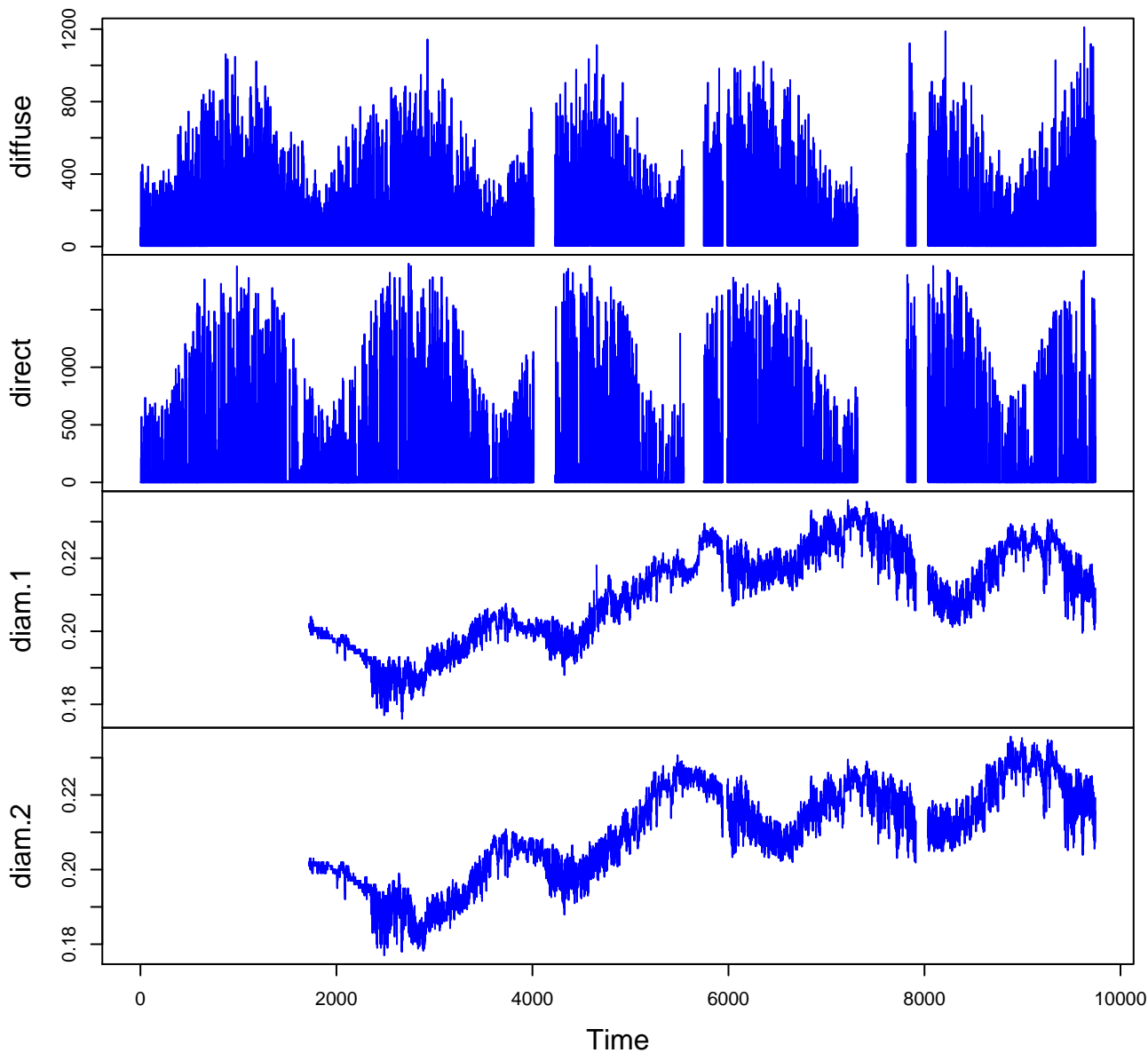
HF249-01 Plot 5



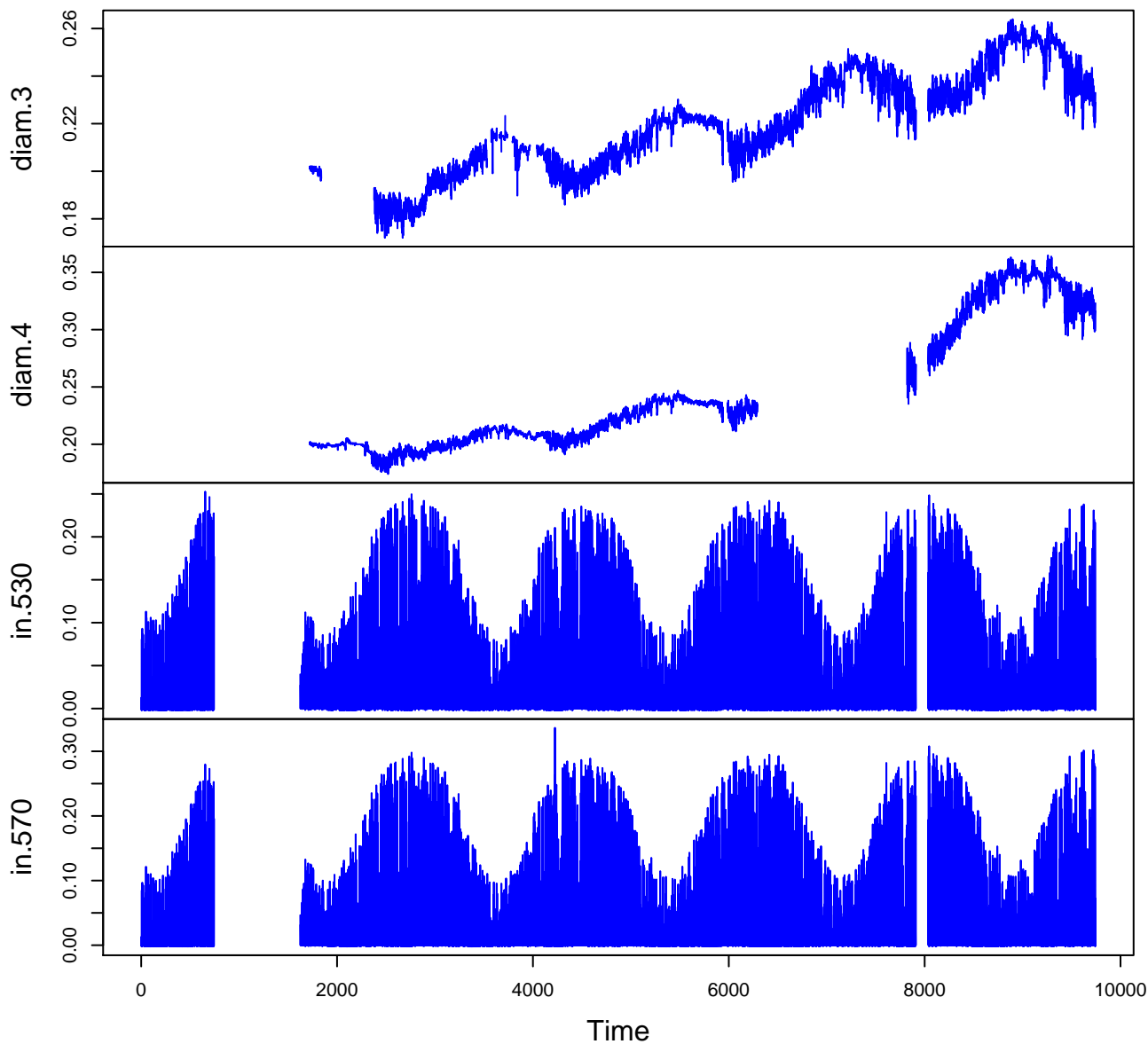
HF249-01 Plot 6



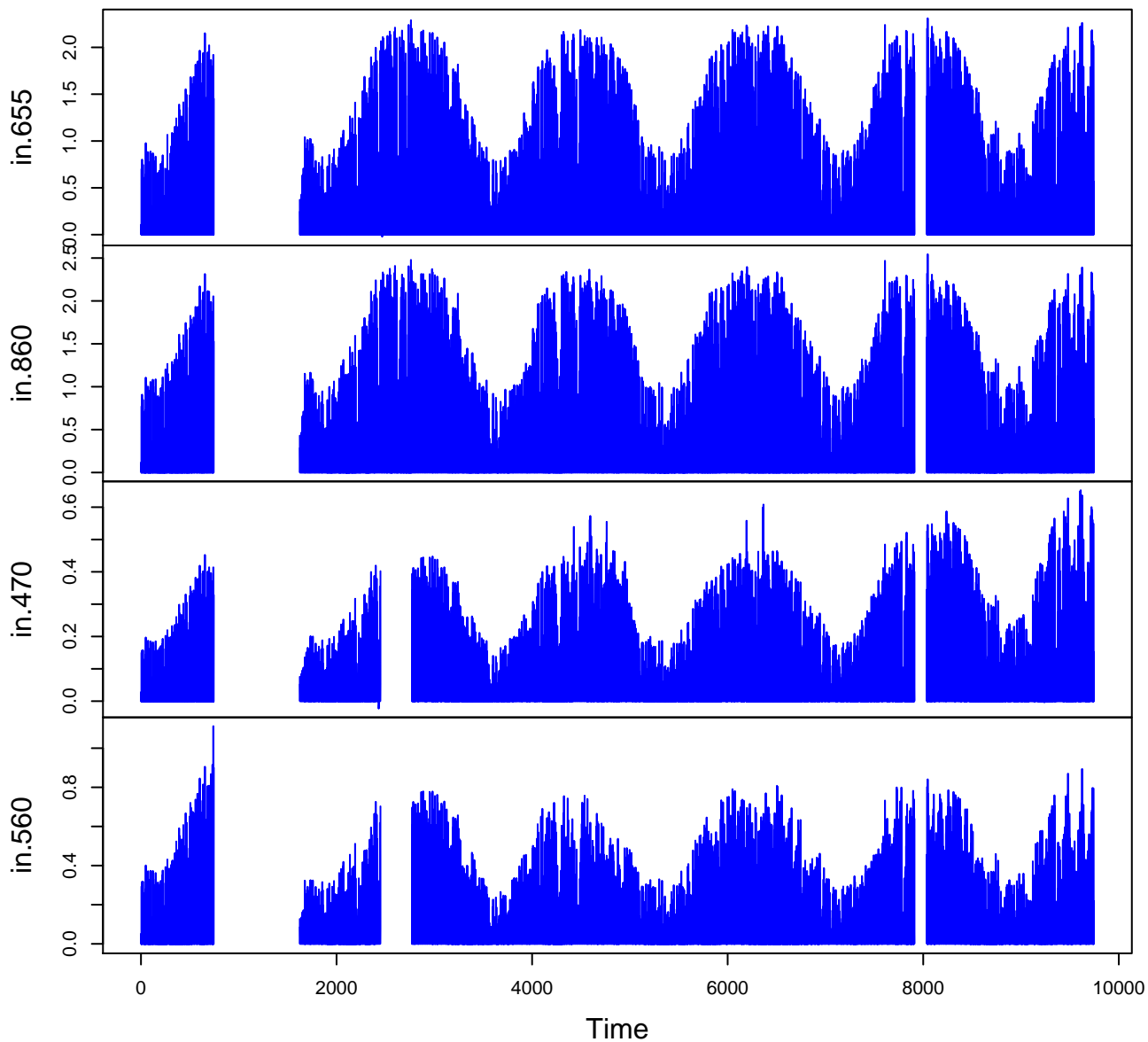
HF249-01 Plot 7



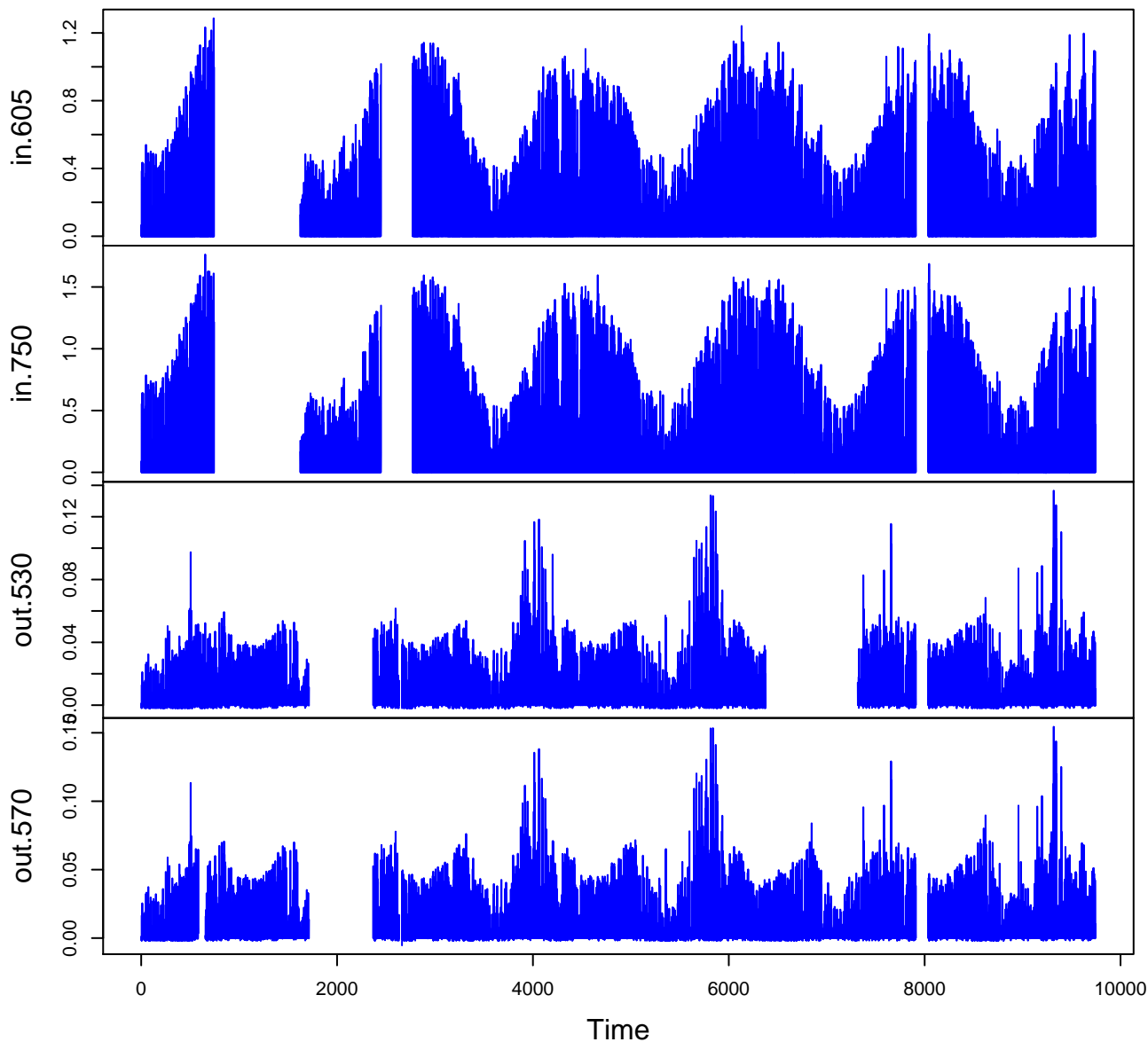
HF249-01 Plot 8



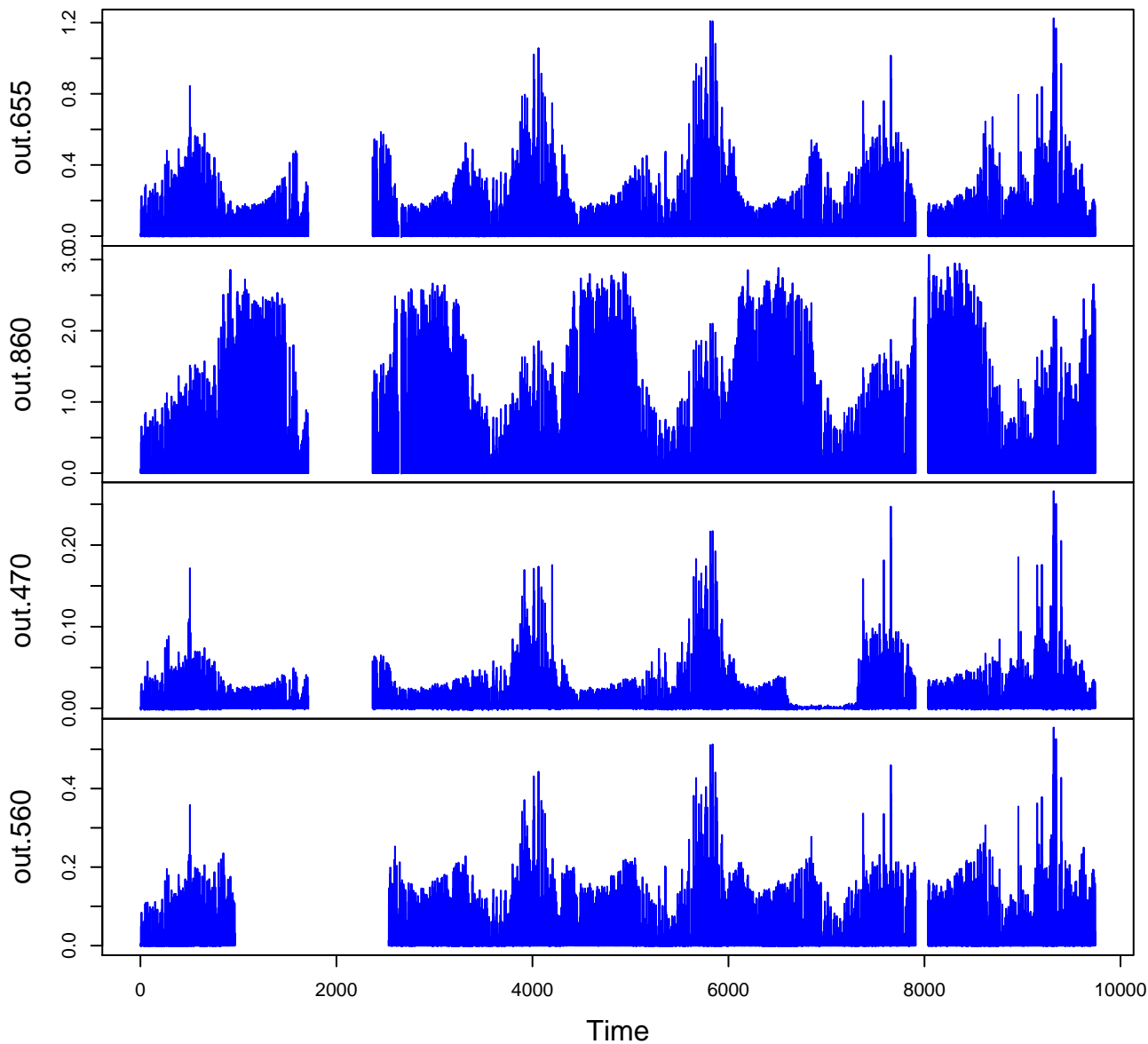
HF249-01 Plot 9



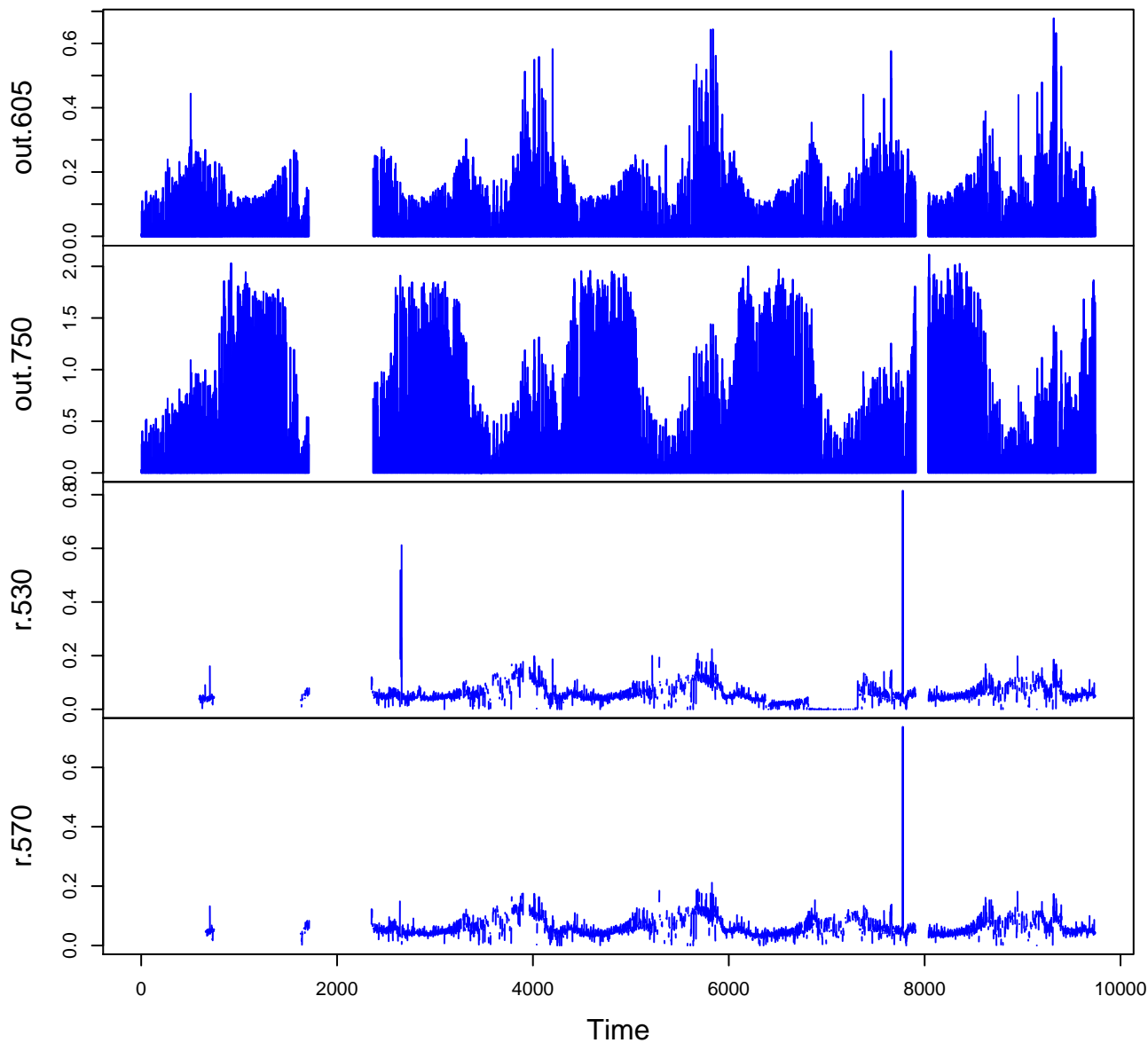
HF249-01 Plot 10



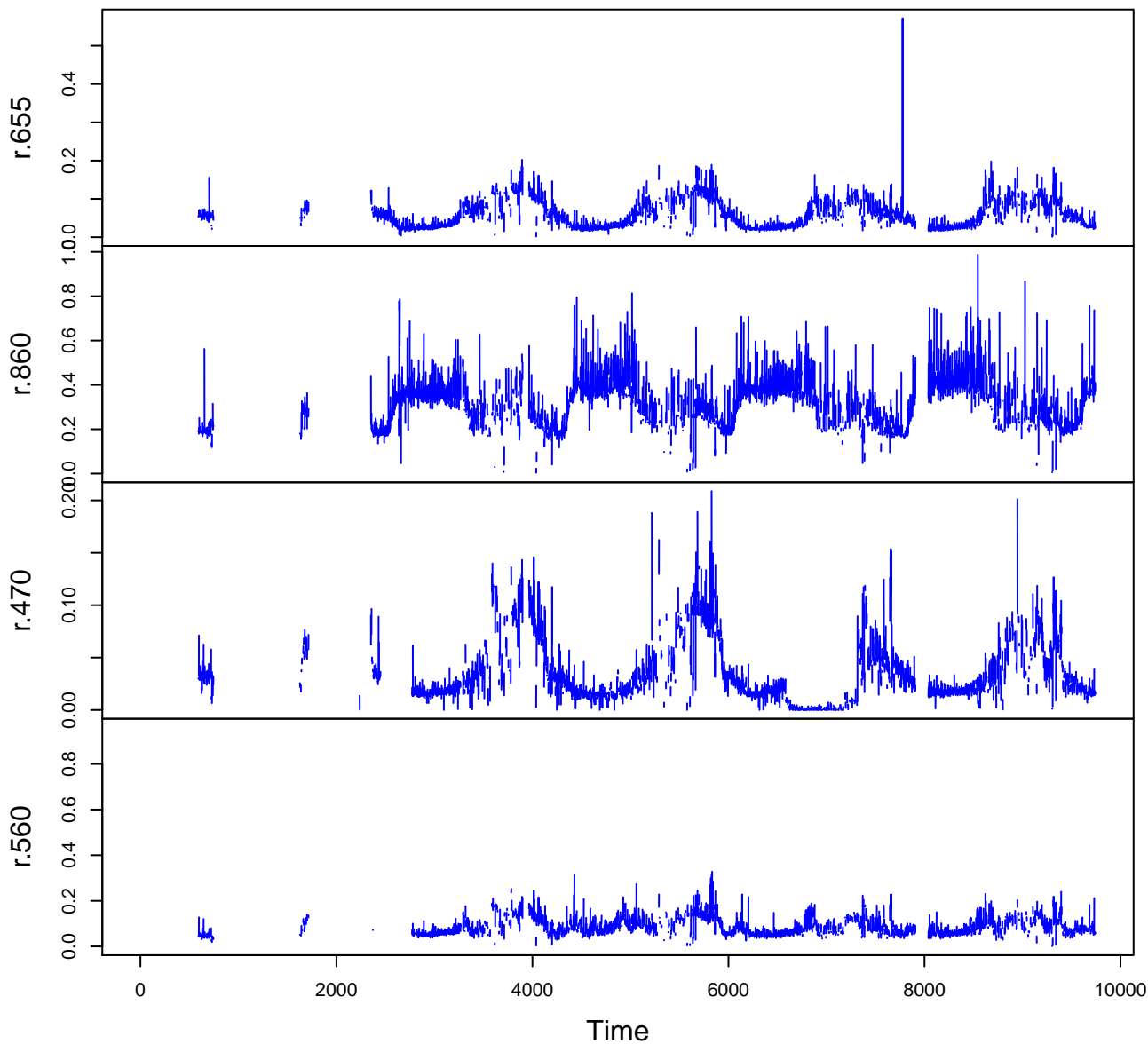
HF249-01 Plot 11



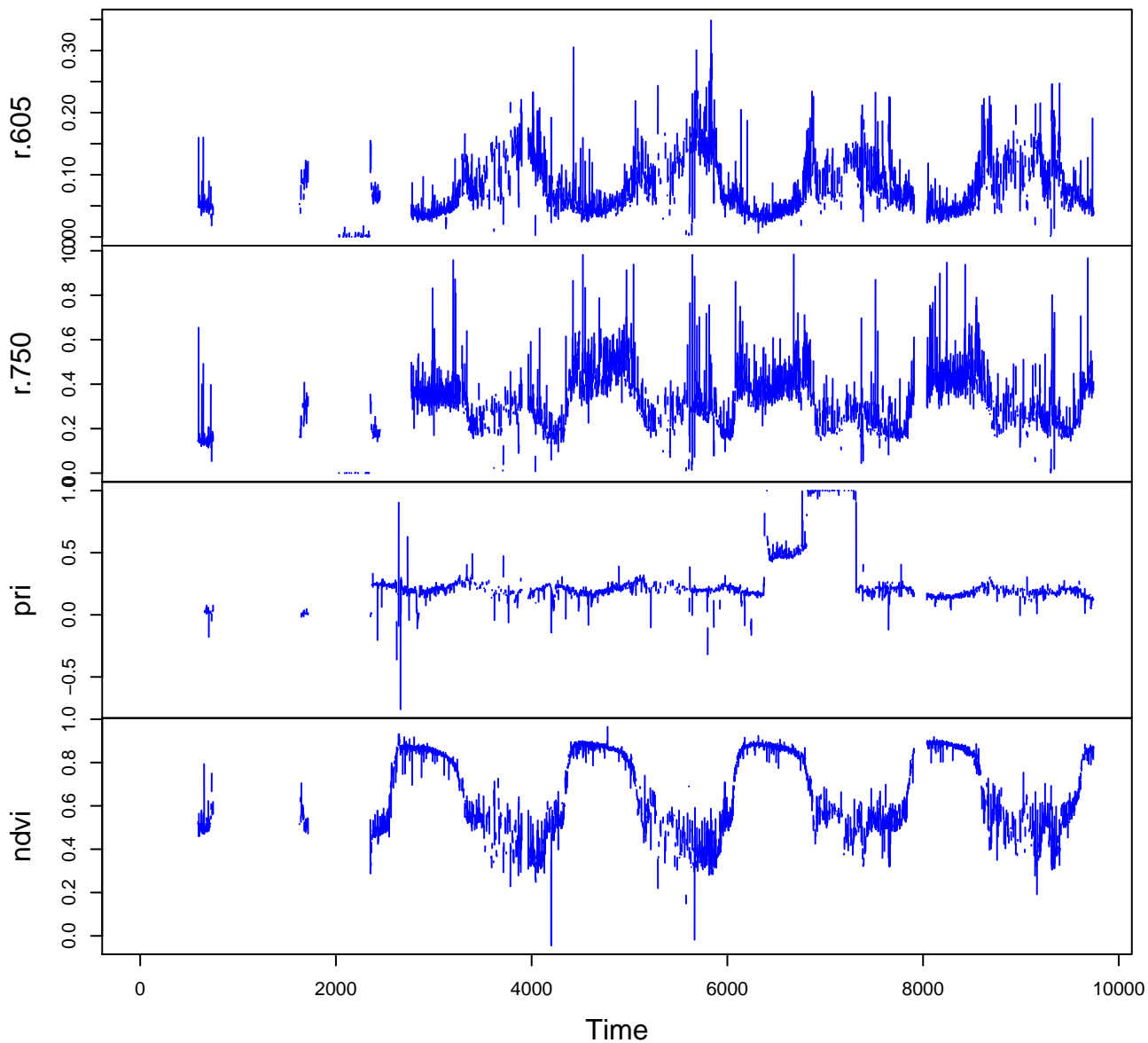
HF249-01 Plot 12



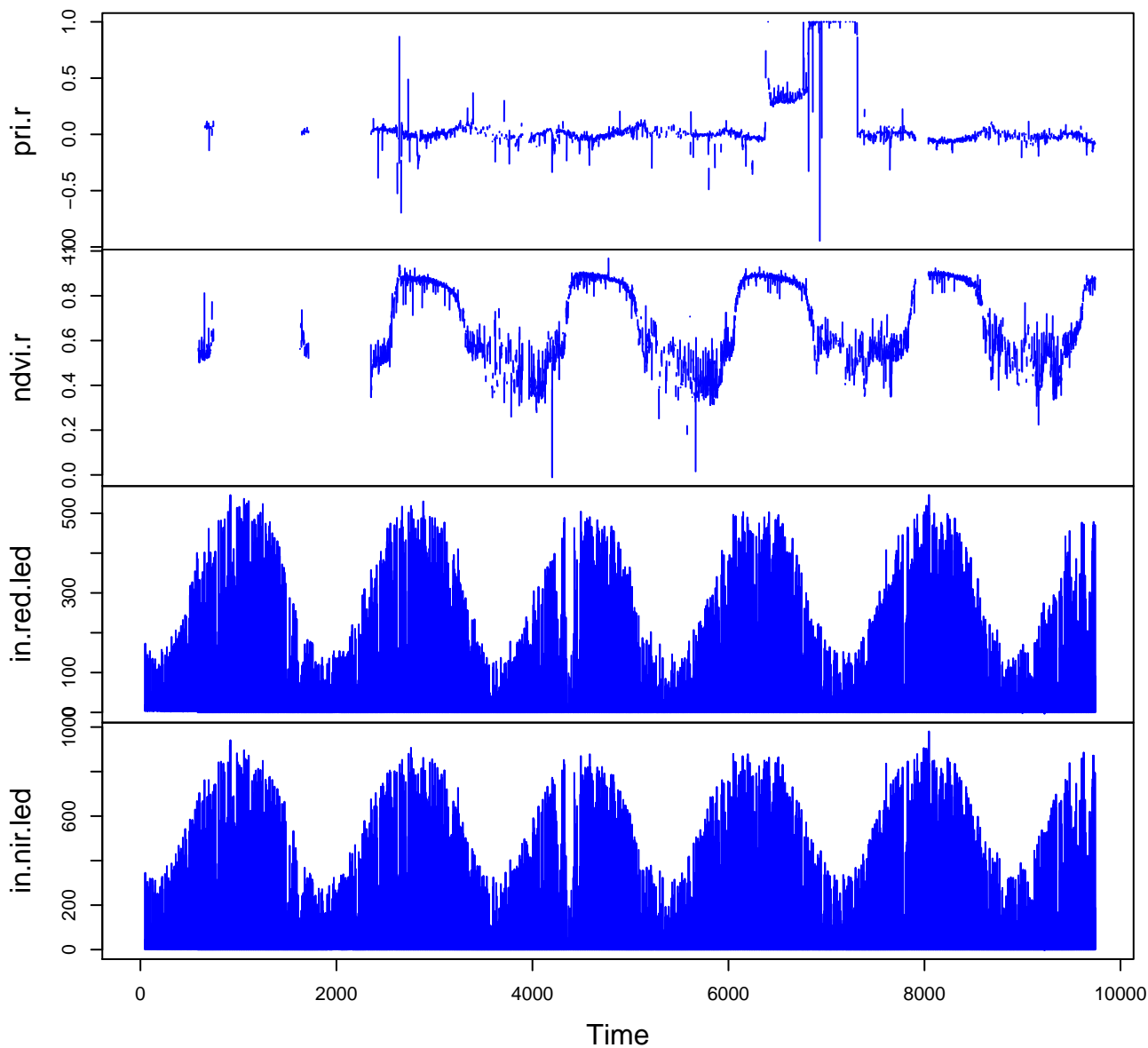
HF249-01 Plot 13



HF249-01 Plot 14



HF249-01 Plot 15



HF249-01 Plot 16

