

Harvard Forest Data Archive HF072-02

Data File:

Name = hf072-02-eddy-2005-2010.csv
Description = eddy flux (2005 to 2010)
Rows = 105167 Columns = 25
MD5 checksum = b9fb26b00d39bcd956a46c0840c26f36

Variables:

year = year
doy = day of the year with hours and minutes converted to a decimal fraction of a day (nominalDay)
co2 = carbon dioxide concentration of the air drawn into the eddy covariance system at 21 m above ground or 4.5 m above the average tree canopy top (dimensionless)
h2o = water vapor concentration of the air drawn into the eddy covariance system at 21 m above ground or 4.5 m above the average tree canopy top (dimensionless)
u = wind speed measured by the sonic anemometer at 21 m or 4.5 m above the average tree canopy top (metersPerSecond)
ustar = friction velocity measured by the sonic anemometer. Friction velocity is the square of momentum flux from the atmosphere above the sonic to the air layers below the sonic, and is a measure of atmospheric turbulence (metersPerSecond)
wind.dir = compass direction in degrees of the average wind vector, with 0 and 360 degrees indicating geographic north (degree)
h = sensible heat flux from the forest to the atmosphere, calculated by the sonic anemometer from the covariance of air temperature and the vertical component of wind velocity (wattPerMeterSquared)
le = flux of latent heat (heat used in evaporating water) from the forest to the atmosphere, calculated by multiplying FH2O (see definition below) by the heat of evaporation of water (wattPerMeterSquared)
fco2.reported = measured carbon dioxide flux from forest to atmosphere. Includes all data collected, some of which are invalid (see below) (micromolePerMeterSquaredPerSecond)
fco2.valid = FCO2 data after removal of data that are invalid due to wind direction or low atmospheric turbulence (see Methods description) (micromolePerMeterSquaredPerSecond)
fco2.value = best estimate of FCO2, using either valid measurement from the column to the left, or a model estimate (micromolePerMeterSquaredPerSecond)
fh2o = measured water vapor flux from forest to atmosphere. Includes all data collected, some of which are invalid (see below) (millimolePerMeterSquaredPerSecond)
fh2o.valid = FH2O data after removal of data that are invalid due to wind direction (see Methods description). Low turbulence data are not removed as the H2O flux during the foliated season for the trees is from the canopy, which therefore does not act as a barrier to movement of H2O, as it does for the large amount of CO2 produced by soil and forest-floor litter. When trees do not have foliage, the leafless canopy is not a significant barrier to evaporation of water from the soil, which occurs primarily when the ground and air near the ground are warm, generating upward movement of air. (millimolePerMeterSquaredPerSecond)

sonic.tair = air temperature estimated from the speed of sound measured by the sonic anemometer. This estimate is based on air density which is directly related to the speed of sound. The sonic air temperature estimate can differ from actual air temperature by a few degrees due to the presence of water vapor, which lowers air density. (celsius)

tair.above.canopy = air temperature measured at 23 m height, or about 6.5 m above the average tree canopy top (celsius)

rh.above.canopy = relative humidity measured at 23 m height (same location as Tair.above.canopy) (dimensionless)

vpd.above.canopy = water vapor pressure deficit (equals saturation water vapor pressure at Tair.above.canopy minus actual water vapor pressure) (kilopascal)

tsoil.10cm = soil temperature measured at 10 cm depth. The average of 3 to 4 values at randomly located points within 15 m of the flux tower base. (celsius)

par = photosynthetically active radiation measured at 22 m height, or about 5.5 m above the average tree canopy top (micromolePerMeterSquaredPerSecond)

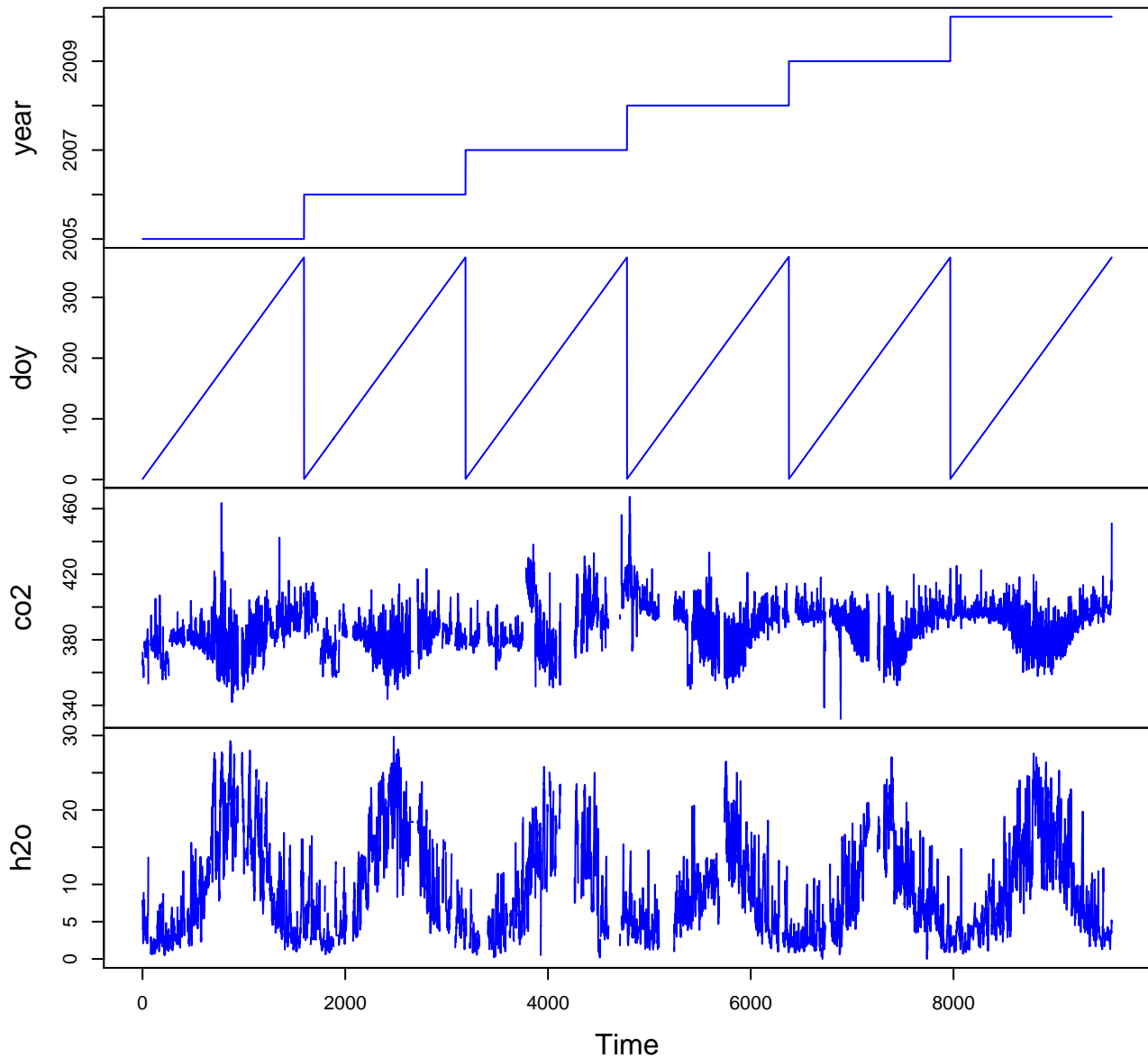
net.radiation = net radiant energy exchange, all wavelengths, measured by a sensor about 27 m above ground, or 10.5 m above the average tree canopy top (wattPerMeterSquared)

understory.tair.20cm = air temperature 20 cm above the soil surface. The average of 2 values at randomly located points within 15 m of the tower. This data is not accurate if the sensors receive direct sunlight. The data is used to identify low-turbulence periods at night or near dawn or dusk when air temperature near the soil is significantly lower than above the canopy, contributing to cold air drainage and invalidating FCO2 and FH2O measurements. (celsius)

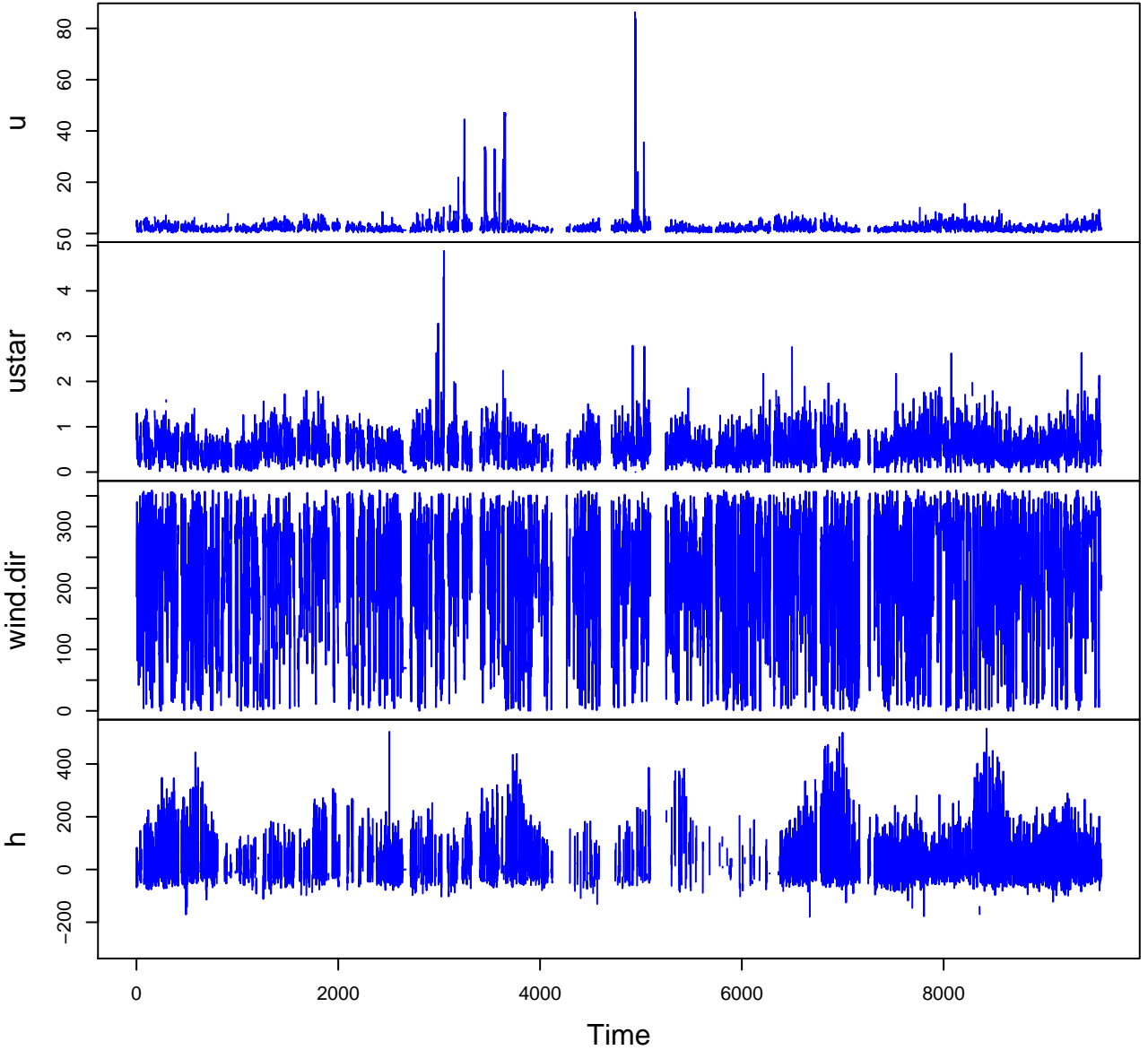
understory.tair.1m. = air temperature 1 m above the soil surface. The average of 2 values at randomly located points within 15 m of the tower. Also not accurate if the sensors receive direct sunlight. (celsius)

Variable	Min	Median	Mean	Max	NAs
year	2005.000	2008.000	2007.500	2010.000	0
doy	1.020	183.600	183.596	367.000	0
co2	330.100	388.040	387.151	497.700	17908
h2o	0.000	7.500	9.157	29.840	15813
u	0.030	2.020	2.593	92.950	17797
ustar	0.000	0.520	0.571	7.870	19221
wind.dir	0.000	226.000	215.212	360.000	16511
h	-314.700	-2.900	28.234	628.300	43459
le	-133.200	4.600	31.971	858.000	50584
fco2.reporte	-43.650	0.650	-0.478	76.450	32269
fco2.valid	-43.650	0.550	-2.298	30.580	72904
fco2.value	-43.650	0.800	-1.465	30.580	48054
fh2o	-5.210	0.090	0.660	19.150	22596
fh2o.valid	-2.970	0.140	0.838	20.000	60907
sonic.tair	-24.100	10.500	9.667	34.300	20519
tair.above.c	-32.000	8.600	8.014	32.500	2466
rh.above.can	0.000	74.300	72.242	100.000	4518
vpd.above.ca	0.000	0.210	0.376	3.520	8526
tsoil.10cm	-2.700	8.900	9.157	28.100	537
par	0.000	8.000	286.577	2210.000	80
net.radiatio	-137.600	-1.300	77.687	772.000	43763
understory.t	-25.500	8.600	8.056	35.000	8715
understory.t	-25.100	8.900	8.374	33.800	8061

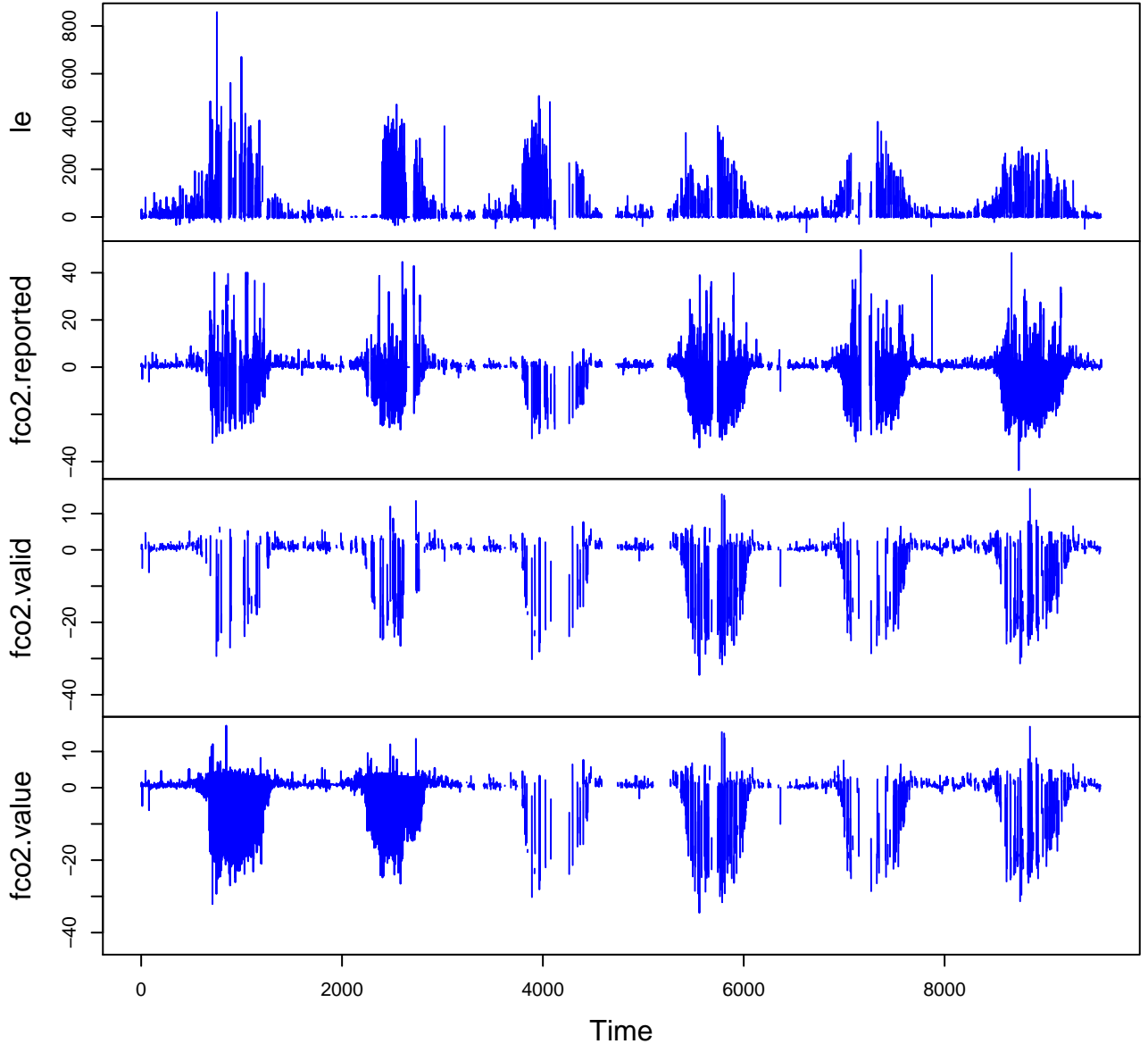
HF072-02 Plot 1



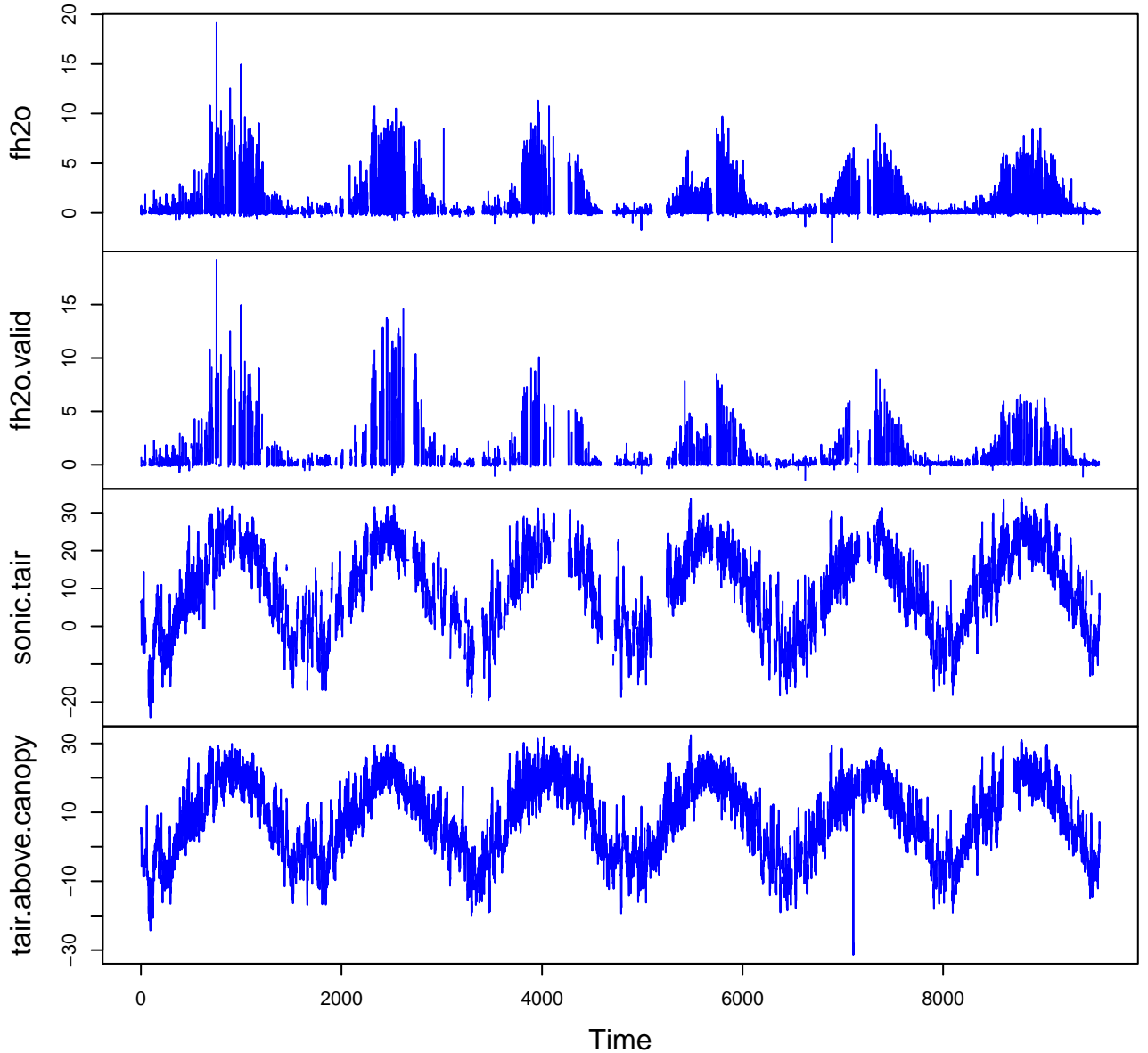
HF072-02 Plot 2



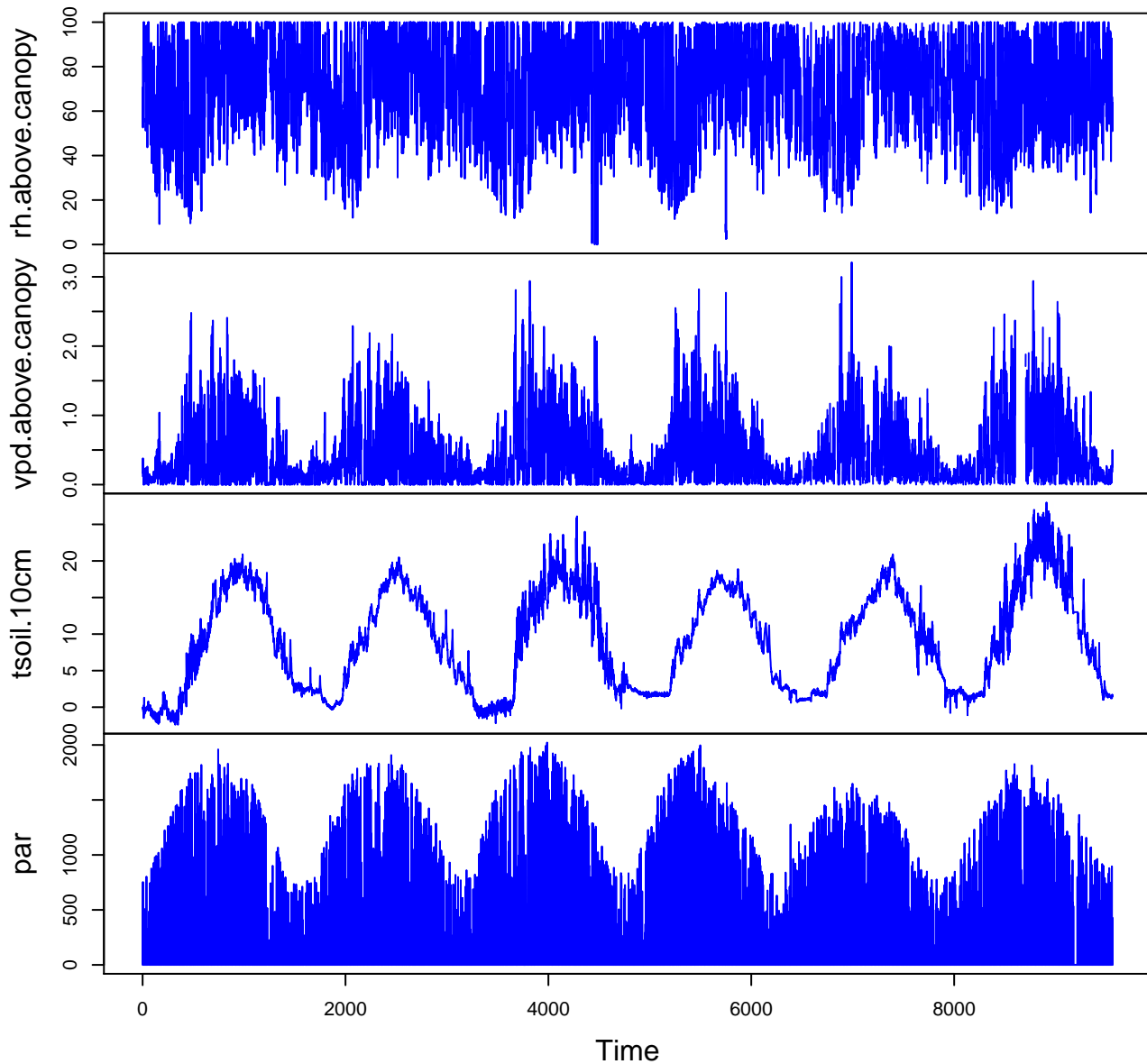
HF072-02 Plot 3



HF072-02 Plot 4



HF072-02 Plot 5



HF072-02 Plot 6

