1. About the data set

Site name (AsiaFlux three letter code)	Kawagoe forest meteorology research site (KWG)
Period of registered data	From January 1, 1996 to December 31, 1996
This document file name	KWG_1996_001a.pdf
Corresponding data file name	KWG_1996_001.csv

Revision information

Date	Details of revision	Renewed file name
27 March 2013	First registration	KWG_1996_001a.pdf KWG_1996_001.csv

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2. Site description

Hour line (Time difference from UTC)	Japan Standard Time (JST) (9 hours ahead of UTC)
Location (address)	Kawagoe, Saitama, Japan
Position	35.8725N, 139.4869E (World Geodetic System 1984)
Elevation	26m above sea level (World Geodetic System 1984)
Terrain type	flat
Slope	0 degrees
Area	approx. 40ha
Fetch	50-500m
Climate	Warm temperate (Köppen climate classification: Cfa)
Mean annual air temperature	15 degree C
Mean annual precipitation	1300mm
Vegetation Type	Deciduous broadleaf forest
Dominant Species (Overstory)	*Quercus serrata* (Konara oak), *Carpinus laxiflora* (red-leaved hornbeam), *Clethra barbineris* (japanese sweetspire), *Ilex macropoda*
Dominant Species (Understory)	-
Canopy height	Approx. 15m
Breast High Diameter	mainly 10-15cm
Age	NA
LAI	approx. 5.5 at max in early summer
Soil Type	Black soil Bl_D (Andosols)
Other information	A local street goes through the forest. Approx. 500m away from Kan-Etsu Expressway. Fallen leaves are occasionally swept away.

References

YASUDA Yukio, WATANABE Tsutomu (2001) Comparative measurements of CO_2 flux over a forest using closed-path and open-path CO_2 analyzers. Boundary-Layer Meteorology, 100(2):191-208

WATANABE Tsutomu, YAMANOI Katsumi, YASUDA Yukio(2000) Testing of the bandpass eddy covariance method for a long-term measurement of water vapour flux over a forest. Boundary-Layer Meteorology, 96(3):473-491

YASUDA Yukio, WATANABE Tsutomu, OHTANI Yoshikazu, OKANO Michiaki, Nakayama Keiichi (1998) Seasonal variation of CO_2 flux over a broadleaf deciduous forest. Journal of Japan Society of Hydrology & Water Resources, 11(6):575-585 [in Japanese with an English abstract]

WATANABE Tsutomu, OHTANI Yoshikazu (1998) A comparative study on Calculation Method of Heat Conduction in Trees Stems. Journal of Agricultural Meteorology, 54(1):47-54 [in Japanese with an English abstract]

3. Registered data

Observation items	Symbol	Unit	Height(s) Depth(s)	Instruments	Note
Date	DATE	-	-	-	yyyymmdd
Time	TIME	-	-	-	hhmm
Precipitation	PPT	mm	0.6m	RT-5 (IKEDA)	
Air temperature	Ta	degrees C	20.92 m	HMP-35D (VAISALA)	
Relative humidity	Rh	%	20.92 m	HMP-35D (VAISALA)	See Note [1]
Wind speed	U	$m \cdot s^{-1}$	21.13m	WM-30P (IKEDA)	
Wind direction	WD	-	25.9 m	WD-16 (IKEDA)	16 cardinal points (0-15) See Note [2]
Global solar radiation (incoming / downward)	Sd	$W \cdot m^{-2}$	25m	MR-22 (EKO)	See Note [3]
Reflected solar radiation (upward)	Su	$W \cdot m^{-2}$	25m	MR-22 (EKO)	See Note [3]
Photosynthetic active photon flux density (downward)	Pd	$micromol \cdot m^{-2} \cdot s^{-1}$	25m	ML020P (EKO) LI190(LI-COR)	See Note [3]
Reflected PAR (upward)	Pu	NA	NA	NA	
Net radiation	Rn	$W \cdot m^{-2}$	25m	MF-11 (EKO)	
Soil heat flux	G	$W \cdot m^{-2}$	-0.02m	MF-81 (EKO)	
Sensible heat flux	H	NA	NA	NA	
Latent heat flux	lE	NA	NA	NA	
Friction velocity	Ust	NA	NA	NA	
CO_2 flux	Fc	NA	NA	NA	
Storage change in canopy air layer	Sc	NA	NA	NA	
Net ecosystem exchange	NEE	NA	NA	NA	
Ecosystem respiration	Re	NA	NA	NA	
Gross primary production	GPP	NA	NA	NA	

Note

[1] value of >100% is replaced by 100%

[2] clockwise from north (=0) to north-northwest (=15)

[3] value in night time is replaced by 0.0

Gap filling

References

Data format

Data consists of fixed length (8 digits) comma separated format. Missing data is labeled as "-9999.00"

Line 1: Symbol (Date, Time, PPT, Ta, …..)

Line 2: Unit (yyyymmdd, hhmm, mm, degC, ….)

"hhmm" shows intermediate time of averaging period.

i.e. "1215" labels half-hourly average (or sum) of data from 12:00 to 12:30

Line 3: Comment

Line 4: Data

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Data example

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    Date, Time,      PPT,       Ta,       Rh,        U,       WD,       Sd,       Su,       Pd,       Pu,  ...........
yyyymmdd, hhmm,       mm,     degC,        %,     ms-1,      deg,     Wm-2,     Wm-2,     (*1),     (*1), ...........
File= KWG_2000_001.CSV; Created: 20100326; Gap= -9999.0; (*1): micro-mol m-2 s-1                          ...........
20000101, 0015,      0.0,     3.34,    87.19,     1.58, -9999.0,      0.1, -9999.0,      0.1,      0.0, ...........
20000101, 0045,      0.0,     3.12,    88.14,     1.44, -9999.0,      0.0, -9999.0,      0.1,      0.0, ...........
20000101, 0115,      0.0,     2.36,    90.51,     1.15, -9999.0,     -0.3, -9999.0,      0.1,      0.0, ...........
20000101, 0145,      0.0,     2.14,    91.32,     0.83, -9999.0,      0.0, -9999.0,      0.1,      0.0, ...........
20000101, 0215,      0.0,     2.28,    88.96,     0.49, -9999.0,     -0.3, -9999.0,      0.1,      0.0, ...........
20000101, 0245,      0.0,     2.24,    89.82,     0.35, -9999.0,     -0.2, -9999.0,      0.2,      0.0, ...........
20000101, 0315,      0.0,     2.05,    89.49,     1.50, -9999.0,      0.1, -9999.0,      0.2,     -0.1, ...........
20000101, 0345,      0.0,     2.41,    87.25,     1.27, -9999.0,      0.0, -9999.0,      0.2,      0.0, ...........
20000101, 0415,      0.0,     2.31,    86.83,     1.12, -9999.0,     -0.2, -9999.0,      0.1,      0.0, ...........
20000101, 0445,      0.0,     2.84,    83.36,     0.54, -9999.0,     -0.6, -9999.0,      0.0,      0.0, ...........
20000101, 0515,      0.0,     2.53,    83.32,     1.23, -9999.0,      0.2, -9999.0,      0.2,      0.0, ...........
20000101, 0545,      0.0,     1.59,    87.54,     1.29, -9999.0,     -0.6, -9999.0,      0.0,      0.0, ...........
20000101, 0615,      0.0,     1.89,    85.13,     0.94, -9999.0,      0.4, -9999.0,      0.3,      0.0, ...........
20000101, 0645,      0.0,     1.77,    82.40,     0.83, -9999.0,      3.5, -9999.0,      8.5,      0.4, ...........
20000101, 0715,      0.0,     2.67,    76.83,     1.38, -9999.0,     45.8, -9999.0,     71.8,     11.6, ...........
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4. Observation and calculation

4-1. Flux observation system and data acquisition

Type of sonic anemometer	
Type of IRGA	
Sampling rate	
Averaging time	
Flux measurement height #1	
Zero-plane displacement	
Roughness length	
Calibration information	
Other information	

4-2. Flux calculation

Calculation methods		Note
Flow attenuation [*4-6]		
Coordinate rotation [*1-3]		
Lag removal [*2, 7, 8]		

4-3. Flux corrections

Correction methods		Target flux	Note
Cross wind correction [*9, 10]			
Vapor correction			
High frequency loss	Band-pass covariance method [*12]		
	Experimental approach [*2]		
Low frequency loss (Detrending)	Linear detrend [*16]		
WPL Correction [*17-21]			
Others [*22-24]			

4-4. Quality control [*25-26]

QC methods				Note
Raw data test [*25,26]	Spike test [*27]			
	Absolute limits			
	Absolute variance			
	Higher-moment statistics	skewness		
		kurtosis		
	Discontinuities	Harr mean test		
		Harr variance test		
	Visual inspection			
Non steady state test [*25]				
Absolute thresholds				
Others				

4-5. Storage term

Target storage		Note

References

5. Important events

Date	Events
1996/ 5/20 - 1996/ 5/27	electrical outage occurred during this period

Please note that there may be more electrical outages other than listed above.

6. Publications relating to this site

YASUDA Yukio, WATANABE Tsutomu (2001) Comparative measurements of CO_2 flux over a forest using closed-path and open-path CO_2 analyzers. Boundary-Layer Meteorology, 100(2):191-208

WATANABE Tsutomu, YAMANOI Katsumi, YASUDA Yukio(2000) Testing of the bandpass eddy covariance method for a long-term measurement of water vapour flux over a forest. Boundary-Layer Meteorology, 96(3):473-491

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Flux correction

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*13 Massman, W. J., 2000. Agric. For. Meteorol. 104, 185-198

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