

1. About the data set

Site name (AsiaFlux three letter code)	Kawagoe forest meteorology research site (KWG)	
Period of registered data	From January 1, 1995 to December 31, 1995	
This document file name	KWG_1995_001a.pdf	
Corresponding data file name	KWG_1995_001.csv	
Revision information		
Date	Details of revision	Renewed file name
27 March 2013	First registration	KWG_1995_001a.pdf KWG_1995_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)	<i>Quercus serrata</i> (Konara oak), <i>Carpinus laxiflora</i> (red-leaved hornbeam), <i>Clethra barbinervis</i> (japanese sweetspire), <i>Ilex macropoda</i>
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. <i>Boundary-Layer Meteorology</i> , 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. <i>Boundary-Layer Meteorology</i> , 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. <i>Journal of Japan Society of Hydrology & Water Resources</i> , 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. <i>Journal of Agricultural Meteorology</i> , 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	$\text{m}\cdot\text{s}^{-1}$	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	$\text{W}\cdot\text{m}^{-2}$	25m	MR-22 (EKO)	See Note [3]
Reflected solar radiation (upward)	Su	$\text{W}\cdot\text{m}^{-2}$	25m	MR-22 (EKO)	See Note [3]
Photosynthetic active photon flux density (downward)	Pd	$\text{micromol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$	25m	ML020P (EKO) LI190(LI-COR)	See Note [3]
Reflected PAR (upward)	Pu	NA	NA	NA	
Net radiation	Rn	$\text{W}\cdot\text{m}^{-2}$	25m	MF-11 (EKO)	
Soil heat flux	G	$\text{W}\cdot\text{m}^{-2}$	-0.02m	MF-81 (EKO)	
Sensible heat flux	H	NA	NA	NA	
Latent heat flux	IE	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

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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

Date, Time, yyyymmdd, hhmm,	PPT, mm,	Ta, degC,	Rh, %,	U, ms-1,	WD, deg,	Sd, Wm-2,	Su, Wm-2,	Pd, (#1),	Pu, (#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, -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,	0.0, -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, -9999.0,	0.1, -9999.0,	0.1,	0.0,	.....
20000101, 0145,	0.0,	2.14,	91.32,	0.83, -9999.0,	0.0, -9999.0,	0.0, -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, -9999.0,	0.1, -9999.0,	0.1,	0.0,	.....
20000101, 0245,	0.0,	2.24,	89.82,	0.35, -9999.0,	-0.2, -9999.0,	0.2, -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,	0.1, -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,	0.0, -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, -9999.0,	0.1, -9999.0,	0.1,	0.0,	.....
20000101, 0445,	0.0,	2.84,	83.36,	0.54, -9999.0,	-0.6, -9999.0,	0.0, -9999.0,	0.0, -9999.0,	0.0,	0.0,	.....
20000101, 0515,	0.0,	2.53,	83.32,	1.23, -9999.0,	0.2, -9999.0,	0.2, -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, -9999.0,	0.0, -9999.0,	0.0,	0.0,	.....
20000101, 0615,	0.0,	1.89,	85.13,	0.94, -9999.0,	0.4, -9999.0,	0.4, -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,	3.5, -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,	45.8, -9999.0,	45.8, -9999.0,	71.9,	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

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5. Important events

Date	Events
1995/12/20 - 1995/12/27	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 CO₂ flux over a forest using closed-path and open-path CO₂ 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 CO₂ flux over a broadleaf deciduous forest. *Journal of Japan Society of Hydrology & Water Resources*, 11(6):575-585 [in Japanese with an English abstract]
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- MIZOGUCHI Yasuko, OHTANI Yoshikazu, WATANABE Tsutomu, YASUDA Yukio, OKANO Michiaki (2003) Long term continuous measurement of CO₂ efflux from a forest floor using dynamic closed chambers with automatic opening/closing capability. *Japanese Journal of Ecology, Japanese Edition*, 53(1):1-12 [in Japanese with an English abstract]
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Publication lists:

http://www2.ffpri.affrc.go.jp/labs/flux/paper_e.html [KWG]

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Flux correction

- *9 Schotanus, P. et al., 1983. Boundary-Layer Meteorology, 26: 81-93.
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- *11 Kaimal J.C. and Gaynor, J.E., 1991. Boundary-Layer Meteorology, 56: 401-410.
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