(Date: 1 August 2025)

1. About the data set

Site name (three letter code)	Fuji Hokuroku Flux Observation Site (FHK)
Period of registered data	From Jan. 1, 2006, to Dec. 31, 2023
This document file name	FxMt_FHK_2013-2023_30m_03.pdf
Corresponding data file name	FxMt_FHK_2013_30m_03.csv, FxMt_FHK_2014_30m_03.csv, FxMt_FHK_2015_30m_03.csv, FxMt_FHK_2016_30m_03.csv, FxMt_FHK_2017_30m_03.csv, FxMt_FHK_2018_30m_03.csv, FxMt_FHK_2019_30m_03.csv, FxMt_FHK_2020_30m_03.csv, FxMt_FHK_2021_30m_03.csv, FxMt_FHK_2022_30m_03.csv, FxMt_FHK_2023_30m_03.csv

Revision information

Date	Details of revision	Renewed file name
Sep. 27, 2013	First registration	SiIn_FHK_2006-09_01.pdf FxMt_FHK_2006-09_35m_01.pdf FxMt_FHK_2006_35m_01.csv FxMt_FHK_2007_35m_01.csv FxMt_FHK_2008_35m_01.csv FxMt_FHK_2009_35m_01.csv
Nov. 18, 2019	Data of the year 2010, 2011, and 2012 were added. None-gap-filled eddy covariance flux (Fc, H, and LE) data were registered. Data of Sc, NEE, Co, Rn, TPAR, RPAR, VPD, and G were added.	SiIn_FHK_2006-2012_02.pdf FxMt_FHK_2006-2012_30m_02.pdf FxMt_FHK_2006_30m_02.csv FxMt_FHK_2007_30m_02.csv FxMt_FHK_2008_30m_02.csv FxMt_FHK_2009_30m_02.csv FxMt_FHK_2010_30m_02.csv FxMt_FHK_2011_30m_02.csv FxMt_FHK_2012_30m_02.csv
Aug. 1, 2025	Data for the year 2013-2023 were added.	SiIn_FHK_2013-2023_03.pdf FxMt_FHK_2013-2023_30m_03.pdf FxMt_FHK_2013_30m_03.csv FxMt_FHK_2014_30m_03.csv FxMt_FHK_2015_30m_03.csv FxMt_FHK_2016_30m_03.csv FxMt_FHK_2017_30m_03.csv FxMt_FHK_2018_30m_03.csv FxMt_FHK_2019_30m_03.csv FxMt_FHK_2020_30m_03.csv FxMt_FHK_2021_30m_03.csv FxMt_FHK_2022_30m_03.csv FxMt_FHK_2023_30m_03.csv
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2. Site description

☻ to DB user ……………… See also the general information file.

Hour line (Time difference from UTC)	9 hours ahead of UTC (Japan Standard Time (JST))
Vegetation Type	Deciduous needleleaf forest (Japanese larch afforestation)
Dominant Species (Overstory)	Japanese larch (*Larix kaempferi Sarg.*), evergreen needle-leafed species (*Pinus densiflora* and *Abies homolepis*), deciduous broad-leafed species (*Swida controversa, Quercus serrata, Quercus crispula, Betula platyphylla var. japonica, Prunus incisa,* etc.)
Dominant Species (Understory)	Ferns (*Dryopteris crassirhizoma*, *Dryopteris expansa*), bamboo grass (*Sasamorpha borealis*), and other herbs.
Canopy height	20-26 m
LAI	Larch: 2.88 m^2 m^{-2} estimated based on the leaf mass abundance (Okano & Arase 2007), and 2.4 m^2 m^{-2} estimated based on 3D portable laser scanner measurement (Maki et al., 2012), Understory: 3.0 m^2 m^{-2} (max). After thinning, the tree LAI was 2.31 in 2016.
Disturbance	Sep. 18, 2017 About 30 trees fell by the extremely strong wind (maximum instant wind speed was 23.7m/s) due to the typhoon.
	Sep. 5 – Oct. 2, 2018 About 30 trees fell by the extremely strong wind (maximum instant wind speed was 41.9m/s) due to the typhoon.
	May 2014 As the first thinning, approximately 36% of the larch trees located more than 20 meters away from the observation tower were cut down. After thinning, the felled trees were removed from the site.
	March 2015 The second thinning was carried out near the observation tower. Between 2014 and 2015, approximately 39% of the larch trees were cut down, reducing the forest density from 409 trees per hectare in 2013 to 249 trees per hectare in 2015. The harvested timber and above-ground residues were removed from the site.
Other information	

3. Observation and calculation

3-1. Flux observation system and data acquisition

Type of sonic anemometer	Three-dimensional sonic anemometer-thermometer: DA-600-3TV, Probe TR-61C, SONIC CORP. (Jan. 1, 2006 – May 9, 2011); DA-650, Probe TR-61C, SONIC CORP. (May 9, 2011 – Nov. 22, 2011); DA-600-3TV, Probe TR-61C, SONIC CORP. (Nov. 22, 2011 – Apr. 18, 2012); DA-700-3TV, Probe TR-61A, SONIC CORP. (Apr. 18, 2012 – Apr. 15, 2014); CSAT3, Campbell Scientific, (Apr. 15, 2014-)
Type of IRGA	Open-path CO_2/H_2O gas analyzer: LI-7500, LI-COR (LE) Closed-path CO_2/H_2O analyzers: LI-6262, LI-COR (Jan. 1, 2006 – Dec. 2012); LI-7000, LI-COR (Jan. 2013 – Dec. 2023) (Fc, H)
Sampling rate	10 Hz
Averaging time	30 min
Flux measurement height #1	35 m
Flux measurement height #2	
Flux measurement height #3	
Zero-plane displacement	
Roughness length	
Calibration information	The gain of CO_2 of the closed-path analyzer was checked once a day by flowing two standard CO_2 gases of 320 ppmv and 420 ppmv that were automatically controlled using a CR-23X, Campbell Scientific, USA (Jan. 2006 – April 2008) and CR-3000, Campbell Scientific, USA (May 2008-).
Other information	

3-2. Flux calculation

		Note/References
Flow attenuation [*4-6]	✓ Yes	Shimizu, T. *et al*., 1999. Boundary-Layer Meteorol., 64: 227–236.
Coordinate rotation [*1-3]	✓ Double (2D) rotation	
Lag removal [*2, 7, 8]	✓ Constant	Digital delay for LI7500 and 3-D sonic anemometer Time lag between *w*' and *c*' for closed-path system

3-3. Flux corrections

		Note/References
For sensible heat flux	✓ Cross wind correction [*9, 10] ✓ Water vapor correction [*11]	
High frequency loss	• **[u*, H, LE]** ✓ Moor (1986) [*15] (Correction for path length and sensor separation)	

	• **[Fc]** ✓ Experimental approach *2	
Low frequency loss *16 (Detrending)	✓ Block average	
WPL Correction*17-21	✓ For latent heat (LE) flux ✓ For CO_2 flux	
Others *22-24	✓ Temperature dependency for latent heat: L ✓ Temperature dependency for air density ✓ Pressure dependency for air density	

3-4. Quality control *25-26

		Note/References
Raw data test	✓ Spike test *27 ✓ Absolute limits	
Non steady state test	✓ YES	
Integral turbulence characteristics	✓ YES (Ust)	
Correlation coefficient	✓ Not applied	
Wind direction	✓ YES	Data with wind blowing from the tower were excluded to remove the tower's influence on measurements.
Footprint test *28, 29	✓ YES	
Absolute thresholds	✓ YES	
Others	✓	

3-5. Storage term

		Note/References
Storage term	• **[CO_2]**	From CO_2 profile data (35, 32, 27, 22, 16, 10, 4.5, 2, 1, 0.5 m) (Jan. 2006 to Jul. 2010) When CO_2 profile data were missing, and after Jul. 2010, CO_2 data at the flux measuring height (35 m) was used.

3-6. Other information

		Note/References

4. Registered Data

Observation items	Symbol	Unit	Height(s) Depth(s)	Instruments	Level of data processing
Year	Year	#### (YYYY)	****	****	
Date	DOY	1～365(6)	****	****	
Time	TIME	#### (HHMM)	****	****	The END of the averaging period
CO_2 flux	Fc	micoromol・m^{-2}・s^{-1}	35 m	Three-dimensional sonic anemometer-thermometers: DA-600, Probe TR-61C (Jan. 1, 2006 – May 9, 2011); DA-650, Probe TR-61C (May 9, 2011 – Nov. 22, 2011); DA-600, Probe TR-61C (Nov. 22, 2011 – Apr. 18, 2012); DA-700, Probe TR-61A (Apr. 18, 2012 – Apr. 11, 2016), SONIC CORP.) and closed-path CO_2/H_2O analyzers: LI-6262, LI-COR (Jan. 1, 2006 – Dec. 2012); LI-7000, LI-COR (Jan. 2013 – Dec. 2023) (Fc, H)	Quality-controlled
CO_2 storage in canopy air layer	Sc	micoromol・m^{-2}・s^{-1}	Profile (35, 32, 27, 22, 16, 10, 4.5, 2, 1, 0.5 m)	Closed-path CO_2/H_2O analyzers: LI6262 LI-COR (Jan. 2006 – Jul. 2010)	Quality-controlled
Net ecosystem carbon exchange	NEE	micoromol・m^{-2}・s^{-1}	-	CO_2 flux + CO_2 storage in canopy air layer	Quality-controlled
CO_2 concentration	Co	micoromol・mol^{-1}	35 m	Closed-path CO_2/H_2O analyzers: LI-6262, LI-COR (Jan. 1, 2006 – Dec. 2012); LI-7000, LI-COR (Jan. 2013 – Dec. 2023)	Quality-controlled
Sensible heat flux	H	W・m^{-2}	35 m	Three-dimensional sonic anemometer-thermometers: DA-600, Probe TR-61C (Jan. 1, 2006 – May 9, 2011); DA-650, Probe TR-61C (May 9, 2011 – Nov. 22, 2011); DA-600, Probe TR-61C (Nov. 22, 2011 – Apr. 18, 2012); DA-700, Probe TR-61A SONIC CORP. (Apr. 18, 2012 – Apr. 11, 2016), and closed-path CO_2/H_2O analyzers: LI-6262, LI-COR (Jan. 1, 2006 – Dec. 2012); LI-7000, LI-COR (Jan. 2013 – Dec. 2023)	Quality-controlled

Latent heat flux	LE	W･m^{-2}	35 m	Three-dimensional sonic anemometer-thermometers: DA-600, Probe TR-61C (Jan. 1, 2006 – May 9, 2011); DA-650, Probe TR-61C (May 9, 2011 – Nov. 22, 2011); DA-600, Probe TR-61C (Nov. 22, 2011 – Apr. 18, 2012); DA-700, Probe TR-61A SONIC CORP. (Apr. 18, 2012 – Apr. 11, 2016), and open-path CO_2/H_2O analyzers: LI7500, LI-COR	Quality-controlled
Friction velocity	USt	m･s^{-1}	35 m	Three-dimensional sonic anemometer-thermometers: DA-600, Probe TR-61C (Jan. 1, 2006 – May 9, 2011); DA-650, Probe TR-61C (May 9, 2011 – Nov. 22, 2011); DA-600, Probe TR-61C (Nov. 22, 2011 – Apr. 18, 2012); DA-700, Probe TR-61A SONIC CORP. (Apr. 18, 2012 – Apr. 15, 2014); CSAT3, Campbell Scientific (Apr. 15, 2014 -)	Quality-controlled
Momentum flux	TAU	m^2･s^{-2}	35 m	Three-dimensional sonic anemometer-thermometers: DA-600, Probe TR-61C (Jan. 1, 2006 – May 9, 2011); DA-650, Probe TR-61C (May 9, 2011 – Nov. 22, 2011); DA-600, Probe TR-61C (Nov. 22, 2011 – Apr. 18, 2012); DA-700, Probe TR-61A (Apr. 18, 2012 – Apr. 15, 2014), SONIC CORP.; CSAT3, Campbell Scientific (Apr. 15, 2014 -)	Quality-controlled
Global solar radiation (incoming)	Rg_32	W･m^{-2}	32 m	Pyranometer: MS-402F, Eko (Jan. 2006 – Sep. 28, 2008); MS-802F, EKO (Sep. 28, 2008 – Sep. 6, 2011); MS-402F, EKO (Sep. 6, 2011 – Apr. 16, 2015); CMP6, Kipp&Zonen (APR. 16, 2015-)	
Global solar radiation (incoming)	Rg_30_Rn	W･m^{-2}	30 m	Radiometer: MR50, Eko (Jan. 2006 - Nov. 16, 2015); NR01, Hukseflux (Nov. 16, 2015 -)	
Global solar radiation (outgoing)	Rg_out_30	W･m^{-2}	30 m	Radiometer: MR50, Eko (Jan. 2006 - Nov. 16, 2015); NR01, Hukseflux (Nov. 16, 2015 -)	
Long-wave radiation	Rgl_30	W･m^{-2}	30 m	Radiometer: MR50, Eko (Jan. 2006 - Nov. 16, 2015); NR01,	

(incoming)				Hukseflux (Nov. 16, 2015 -)	
Long-wave radiation (outgoing)	Rgl_out_30	W・m^{-2}	30 m	Radiometer: MR50, Eko (Jan. 2006 - Nov. 16, 2015); NR01, Hukseflux (Nov. 16, 2015 -)	
Net Radiation	Rn_30	W・m^{-2}	30 m	Rg_30_Rn – Rg_out_30 + Rgl_30 – Rgl_out_30	
Transmitted solar radiation (below canopy incoming)	TR_1_2	W・m^{-2}	2 m	Pyranometer: MS-601, Eko (Jan. 2006 – Apr. 15, 2015); CMP6, Kipp&Zonen (Apr. 15, 2015 -)	
Transmitted solar radiation (below canopy incoming)	TR_2_2	W・m^{-2}	2 m	Pyranometer: MS-601, Eko (Jan. 2006 – Apr. 15, 2015); CMP6, Kipp&Zonen (Apr. 15, 2015 -)	
Transmitted solar radiation (below canopy incoming)	TR_3_2	W・m^{-2}	2 m	Pyranometer: MS-601, Eko (Jan. 2006 – Apr. 15, 2015); CMP6, Kipp&Zonen (Apr. 15, 2015 -)	
Transmitted solar radiation (below canopy incoming)	TR_4_2	W・m^{-2}	2 m	Pyranometer: MS-601, Eko (Jan. 2006 – Apr. 15, 2015); CMP6, Kipp&Zonen (Apr. 15, 2015 -)	
Transmitted solar radiation (below canopy incoming)	TR_5_2	W・m^{-2}	2 m	Pyranometer: MS-601, Eko (Jan. 2006 – Apr. 15, 2015); CMP6, Kipp&Zonen (Apr. 15, 2015 -)	
Transmitted solar radiation (below canopy incoming)	TR_1_2_Rn	W・m^{-2}	2 m	Radiometer: MR50, Eko (Jan. 2006 – Apr. 12, 2018); NR01, Hukseflux (Apr. 12, 2018 -)	
Transmitted solar radiation (below canopy outgoing)	TR_out_1_2	W・m^{-2}	2 m	Radiometer: MR50, Eko (Jan. 2006 – Apr. 12, 2018); NR01, Hukseflux (Apr. 12, 2018 -)	
Transmitted long-wave radiation (below canopy incoming)	TRl_1_2	W・m^{-2}	2 m	Radiometer: MR50, Eko (Jan. 2006 – Apr. 12, 2018); NR01, Hukseflux (Apr. 12, 2018 -)	
Transmitted long-wave radiation (below canopy outgoing)	TRl_out_1_2	W・m^{-2}	2 m	Radiometer: MR50, Eko (Jan. 2006 – Apr. 12, 2018); NR01, Hukseflux (Apr. 12, 2018 -)	
Transmitted Net Radiation (below canopy)	TRn_1_2	W・m^{-2}	2 m	TR_1_2_Rn – TR_out_1_2 + TRl_1_2 – TRl_out_1_2	
Transmitted solar radiation (below canopy incoming)	TR_2_2_Rn	W・m^{-2}	2 m	Radiometer: MR50, Eko (Jan. 2006 – Apr. 10, 2017); NR01, Hukseflux (Apr. 10, 2017 -)	
Transmitted solar radiation (below canopy outgoing)	TR_out_2_2	W・m^{-2}	2 m	Radiometer: MR50, Eko (Jan. 2006 – Apr. 10, 2017); NR01, Hukseflux (Apr. 10, 2017 -)	
Transmitted long-wave radiation (below canopy incoming)	TRl_2_2	W・m^{-2}	2 m	Radiometer: MR50, Eko (Jan. 2006 – Apr. 10, 2017); NR01, Hukseflux (Apr. 10, 2017 -)	
Transmitted long-wave	TRl_out_2_	W・m^{-2}	2 m	Radiometer: MR50, Eko (Jan.	

radiation (below canopy outgoing)	2			2006 – Apr. 10, 2017); NR01, Hukseflux (Apr. 10, 2017 -)	
Transmitted Net Radiation (below canopy)	TRn_2_2	W・m^{-2}	2 m	TR_2_2_Rn – TR_out_2_2 + TRl_2_2 – TRl_out_2_2	
Photosynthetic active photon flux density	PPFD_32	micoromol・m^{-2}・s^{-1}	32 m	Quantum sensor: ML-020P; Eko (Jan. 2006 – Apr.16, 2015); LI-190S, LI-COR encased in a weather-proof external housing with a glass dome (Apr.16, 2015 -)	
Photosynthetic active photon flux density (gap-filled)	PPFD_32_gf	micoromol・m^{-2}・s^{-1}	32 m	Quantum sensor: ML-020P; Eko (Jan. 2006 – Apr.16, 2015); LI-190S, LI-COR encased in a weather-proof external housing with a glass dome (Apr.16, 2015 -)	Gap filled
Transmitted PAR	TPAR_1_2	micoromol・m^{-2}・s^{-1}	2 m	Quantum sensor: LI-190S, LI-COR (Jan.2006 – Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013); SQ-110, Apogee, USA (Apr. 15, 2013 -)	
Transmitted PAR	TPAR_2_2	micoromol・m^{-2}・s^{-1}	2 m	Quantum sensor: LI-190S, LI-COR (Jan.2006-Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013); SQ-110, Apogee, USA (Apr. 15, 2013 -)	
Transmitted PAR	TPAR_3_2	micoromol・m^{-2}・s^{-1}	2 m	Quantum sensor: LI-190S, LI-COR (Jan.2006-Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013); SQ-110, Apogee, USA (Apr. 15, 2013 -)	
Transmitted PAR	TPAR_4_2	micoromol・m^{-2}・s^{-1}	2 m	Quantum sensor: LI-190S, LI-COR (Jan.2006-Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013); SQ-110, Apogee, USA (Apr. 15, 2013 -)	
Transmitted PAR	TPAR_5_2	micoromol・m^{-2}・s^{-1}	2 m	Quantum sensor: LI-190S, LI-COR (Jan.2006-Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013); SQ-110, Apogee, USA (Apr. 15, 2013 -)	
Reflected PAR	RPAR_30	micoromol・m^{-2}・s^{-1}	30 m	Quantum sensor: LI-190S, LI-COR (Jan.2006-Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013); SQ-110, Apogee, USA (Apr. 15, 2013 -); LI-190S, LI-COR) encased in a weather-proof external housing with a glass dome, (Apr. 12, 2018 -)	

Reflected PAR (below canopy outgoing)	RPAR_1_2	micoromol・ m^{-2}・s^{-1}	2 m	Quantum sensor: LI-190S, LI-COR (Jan.2006-Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013)) Quantum sensor (SQ-110, Apogee, USA (Apr. 15, 2013 -))	
Reflected PAR (below canopy outgoing)	RPAR_2_2	micoromol・ m^{-2}・s^{-1}	2 m	Quantum sensor: LI-190S, LI-COR (Jan.2006-Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013); SQ-110, Apogee, USA (Apr. 15, 2013 -)	
Reflected PAR (below canopy outgoing)	RPAR_3_2	micoromol・ m^{-2}・s^{-1}	2 m	Quantum sensor: LI-190S, LI-COR (Jan.2006-Mar.2007); ML-020P, Eko (Mar.2007- Apr. 15, 2013); SQ-110, Apogee, USA (Apr. 15, 2013 -)	
Wind direction	WD_35	degrees	35 m	Three-dimensional sonic anemometer-thermometer: DA-600-3TV, Probe TR-61C, SONIC CORP. (Jan. 1, 2006 – May 9, 2011); DA-650, Probe TR-61C, SONIC CORP. (May 9, 2011 – Nov. 22, 2011); DA-600-3TV, Probe TR-61C, SONIC CORP. (Nov. 22, 2011 – Apr. 18, 2012); DA-700-3TV, Probe TR-61A, SONIC CORP., (Apr. 18, 2012 – Apr. 11, 2016); CSAT3, Campbell Scientific, USA (Apr. 14, 2014-)	Vector average
Wind direction	WD_32	16 directions	32 m	Sonic anemometer: MA-130A, Eko (Jan.2006-Mar.2007); PGWS-100-3, GILL (Apr.2007-)	Most frequent direction
Wind direction	WD_27	16 directions	27 m	Sonic anemometer: PGWS-100-3, GILL	Most frequent direction
Wind direction	WD_22	16 directions	22 m	Sonic anemometer: PGWS-100-3, GILL	Most frequent direction
Wind direction	WD_16	16 directions	16 m	Sonic anemometer: PGWS-100-3, GILL	Most frequent direction
Wind direction	WD_10	16 directions	10 m	Sonic anemometer: PGWS-100-3, GILL	Most frequent direction
Wind direction	WD_045	16 directions	4.5 m	Sonic anemometer: PGWS-100-3, GILL	Most frequent direction
Wind direction	WD_02	16 directions	2 m	Sonic anemometer: PGWS-100-3, GILL	Most frequent direction
Wind speed	WS_35	m・s^{-1}	35 m	Three-dimensional sonic anemometer-thermometer: DA-600-3TV, Probe TR-61C, SONIC CORP. (Jan. 1, 2006 –	

				May 9, 2011); DA-650, Probe TR-61C, SONIC CORP. (May 9, 2011 – Nov. 22, 2011); DA-600-3TV, Probe TR-61C, SONIC CORP. (Nov. 22, 2011 – Apr. 18, 2012); DA-700-3TV, Probe TR-61A, SONIC CORP., (Apr. 18, 2012 – Apr. 11, 2016); CSAT3, Campbell Scientific, USA (Apr. 14, 2014-)	
Wind speed	WS_32	$m \cdot s^{-1}$	32 m	Sonic anemometer: MA-130A, Eko (Jan.2006-Mar.2007); PGWS-100-3, GILL (Apr.2007-)	
Wind speed	WS_27	$m \cdot s^{-1}$	27 m	Sonic anemometer: MA-130A, Eko (Jan.2006-Mar.2007); PGWS-100-3, GILL (Apr.2007-)	
Wind speed	WS_22	$m \cdot s^{-1}$	22 m	Sonic anemometer: MA-130A, Eko (Jan.2006-Mar.2007); PGWS-100-3, GILL (Apr.2007-)	
Wind speed	WS_16	$m \cdot s^{-1}$	16 m	Sonic anemometer: MA-130A, Eko (Jan.2006-Mar.2007); PGWS-100-3, GILL (Apr.2007-)	
Wind speed	WS_10	$m \cdot s^{-1}$	10 m	Sonic anemometer: MA-130A, Eko (Jan.2006-Mar.2007); PGWS-100-3, GILL (Apr.2007-)	
Wind speed	WS_045	$m \cdot s^{-1}$	4.5 m	Sonic anemometer: MA-130A, Eko (Jan.2006-Mar.2007); PGWS-100-3, GILL (Apr.2007-)	
Wind speed	WS_02	$m \cdot s^{-1}$	2 m	Sonic anemometer: MA-130A, Eko (Jan.2006-Mar.2007); PGWS-100-3, GILL (Apr.2007-)	
Air temperature	Ta_32	degrees C	32 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Air temperature	Ta_27	degrees C	27 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Air temperature	Ta_22	degrees C	22 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield	

				(CPR-AS-21, Climatec)	
Air temperature	Ta_16	degrees C	16 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Air temperature	Ta_10	degrees C	10 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Air temperature	Ta_045	degrees C	4.5 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Air temperature	Ta_02	degrees C	2 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Air temperature	Ta_01	degrees C	1 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec	
Air temperature	Ta_005	degrees C	0.5 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Air temperature (gap-filled)	Ta_22_gf	degrees C	22 m	Platinum resistance thermometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	Gap filled
Relative humidity	Rh_32	%	32 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21,	

				Climatec)	
Relative humidity	Rh_27	%	27 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Relative humidity	Rh_22	%	22 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Relative humidity	Rh_16	%	16 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Relative humidity	Rh_10	%	10 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Relative humidity	Rh_4.5	%	4.5 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Relative humidity	Rh_2	%	2 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Relative humidity	Rh_1	%	1 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21, Climatec)	
Relative humidity	Rh_005	%	0.5 m	Capacitive hygrometers: HMP45D, Vaisala (Jan. 2006 – Apr. 12, 2011); HMP155D, Vaisala (Apr. 12, 2011 -) with a fan-aspirated radiation shield (CPR-AS-21,	

				Climatec)	
Vapor pressure deficit	VPD_22	kPa	22 m	Calculated from Ta_22 and Rh_22	
Vapor pressure deficit (gap-filled)	VPD_22_gf	kPa	22 m	Calculated from Ta_22 and Rh_22	Gap filled
Soil temperature	Ts_1_0	degrees C	0 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_1_2	degrees C	-2 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_1_5	degrees C	-5 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_1_15	degrees C	-15 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_1_30	degrees C	-30 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_1_60	degrees C	-60 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_2_0	degrees C	0 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_2_2	degrees C	-2 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_2_5	degrees C	-5 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_3_0	degrees C	0 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_3_2	degrees C	-2 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Soil temperature	Ts_3_5	degrees C	-5 cm	Platinum resistance thermometer: C-PTWP; Climatec	
Ground heat flux	G_1_1	$W \cdot m^{-2}$	-2 cm	Heat flux plate: PHF-01, REBS	
Ground heat flux	G_1_2	$W \cdot m^{-2}$	-2 cm	Heat flux plate: PHF-01, REBS	
Ground heat flux	G_2_1	$W \cdot m^{-2}$	-2 cm	Heat flux plate: PHF-01, REBS	
Ground heat flux	G_2_2	$W \cdot m^{-2}$	-2 cm	Heat flux plate: PHF-01, REBS	
Ground heat flux	G_3_1	$W \cdot m^{-2}$	-2 cm	Heat flux plate: PHF-01, REBS	
Ground heat flux	G_3_2	$W \cdot m^{-2}$	-2 cm	Heat flux plate: PHF-01, REBS	
Soil water content	SWC_1_0	$m^3 m^{-3}$	0 cm	TDR sensor: CS616, Campbell	
Soil water content	SWC_1_10	$m^3 m^{-3}$	-10 cm	TDR sensor: CS616, Campbell	
Soil water content	SWC_1_20	$m^3 m^{-3}$	-20 cm	TDR sensor: CS616, Campbell	
Soil water content	SWC_2_0	$m^3 m^{-3}$	0 cm	TDR sensor: CS616, Campbell	
Soil water content	SWC_2_10	$m^3 m^{-3}$	-10 cm	TDR sensor: CS616, Campbell	
Soil water content	SWC_2_20	$m^3 m^{-3}$	-20 cm	TDR sensor: CS616, Campbell	
Soil water content	SWC_3_0	$m^3 m^{-3}$	0 cm	TDR sensor: CS616, Campbell	

Barometric pressure	Pa	kPa	1.5 m	Barometer: PTB100, Vaisala	
Precipitation	PPT	mm	32 m	Tipping-bucket rain gauge with heater: CYG-52202, R. M. Young	
Snow depth	SNOWD	cm	2 m	Sonic ranging sensor: SR-50; Campbel	

5. Note for data users

The figure of “-9999” denote missing or rejected data.

6. Important events

Date	Events
May, 2014	First thinning was conducted for 36% of the trees which stand more than 20m far from the observation tower within the site. After thinning, cut trees were removed from the site. Incoming solar radiation below canopy increased.
Apr., 2015	Second thinning was conducted for 4.9% of the trees which stand within 20m from the observation tower. About 39% of the trees within this site were thinned between 2014 and 2015, and the stand density decreased from 409 trees per ha in 2013 to 249 in 2015. Cut trees were removed from the site.
Sep. 18, 2017	The typhoon's ferocious winds (maximum instantaneous wind speed of 23.7 m/s) caused about 30 trees to fall. Most of the leaves and branches of the damaged trees were removed, but the trunks remained.
Oct. 1, 2018	The typhoon's ferocious winds (maximum instantaneous wind speed of 41.9 m/s) caused about 30 trees to fall. Most of the leaves and branches of the damaged trees were removed, but the trunks remained.

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