



Supplement of

A flux tower site attribute dataset intended for land surface modeling

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The Supplementary Information contains:

Tables S1-3

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Table S1: Sources of attribute values for the selected flux tower sites. Including percent cover of plant functional types (PCT_PFT), Maximum LAI (LAI_max), Soil texture (TEX), Reference height (Ref_H); Soil bulk density (BD), soil organic carbon concentration (OC), soil depth (Depth), slope, and aspect.

Site	PCT_PFT	LAI_max	TEX	Ref_H	BD, OC, and Depth	slope and aspect
AT-Neu	Site picture ^a	Gilmanov et al., 2007	Wohlfahrt et al., 2008	Wohlfahrt et al., 2008	-	FLUXNET BADM
AU-Cpr	Satellite data ^b	Lin et al., 2023	Sun et al., 2017	OzFlux	Sun et al., 2017	OzFlux; Meyer et al., 2015
AU-DaP	Satellite data	Lin et al., 2023	Hutley et al., 2011	OzFlux	-	OzFlux
AU-DaS	Satellite data	Lin et al., 2023	Hutley et al., 2011	OzFlux	Whitley et al., 2016	OzFlux
AU-Dry	Satellite data	Lin et al., 2023	Hutley et al., 2011	OzFlux	Whitley et al., 2016	OzFlux
AU-How ^f	Hutley et al., 2000	Hutley et al., 2000	Hutley et al., 2000	OzFlux	Livesley et al., 2011	OzFlux
AU-Lit	Satellite data	Lin et al., 2023	Shangguan et al., 2014	OzFlux	-	Ukkola et al., 2022
AU-Stp	Site picture	Lin et al., 2023	Whitley et al., 2016	OzFlux	Whitley et al., 2016	OzFlux
BE-Bra	Janssens et al., 1999	Carrara et al., 2004	Neiryneck et al., 2002	Carrara et al., 2004	-	FLUXNET BADM
BE-Lon	Moureaux et al., 2006	Lin et al., 2023	Moureaux et al., 2006	Moureaux et al., 2006	-	FLUXNET BADM
BE-Vie	Aubinet et al., 2001; Laitat et al., 2000	van Wijk and Bouten, 2000	Shangguan et al., 2014	Aubinet et al., 2001	-	FLUXNET BADM
CA-Qfo	Bergeron et al., 2007	Chen et al., 2006	Matheny et al., 2014	AmeriFlux	AmeriFlux BADM	FLUXNET BADM; Bergeron et al., 2007
CA-SF1	Satellite data	Amiro, 2009	Amiro, 2009	AmeriFlux	-	FLUXNET BADM
CA-SF2	Satellite data	Amiro, 2009	Amiro, 2009	AmeriFlux	-	FLUXNET BADM
CA-SF3	Satellite data	Amiro, 2009	Amiro, 2009	AmeriFlux	-	FLUXNET BADM
CH-Cha	Osterwalder et al., 2020	Lin et al., 2023	Swiss Fluxnet	Osterwalder et al., 2020	Osterwalder et al., 2020	FLUXNET BADM; Gharun et al., 2020
CH-Dav	Zweifel et al., 2010	Etzold et al., 2011	Gharun et al., 2020	Etzold et al., 2011	-	FLUXNET BADM
CH-Fru	Rogger et al., 2022	Lin et al., 2023	Swiss Fluxnet	Rogger et al., 2022	Rogger et al., 2022	FLUXNET BADM; Gharun et al., 2020
CN-Cng	Site picture	Lin et al., 2023	Shangguan et al., 2014	ChinaFlux	-	ChinaFlux
CN-Du2	Site picture	Miao et al., 2009	Miao et al., 2009	ChinaFlux	Miao et al., 2009; ChinaFlux	ChinaFlux
CN-HaM	ChinaFlux	Lin et al., 2023	Kato et al., 2006	ChinaFlux	Kato et al., 2006	ChinaFlux; Kato et al., 2006
CZ-wet	Satellite data	Lin et al., 2023	Káplová et al., 2011	Dušek et al., 2009	Káplová et al., 2011	FLUXNET BADM
DE-Bay	Satellite data	van Wijk and Bouten, 2000	Schmid et al., 2006	Foken, 2017	Schmid et al., 2006	Schmid et al., 2006; van Wijk and Bouten, 2000

DE-Geb	Anthoni et al., 2004b	Anthoni et al., 2004a	Lehuger et al., 2010	Anthoni et al., 2004b		FLUXNET BADM
DE-Gri	Hussain, 2011	Hussain, 2011	Hussain, 2011	Hussain, 2011; Prescher et al., 2010	Hussain, 2011	FLUXNET BADM
DE-Hai	Knohl et al., 2003	Knohl et al., 2003	Knohl et al., 2003	FLUXNET BADM ^c	Knohl et al., 2003	FLUXNET BADM
DE-Kli	Prescher et al., 2010	Lin et al., 2023	Prescher et al., 2010	Prescher et al., 2010	-	FLUXNET BADM
DE-Meh	Satellite data	Lin et al., 2023	Don et al., 2009	Don et al., 2009	Don et al., 2009	European Fluxes; Chen and Dirmeyer, 2016
DE-Obe	Satellite data	Lin et al., 2023	Shangguan et al., 2014	FLUXNET BADM	-	FLUXNET BADM
DE-Seh	Schmidt et al., 2012	Schmidt et al., 2012	Schmidt et al., 2012	Schmidt et al., 2012	-	FLUXNET BADM
DE-SfN	Satellite data	Lin et al., 2023	Shangguan et al., 2014	Hommeltemberg et al., 2014	Hommeltemberg et al., 2014	FLUXNET BADM
DE-Tha	Prescher et al., 2010	Slevin et al., 2015	Prescher et al., 2010	Prescher et al., 2010	-	FLUXNET BADM; Prescher et al., 2010
DE-Wet	Satellite data	Anthoni et al., 2004a	Shangguan et al., 2014	Anthoni et al., 2004a	-	Anthoni et al., 2004a
DK-Lva	Satellite data	Gilmanov et al., 2007	Gilmanov et al., 2007	Gilmanov et al., 2007	-	Soussana et al., 2007
DK-Sor	Pilegaard et al., 2003	Pilegaard et al., 2003	Shangguan et al., 2014	Pilegaard et al., 2003	Pilegaard et al., 2003	FLUXNET BADM; Pilegaard et al., 2003
ES-LMa	El-Madany et al., 2018	El-Madany et al., 2018	Lopez-Sangil et al., 2011	El-Madany et al., 2018	Lopez-Sangil et al., 2011	European Fluxes; Oliphant and Stoy, 2018
FI-Hyy	Satellite data	Kolari et al., 2022	Kolari et al., 2022	Vesala et al., 2005	Launiainen et al., 2016	FLUXNET BADM
FI-Lom	Satellite data	Aurela et al., 2015	Shangguan et al., 2014	Aurela et al., 2015	-	FLUXNET BADM
FI-Sod	Satellite data	Launiainen et al., 2016	Mäkelä et al., 2008	Thum et al., 2007	-	FLUXNET BADM
FR-Gri	Lehuger et al., 2010	Loubet et al., 2011	Lehuger et al., 2010	Loubet et al., 2011	Lehuger et al., 2010; Loubet et al., 2011	FLUXNET BADM
FR-Hes	Granier et al., 2000	Granier et al., 2000	Schmid et al., 2006	Granier et al., 2000	Schmid et al., 2006	European Fluxes; Granier et al., 2000
FR-LBr	Satellite data	Rivalland et al., 2005	Rivalland et al., 2005	Berbigier et al., 2001	Rivalland et al., 2005	FLUXNET BADM
FR-Pue	Reichstein et al., 2002	Reichstein et al., 2002	Rambal et al., 2003	Rambal et al., 2003	-	FLUXNET BADM; European Fluxes
HU-Bug	Satellite data	Gilmanov et al., 2007	Nagy et al., 2005	Gilmanov et al., 2007	-	Dou and Yang, 2018
IE-Dri	Jaksic et al., 2006	Lawton et al., 2006	Byrne et al., 2005	Jaksic et al., 2006	Byrne et al., 2005	Lawton et al., 2006
IT-Amp	Satellite data	Gilmanov et al., 2007	Shangguan et al., 2014	Gilmanov et al., 2007	-	Oliphant and Stoy, 2018
IT-Cpz	Reichstein et al., 2002	Reichstein et al., 2002	Moreno et al., 2001	FLUXNET BADM	Moreno et al., 2001	FLUXNET BADM; Reichstein et al., 2002
IT-Isp	Satellite data	Lin et al., 2023	Ferréa et al., 2012	FLUXNET BADM	Ferréa et al., 2012	FLUXNET BADM
IT-Lav	Marcolla et al., 2003	Lin et al., 2023	Shangguan et al., 2014	Marcolla et al., 2003; FLUXNET BADM	-	FLUXNET BADM
IT-MBo	Marcolla et al., 2011	Gilmanov et al., 2007	Shangguan et al., 2014	Marcolla et al., 2011	-	FLUXNET BADM
IT-Noe	Morillas et al., 2017	Marras et al., 2011	Morillas et al., 2017	Marras et al., 2011	Morillas et al., 2017	FLUXNET BADM
IT-PT1	Satellite data	Migliavacca et al., 2009	Migliavacca et al., 2009	Migliavacca et al., 2009	Migliavacca et al., 2009	FLUXNET BADM

IT-Ren	Montagnani et al., 2009	Montagnani et al., 2009	Shangguan et al., 2014	Montagnani et al., 2009	-	FLUXNET BADM
IT-SR2	Chiesi et al., 2005	Chiesi et al., 2005	Arduini et al., 2020	FLUXNET BADM	-	FLUXNET BADM
IT-SRo	Chiesi et al., 2005	Chiesi et al., 2005	Arduini et al., 2020	FLUXNET BADM	-	FLUXNET BADM
NL-Ca1	Beljaars and Bosveld, 1997	Jacobs et al., 2007	Jacobs et al., 2007	Beljaars and Bosveld, 1997	Jacobs et al., 2007; Beljaars and Bosveld, 1997	Oliphant and Stoy, 2018
NL-Loo	FLUXNET BADM	Moors et al., 2012	Moors et al., 2012	Moors et al., 2012	-	FLUXNET BADM
PL-wet	Satellite data	Lund et al., 2009	Shangguan et al., 2014	Kowalska et al., 2013	-	European Fluxes; Oliphant and Stoy, 2018
PT-Mi2 ^f	Pereira et al., 2007	Pereira et al., 2007	Shangguan et al., 2014	Pereira et al., 2007	-	Oliphant and Stoy, 2018
RU-Fyo	Milyukova et al., 2002	Launiainen et al., 2016	Schulze et al., 1999	Kurbatova et al., 2008	-	FLUXNET BADM
SD-Dem ^f	Ardö et al., 2008	Lin et al., 2023	Ardö et al., 2008	Ardö et al., 2008	Ardö et al., 2008	FLUXNET BADM
US-AR1	Satellite data	Lin et al., 2023	Raz-Yaseef et al., 2015	AmeriFlux	-	AmeriFlux BADM
US-AR2	Satellite data	Lin et al., 2023	Raz-Yaseef et al., 2015	AmeriFlux	-	AmeriFlux BADM
US-ARM	Site picture	Fischer et al., 2007	AmeriFlux BADM ^d	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Aud ^f	Krishnan et al., 2012	Krishnan et al., 2012	Krishnan et al., 2012	AmeriFlux	-	Krishnan et al., 2012
US-Bkg	Satellite data	Hollinger et al., 2010	Shangguan et al., 2014	AmeriFlux	-	AmeriFlux
US-Bo1	Meyers and Hollinger, 2004	Meyers and Hollinger, 2004	Meyers and Hollinger, 2004	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-FPe ^f	Site picture; Gilmanov et al., 2005	Slevin et al., 2015	Gilmanov et al., 2005	AmeriFlux	-	Gilmanov et al., 2005
US-GLE	Satellite data	Chu et al., 2018	Shangguan et al., 2014	AmeriFlux	-	AmeriFlux BADM
US-Goo	Satellite data	Hollinger et al., 2010	Shangguan et al., 2014	AmeriFlux	-	FLUXNET BADM
US-Ho1	Hollinger et al., 1999	AmeriFlux BADM	Matheny et al., 2014	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-KS2	Satellite data	Powell et al., 2006	AmeriFlux BADM	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Los	Satellite data	Desai et al., 2008	Shangguan et al., 2014	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Me2	Satellite data	AmeriFlux BADM	Thomas et al., 2009	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Me4	Law et al., 2001	Anthoni et al., 2002	Law et al., 2001	AmeriFlux	Law et al., 2001; AmeriFlux BADM	AmeriFlux BADM
US-Me6	Satellite data	Chu et al., 2018	Ruehr et al., 2014	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-MMS	Schmid et al., 2000; AmeriFlux	Slevin et al., 2015	AmeriFlux BADM	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-MOz	Satellite data	AmeriFlux BADM	Gu et al., 2006	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Ne3	Site picture	AmeriFlux BADM	AmeriFlux BADM	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-NR1	Monson et al., 2002	AmeriFlux BADM	Burns et al., 2018	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-SP2	Satellite data	AmeriFlux BADM	AmeriFlux BADM	AmeriFlux; Clark et al., 2004	AmeriFlux BADM	AmeriFlux BADM
US-SP3	Satellite data	AmeriFlux BADM	AmeriFlux BADM	AmeriFlux; Clark et al., 2004	AmeriFlux BADM	AmeriFlux BADM
US-SRG	Scott et al., 2015; AmeriFlux	Lin et al., 2023	Scott et al., 2015	AmeriFlux	-	AmeriFlux BADM

US-SRM	Barron-Gafford et al., 2011; Scott et al., 2009	Scott et al., 2009	Scott et al., 2015	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Syv	Desai et al., 2005	Tang et al., 2006	AmeriFlux BADM	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Ton	Baldocchi et al., 2004	Baldocchi et al., 2004	Baldocchi et al., 2004	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Var ^f	Liu et al., 2017	AmeriFlux BADM	Grant et al., 2012	AmeriFlux	Grant et al., 2012	AmeriFlux BADM
US-WCr	Satellite data	Chu et al., 2018	Cook et al., 2004	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM
US-Whs	Scott et al., 2006	Lin et al., 2023	Scott et al., 2006	AmeriFlux	-	AmeriFlux BADM; Moran et al., 2009
US-Wkg ^f	Scott et al., 2010	Nouvellon et al., 2001	AmeriFlux BADM	AmeriFlux	AmeriFlux BADM	AmeriFlux BADM; Scott et al., 2010

^a Site picture: Using site picture to derive 100% coverage of grassland or cropland. Except for AT-Neu and US-FPe, all site pictures were obtained from the regional network^e to which the site belongs. AT-Neu pictures were obtained from the research group's network (<http://www.biomet.co.at/home/>). US-FPe pictures were obtained from the Global Monitoring Laboratory (<https://gml.noaa.gov/grad/surfrad/ftpeck.html>).

^b Satellite data: Indicating the PCT_PFT obtained using the 300m global PFT map (Harper et al., 2023) .

^c FLUXNET BADM: BADM (Biological, Ancillary, Disturbance, and Metadata) file from the FLUNET website (<https://fluxnet.org/>).

^d AmeriFlux BADM: BADM file from the AmeriFlux (<https://ameriflux.lbl.gov/>).

^e Regional network: AmeriFlux (<https://ameriflux.lbl.gov/>), ChinaFlux (<http://www.chinaflux.org/>), European Fluxes (<http://www.europe-fluxdata.eu/>), OzFlux (<https://www.ozflux.org.au/>), and Swiss Fluxnet (<https://www.swissfluxnet.ethz.ch/>).

^f Sites using literature descriptions for C3/C4 classification.

Table S2: Selected years for the 90 sites and corresponding databases. The ‘Excluded year’ denotes years excluded due to a high percentage of gap-filled data, with the reason (Flux and/or VPD) in parentheses indicating the specific variable with a high gap-filled proportion (Flux: QC > 1 exceeds 10%; VPD: QC > 0 exceeds 10%). The ‘Selected year’ indicates the years of high-quality datasets that were ultimately retained.

Selected site	Excluded year (Reason)	Selected year	Database
AT-Neu	2002-2003 (VPD)	2004-2012	FLUXNET2015
AU-Cpr	2013-2014 (Flux)	2011-2012, 2015-2017	OzFlux
AU-DaP	2009,2011-2012 (Flux)	2010	OzFlux
AU-DaS	2010-2011, 2014-2015, 2017 (Flux)	2012-2013, 2016	OzFlux
AU-Dry	2011-2012, 2014-2015 (Flux)	2013	OzFlux
AU-How	2003-2015 (Flux)	2016-2017	OzFlux
AU-Lit	2016 (Flux)	2017	OzFlux
AU-Stp	2010-2014, 2016-2017 (Flux)	2015	OzFlux
BE-Bra	2004, 2013 (Flux); 2005-2006, 2010 (VPD)	2007-2009, 2011-2012, 2014	FLUXNET2015
BE-Lon	2006 (Flux); 2009-2010 (VPD); 2007 (Flux and VPD)	2005, 2008, 2011-2014	FLUXNET2015
BE-Vie	2012-2013 (Flux); 1999 (VPD); 2004, 2006, 2009 (Flux and VPD)	1997-1998, 2000-2003, 2005, 2007-2008, 2010-2011, 2014	FLUXNET2015
CA-Qfo	2004, 2009 (Flux); 2010 (Flux and VPD)	2005-2008	FLUXNET2015
CA-SF1	2006 (Flux and VPD)	2004-2005	FLUXNET2015
CA-SF2	2005 (Flux and VPD)	2003-2004	FLUXNET2015
CA-SF3	2005 (VPD)	2003-2004	FLUXNET2015
CH-Cha	2009 (Flux); 2007, 2011-2014 (VPD)	2006, 2008, 2010	FLUXNET2015
CH-Dav	1998-1999 (VPD); 2005 (Flux and VPD)	1997, 2000-2004, 2006-2014	FLUXNET2015
CH-Fru	2009-2010 (Flux); 2011 (VPD)	2007-2008, 2012-2014	FLUXNET2015
CN-Cng	-	2008-2009	FLUXNET2015
CN-Du2	-	2007-2008	FLUXNET2015
CN-HaM	2002 (Flux and VPD)	2003	FLUXNET2015
CZ-wet	2013 (VPD)	2007-2012, 2014	FLUXNET2015
DE-Bay	1997 (Flux); 1999(VPD)	1998	La Thuile
DE-Geb	-	2001-2014	FLUXNET2015
DE-Gri	-	2004-2014	FLUXNET2015
DE-Hai	2010-2012 (Flux)	2000-2009	FLUXNET2015

DE-Kli	2008-2009 (Flux); 2013 (Flux and VPD)	2005-2007, 2010-2012, 2014	FLUXNET2015
DE-Meh	-	2004-2006	La Thuile
DE-Obe	2009 (VPD)	2008, 2010-2014	FLUXNET2015
DE-Seh	2010 (Flux and VPD)	2008-2009	FLUXNET2015
DE-SfN	2013 (Flux)	2014	FLUXNET2015
DE-Tha	-	1998-2014	FLUXNET2015
DE-Wet	-	2002-2006	La Thuile
DK-Lva	2005 (VPD)	2006	La Thuile
DK-Sor	1997, 2005 (VPD); 2004, 2014 (Flux and VPD)	1998-2003, 2006-2013	FLUXNET2015
ES-LMa	2006 (VPD)	2004-2005	La Thuile
FI-Hyy	2000 (Flux); 1998, 2003-2004, 2010-2014 (VPD); 1996, 2005 (Flux and VPD)	1997, 1999, 2001-2002, 2006-2009	FLUXNET2015
FI-Lom	-	2007-2009	FLUXNET2015
FI-Sod	2010, 2012 (Flux); 2013 (VPD)	2008-2009, 2011, 2014	FLUXNET2015
FR-Gri	2008-2009 (Flux); 2005-2006 (VPD)	2007, 2010-2013	FLUXNET2015
FR-Hes	2000 (Flux and VPD)	1997-1999, 2001-2006	La Thuile
FR-LBr	2008 (Flux)	2003-2007	FLUXNET2015
FR-Pue	2000, 2012 (Flux)	2001-2011, 2013-2014	FLUXNET2015
HU-Bug	2005 (Flux); 2003-2004 (Flux and VPD)	2006	La Thuile
IE-Dri	2005 (Flux)	2003-2004	La Thuile
IT-Amp	2006 (Flux); 2005 (Flux and VPD)	2003-2004	La Thuile
IT-Cpz	2001, 2004, 2008 (Flux); 2003, 2006 (VPD); 2002 (Flux and VPD)	2005, 2007	FLUXNET2015
IT-Isp	-	2013-2014	FLUXNET2015
IT-Lav	2014 (Flux); 2009-2010 (VPD); 2012 (Flux and VPD)	2005-2008, 2011, 2013	FLUXNET2015
IT-MBo	2008-2010 (VPD)	2003-2007, 2011-2012	FLUXNET2015
IT-Noe	2011, 2013-2014 (Flux); 2005, 2008, 2010 (VPD); 2004, 2009 (Flux and VPD)	2006-2007, 2012	FLUXNET2015
IT-PT1	2004 (Flux)	2003	FLUXNET2015
IT-Ren	-	2010-2013	FLUXNET2015
IT-SR2	-	2013-2014	FLUXNET2015

IT-SRo	2005, 2009 (Flux); 2011 (VPD); 2008, 2010 (Flux and VPD)	2003-2004, 2006-2007, 2012	FLUXNET2015
NL-Ca1	2005 (Flux)	2003-2004, 2006	La Thuile
NL-Loo	1999, 2008, 2013 (Flux); 2001 (VPD), 1998 (Flux and VPD)	1997, 2000, 2002-2007, 2009-2012	FLUXNET2015
PL-wet	2004 (VPD)	2005	La Thuile
PT-Mi2	-	2005-2006	La Thuile
RU-Fyo	2010 (Flux)	2003-2009, 2011-2014	FLUXNET2015
SD-Dem	2005-2006, 2008 (Flux), 2007 (Flux and VPD)	2009	FLUXNET2015
US-AR1	2012 (Flux)	2010-2011	FLUXNET2015
US-AR2	-	2010-2011	FLUXNET2015
US-ARM	2008 (VPD); 2012 (Flux and VPD)	2003-2007, 2009-2011	FLUXNET2015
US-Aud	2003 (Flux)	2004-2005	La Thuile
US-Bkg	2005 (VPD)	2006	La Thuile
US-Bo1	2000-2001, 2004 (Flux); 2006 (Flux and VPD)	1997-1999, 2002-2003, 2005	La Thuile
US-FPe	2000-2003 (Flux)	2004-2006	La Thuile
US-GLE	-	2009-2014	FLUXNET2015
US-Goo	2004-2005 (Flux)	2006	La Thuile
US-Ho1	1996, 1998, 2002 (VPD)	1997, 1999-2001, 2003-2004	La Thuile
US-KS2	2003 (Flux); 2006 (VPD)	2004-2005	FLUXNET2015
US-Los	2000 (Flux)	2001-2008	FLUXNET2015
US-Me2	2003 (Flux); 2007 (VPD); 2006, 2011, 2014 (Flux and VPD)	2002, 2004-2005, 2008-2010, 2012-2013	FLUXNET2015
US-Me4	1996-1999 (Flux)	2000	La Thuile
US-Me6	2011 (Flux); 2012, 2014 (VPD)	2013	FLUXNET2015
US-MMS	1999 (VPD); 2000 (Flux and VPD)	2001-2014	FLUXNET2015
US-MOz	-	2005-2006	La Thuile
US-Ne3	-	2002-2012	FLUXNET2015
US-NR1	-	1999-2014	FLUXNET2015
US-SP2	-	2000-2004	La Thuile
US-SP3	1999-2000 (Flux)	2001-2004	La Thuile
US-SRG	-	2009-2014	FLUXNET2015
US-SRM	-	2004-2014	FLUXNET2015

US-Syv	2004-2005, 2007-2008 (Flux)	2002-2003, 2006	FLUXNET2015
US-Ton	2007 (Flux); 2001 (Flux and VPD)	2002-2006, 2008-2014	FLUXNET2015
US-Var	2005 (Flux and VPD)	2001-2004, 2006-2014	FLUXNET2015
US-WCr	2001 (VPD); 1999, 2004, 2006 (Flux and VPD)	2000, 2002-2003, 2005	FLUXNET2015
US-Whs	-	2008-2014	FLUXNET2015
US-Wkg	-	2005-2014	FLUXNET2015

Table S3: The 80 sites excluded and specific reasons for exclusion. Four situations are included: only one year of observations; high proportion of gap-filled data in flux and/or VPD; lack of surface heat flux observations and 10 sites with external disturbances. Flux and VPD in parentheses are the same as in Table S2.

Excluded Site	Reason for excluding	Database
AR-SLu	Only one year of observations	FLUXNET2015
BW-Ma1	Only one year of observations	La Thuile
CA-NS1	Only one year of observations	FLUXNET2015
DK-Fou	Only one year of observations	FLUXNET2015
ES-LgS	Only one year of observations	FLUXNET2015
ES-VDA	Only one year of observations	La Thuile
IT-Ma1	Only one year of observations	La Thuile
IT-Non	Only one year of observations	La Thuile
PT-Mi1	Only one year of observations	La Thuile
RU-Zot	Only one year of observations	La Thuile
UK-Ham	Only one year of observations	La Thuile
US-Bar	Only one year of observations	La Thuile
US-SP1	Only one year of observations	La Thuile
US-Tw4	Only one year of observations	FLUXNET2015
ZM-Mon	Only one year of observations	FLUXNET2015
AU-ASM	2011-2017 (Flux)	OzFlux
AU-Cow	2010-2015 (Flux)	OzFlux
AU-Ctr	2010-2017 (Flux)	OzFlux
AU-Cum	2013-2018 (Flux)	OzFlux
AU-Emr	2012-2013 (Flux)	OzFlux
AU-Gin	2012-2017 (Flux)	OzFlux
AU-GWW	2013-2017 (Flux)	OzFlux
AU-Otw	2009-2010 (Flux)	OzFlux
AU-Rig	2011-2016 (Flux)	OzFlux
AU-Rob	2014-2017 (Flux)	OzFlux
AU-Sam	2011-2017 (Flux)	OzFlux
AU-TTE	2013-2017 (Flux)	OzFlux
AU-Tum	2002-2017 (Flux)	OzFlux
AU-Whr	2015-2016 (Flux)	OzFlux

AU-Wrr	2016-2017 (Flux)	OzFlux
AU-Ync	2011-2017 (Flux)	OzFlux
BR-Sa3	2001-2003 (VPD)	FLUXNET2015
DK-ZaH	2000-2013 (Flux)	FLUXNET2015
FI-Kaa	2000-2002 (VPD)	La Thuile
IT-CA2	2012-2013 (VPD)	FLUXNET2015
IT-Col	2007-2014 (Flux and VPD)	FLUXNET2015
IT-LMa	2003 (Flux); 2004 (Flux and VPD)	La Thuile
NL-Hor	2008 (VPD); 2009-2011 (Flux and VPD)	FLUXNET2015
PT-Esp	2002-2004 (Flux)	La Thuile
RU-Che	2003 (Flux); 2004 (Flux and VPD)	FLUXNET2015
UK-Gri	2000 (VPD); 2001 (Flux and VPD)	La Thuile
US-Blo	2000-2006 (VPD)	FLUXNET2015
US-Cop	2002-2003 (Flux)	FLUXNET2015
US-Prr	2011-2012 (Flux); 2013 (Flux and VPD)	FLUXNET2015
ZA-Kru	2001-2002 (Flux); 2000 (Flux and VPD)	FLUXNET2015
CA-NS2	No observation of Qg	FLUXNET2015
CA-NS4	No observation of Qg	FLUXNET2015
CA-NS5	No observation of Qg	FLUXNET2015
CA-NS6	No observation of Qg	FLUXNET2015
CA-NS7	No observation of Qg	FLUXNET2015
CH-Oe1	No observation of Qg	FLUXNET2015
CN-Cha	No observation of Qg	FLUXNET2015
CN-Dan	No observation of Qg	FLUXNET2015
CN-Din	No observation of Qg	FLUXNET2015
CN-Qia	No observation of Qg	FLUXNET2015
DK-Ris	No observation of Qg	La Thuile
DK-ZaH	No observation of Qg	FLUXNET2015
FR-Fon	No observation of Qg	FLUXNET2015
GF-Guy	No observation of Qg	FLUXNET2015
ID-Pag	No observation of Qg	La Thuile
IT-Ro1	No observation of Qg	FLUXNET2015
PT-Esp	No observation of Qg	La Thuile

SE-Deg	No observation of Qg	La Thuile
UK-PL3	No observation of Qg	La Thuile
US-Ha1	No observation of Qg	FLUXNET2015
US-Myb	No observation of Qg	FLUXNET2015
US-PFa	No observation of Qg	FLUXNET2015
US-UMB	No observation of Qg	FLUXNET2015
FR-Fq1	Energy Balance Ratio = $(LH+H)/(Rn - G) = 35.4\%$	La Thuile
FR-Fq2	Energy Balance Ratio = $(LH+H)/(Rn - G) = 34.3\%$	La Thuile
CA-Qcu	Logging was carried out in 2000 (Giasson et al., 2006).	La Thuile
ES-ES1	Affected by large water bodies (Haughton et al., 2016).	La Thuile
ES-ES2	Farmland with irrigation (Haughton et al., 2016).	La Thuile
IT-BCi	Farmland with irrigation (Vitale et al., 2016).	FLUXNET2015
IT-CA1	Irrigation during the summer (Sabbatini et al., 2016).	FLUXNET2015
IT-CA3	Irrigation during the summer (Sabbatini et al., 2016).	FLUXNET2015
IT-Ro2	Deforestation (Rey et al., 2002; Tedeschi et al., 2006).	FLUXNET2015
US-Ne1	Farmland with irrigation (Verma et al., 2005).	FLUXNET2015
US-Ne2	Farmland with irrigation (Verma et al., 2005).	FLUXNET2015
US-Twt	Rice planting is flooded most of the time (Baldocchi et al., 2016).	FLUXNET2015

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