

Supplementary Table 4: FLUXNET citations

Sites, vegetation types, locations and studied periods of flux sites used in this analysis. All data originally from www.fluxdata.org. Source: FLUXNET2015 (Fl); LaThuille (La). Vegetation types: deciduous broadleaf forest (DBF); evergreen broadleaf forest (EBF); evergreen needleleaf forest (ENF); grassland (GRA); mixed deciduous and evergreen needleleaf forest (MF); savanna ecosystem (SAV); shrub ecosystem (SHR); wetland (WET).

Site code	Source	Veg type	Latitude	Longitude	Period	Reference
AR-SLu	Fl	MF	-33.4648	-66.4598	2009-2011	(Ulke et al., 2015)
AR-Vir	Fl	ENF	-28.2395	-56.1886	2009-2012	(Posse et al., 2016)
AT-Neu	Fl	GRA	47.1167	11.3175	2002-2012	(Wohlfahrt et al., 2008)
AU-Ade	Fl	WSA	-13.0769	131.117	2007-2009	(Beringer et al., 2011)
AU-ASM	Fl	ENF	-22.2830	133.2490	2010-2013	(Cleverly et al., 2013)
AU-Cpr	Fl	SAV	-34.0021	140.5891	2010-2014	(Meyer et al., 2015)
AU-Cum	Fl	EBF	-33.6133	150.7225	2012-2014	(Beringer et al., 2016)
AU-DaP	Fl	GRA	-14.0633	131.3181	2007-2013	(Beringer et al., 2011)
AU-DaS	Fl	SAV	-14.1593	131.3881	2008-2014	(Hutley et al., 2011)
AU-Dry	Fl	SAV	-15.2588	132.3706	2008-2014	(Cernusak et al., 2011)
AU-Emr	Fl	GRA	-23.8587	148.4746	2011-2013	(Schroder et al., 2014)
AU-Fog	Fl	WET	-12.5452	131.3072	2006-2008	(Beringer et al., 2013)
AU-Gin	Fl	WSA	-31.3764	115.7138	2011-2014	(Beringer et al., 2016)
AU-GWW	Fl	SAV	-30.1913	120.6541	2013-2014	(Prober et al., 2012)
AU-How	Fl	SAV	-12.4943	131.1523	2001-2014	(Cernusak, 2007)
AU-Lox	Fl	DBF	-34.4704	140.6551	2008-2009	(Stevens et al., 2011)
AU-RDF	Fl	WSA	-14.5636	132.4776	2011-2013	(Bristow et al., 2016)
AU-Rig	Fl	GRA	-36.6499	145.5759	2011-2014	(Beringer et al., 2016)
AU-Rob	Fl	EBF	-17.1175	145.6301	2014-2014	(Beringer et al., 2016)
AU-Stp	Fl	GRA	-17.1507	133.3502	2008-2014	(Beringer et al., 2011)
AU-TTE	Fl	OSH	-22.2870	133.6400	2012-2013	(Cleverly et al., 2016)
AU-Tum	Fl	EBF	-35.6566	148.1517	2001-2014	(van Gorsel et al., 2008)
AU-Wac	Fl	EBF	-37.4259	145.1878	2005-2008	(Kilinc et al., 2013)
AU-Whr	Fl	EBF	-36.6732	145.0294	2011-2014	(McHugh et al., 2017)
AU-Wom	Fl	EBF	-37.4222	144.0944	2010-2012	(Hinko-Najera et al., 2017)
AU-Ync	Fl	GRA	-34.9893	146.2907	2012-2014	(Yee et al., 2015)
BE-Bra	Fl	MF	51.3092	4.5206	1996-2014	(Carrara et al., 2004)
BE-Lon	Fl	CRO	50.5516	4.7461	2004-2014	(Moureaux et al., 2006)
BE-Vie	Fl	MF	50.3051	6.9981	1996-2014	(Aubinet et al., 2001)
BR-Sa3	Fl	EBF	-3.0180	-54.9714	2000-2004	(Wick et al., 2005)
BW-Ma1	La	SAV	-19.9155	23.5605	1999-2001	(Veenendaal et al., 2004)
CA-Man	Fl	ENF	55.8796	-98.4808	1994-2008	(Dunn et al., 2007)
CA-Mer	La	WET	45.4094	-75.5286	1998-2005	(Lafleur et al., 2003)
CA-NS1	Fl	ENF	55.8792	-98.4839	2001-2005	(Goulden et al., 2006)
CA-NS2	Fl	ENF	55.9058	-98.5247	2001-2005	(Goulden et al., 2006)

CA-NS3	Fl	ENF	55.9117	-98.3822	2001-2005	(Goulden et al., 2006)
CA-NS4	Fl	ENF	55.9144	-98.3806	2002-2005	(Goulden et al., 2006)
CA-NS5	Fl	ENF	55.8631	-98.4850	2001-2005	(Goulden et al., 2006)
CA-NS6	Fl	OSH	55.9169	-98.9644	2001-2005	(Goulden et al., 2006)
CA-NS7	Fl	OSH	56.6358	-99.9483	2002-2005	(Goulden et al., 2006)
CA-Qcu	La	ENF	49.2671	-74.0365	2001-2006	(Giasson et al., 2006)
CA-Qfo	Fl	ENF	49.6925	-74.3421	2003-2010	(Bergeron et al., 2007)
CA-SF1	Fl	ENF	54.4850	-105.8176	2003-2006	(Mkhabela et al., 2009)
CA-SF2	Fl	ENF	54.2539	-105.8775	2001-2005	(Mkhabela et al., 2009)
CA-SF3	Fl	ENF	54.0916	-106.0053	2001-2006	(Mkhabela et al., 2009)
CH-Cha	Fl	GRA	47.2102	8.4104	2005-2014	(Merbold et al., 2014)
CH-Dav	Fl	ENF	46.8153	9.8559	1997-2014	(Zielis et al., 2014)
CH-Fru	Fl	GRA	47.1158	8.5378	2005-2014	(Imer et al., 2013)
CH-Lae	Fl	MF	47.4781	8.3650	2004-2014	(Etzold et al., 2011)
CH-Oe1	Fl	GRA	47.2858	7.7319	2002-2008	(Ammann et al., 2007)
CH-Oe2	Fl	CRO	47.2863	7.7343	2004-2014	(Dietiker et al., 2010)
CN-Cha	Fl	MF	42.4025	128.0958	2003-2005	(Guan et al., 2006)
CN-Cng	Fl	GRA	44.5934	123.5092	2007-2010	--
CN-Dan	Fl	GRA	30.4978	91.0664	2004-2005	(Shi et al., 2006)
CN-Din	Fl	EBF	21.1733	112.5361	2003-2005	(Yan et al., 2013)
CN-Du2	Fl	GRA	42.0467	116.2836	2006-2008	(Chen et al., 2009)
CN-HaM	Fl	GRA	37.3700	101.1800	2002-2004	(Kato et al., 2006)
CN-Qia	Fl	ENF	26.7414	115.0581	2003-2005	(Wen et al., 2010)
CN-Sw2	Fl	GRA	41.7902	111.8971	2010-2012	(Shao et al., 2017)
CZ-BK1	Fl	ENF	49.5021	18.5369	2004-2008	(Acosta et al., 2013)
CZ-BK2	Fl	GRA	49.4944	18.5429	2006-2006	--
CZ-wet	Fl	WET	49.0247	14.7704	2006-2014	(Dušek et al., 2012)
DE-Akm	Fl	WET	53.8662	13.6834	2009-2014	--
DE-Bay	La	ENF	50.1419	11.8669	1997-1999	(Valentini et al., 2000)
DE-Geb	Fl	CRO	51.1001	10.9143	2001-2014	(Anthoni et al., 2004)
DE-Gri	Fl	GRA	50.9500	13.5126	2004-2014	(Prescher et al., 2010)
DE-Hai	Fl	DBF	51.0792	10.4530	2000-2012	(Knohl et al., 2003)
DE-Kli	Fl	CRO	50.8931	13.5224	2004-2014	(Prescher et al., 2010)
DE-Lkb	Fl	ENF	49.0996	13.3047	2009-2013	(Lindauer et al., 2014)
DE-Meh	La	GRA	51.2753	10.6555	2003-2006	(Don et al., 2009)
DE-Obe	Fl	ENF	50.7867	13.7213	2008-2014	--
DE-RuR	Fl	GRA	50.6219	6.3041	2011-2014	(Post et al., 2015)
DE-RuS	Fl	CRO	50.8659	6.4472	2011-2014	(Mauder et al., 2013)
DE-Seh	Fl	CRO	50.8706	6.4497	2007-2010	(Schmidt et al., 2012)
DE-SfN	Fl	WET	47.8064	11.3275	2012-2014	(Hommeltenberg et al., 2014)
DE-Spw	Fl	WET	51.8923	14.0337	2010-2014	--
DE-Tha	Fl	ENF	50.9624	13.5652	1996-2014	(Grünwald and Bernhofer, 2007)
DE-Wet	La	ENF	50.4535	11.4575	2002-2006	(Rebmann et al., 2010)
DK-Fou	Fl	CRO	56.4842	9.5872	2005-2005	--

DK-Lva	La	GRA	55.6833	12.0833	2005-2006	(Gilmanov et al., 2007)
DK-NuF	Fl	WET	64.1308	-51.3861	2008-2014	(Westergaard-Nielsen et al., 2013)
DK-Ris	La	CRO	55.5303	12.972	2004-2005	(Chen et al., 2010)
DK-Sor	Fl	DBF	55.4859	11.6446	1996-2014	(Pilegaard et al., 2003)
DK-ZaF	Fl	WET	74.4814	-20.5545	2008-2011	(Stiegler et al., 2016)
DK-ZaH	Fl	GRA	74.4732	-20.5503	2000-2014	(Lund et al., 2012)
ES-Es1	La	ENF	39.3460	-0.3188	1999-2006	(Reichstein et al., 2005)
ES-Es2	La	CRO	39.2755	-0.3152	2005-2006	(Chen et al., 2010)
ES-LgS	Fl	OSH	37.0979	-2.9658	2007-2009	(Reverter et al., 2010)
ES-Lma	La	SAV	39.9415	-5.77	2004-2006	(Yi et al., 2010)
ES-Ln2	Fl	OSH	36.9695	-3.4758	2009-2009	(Serrano-Ortiz et al., 2011)
ES-Vda	La	ENF	39.35	-0.32	2004-2006	(Migliavacca et al., 2011)
FI-Hyy	Fl	ENF	61.8474	24.2948	1996-2014	(Suni et al., 2003)
FI-Jok	Fl	CRO	60.8986	23.5135	2000-2003	(Lohila, 2004)
FI-Kaa	La	WET	69.1407	27.2950	2000-2006	(Aurela et al., 2002)
FI-Lom	Fl	WET	67.9972	24.2092	2007-2009	(Aurela et al., 2015)
FI-Sod	Fl	ENF	67.3619	26.6378	2001-2014	(Thum et al., 2007)
FR-Fon	Fl	DBF	48.4764	2.7801	2005-2014	(Delpierre et al., 2015)
FR-Gri	Fl	CRO	48.8442	1.9519	2004-2013	(Loubet et al., 2011)
FR-Hes	La	DBF	48.6742	7.0646	1997-2006	(Granier et al., 2000)
FR-LBr	Fl	ENF	44.7171	-0.7693	1996-2008	(Berbigier et al., 2001)
FR-Lq1	La	GRA	45.6441	2.7370	2004-2006	(Gilmanov et al., 2007)
FR-Lq2	La	GRA	45.6392	2.7370	2004-2006	(Gilmanov et al., 2007)
FR-Pue	Fl	EBF	43.7414	3.5958	2000-2014	(Rambal et al., 2004)
GF-Guy	Fl	EBF	5.2788	-52.9249	2004-2014	(Bonal et al., 2008)
HU-Bug	La	GRA	46.6911	19.6013	2002-2006	(Gilmanov et al., 2007)
HU-Mat	La	GRA	47.8496	19.7260	2004-2006	(Pinter et al., 2008)
ID-Pag	La	EBF	-2.3450	114.036	2002-2003	(Hirano et al., 2007)
IE-Ca1	La	CRO	52.8588	-6.9181	2004-2006	(Gilmanov et al., 2007)
IE-Dri	La	GRA	51.99	-8.75	2003-2005	(Jaksic et al., 2006)
IL-Yat	La	ENF	31.3450	30.0515	2001-2002 2006-2006	(Reichstein et al., 2003)
IT-Amp	La	GRA	41.9041	13.6052	2002-2006	(Gilmanov et al., 2007)
IT-BCi	Fl	CRO	40.5238	14.9574	2004-2014	(Vitale et al., 2015)
IT-CA1	Fl	DBF	42.3804	12.0266	2011-2014	(Sabbatini et al., 2016a)
IT-CA2	Fl	CRO	42.3772	12.0260	2011-2014	(Sabbatini et al., 2016b)
IT-CA3	Fl	DBF	42.3800	12.0222	2011-2014	(Sabbatini et al., 2016c)
IT-Col	Fl	DBF	41.8494	13.5881	1996-2014	(Valentini et al., 1996)
IT-Cp2	Fl	EBF	41.7043	12.3573	2012-2014	(Fares et al., 2014)
IT-Cpz	Fl	EBF	41.7052	12.3761	1997-2009	(Garbulsky et al., 2008)
IT-Isp	Fl	DBF	45.8126	8.6336	2013-2014	(Ferréa et al., 2012)
IT-La2	Fl	ENF	45.9542	11.2853	2000-2002	(Marcolla et al., 2003a)
IT-Lav	Fl	ENF	45.9562	11.2813	2003-2014	(Marcolla et al., 2003b)
IT-Lma	La	GRA	45.5813	7.1546	2003-2006	--
IT-Mal	La	GRA	46.1167	11.7028	2003-2004	(Gilmanov et al., 2007)

IT-MBo	Fl	GRA	46.0247	11.0458	2003-2013	(Migliavacca et al., 2009)
IT-Noe	Fl	CSH	40.6061	8.1515	2004-2014	(Papale et al., 2014)
IT-Non	La	DBF	44.6898	11.0887	2001-2002 2006-2006	(Reichstein et al., 2005)
IT-PT1	Fl	DBF	45.2009	9.0610	2002-2004	(Migliavacca et al., 2009)
IT-Ren	Fl	ENF	46.5869	11.4337	1998-2013	(Montagnani et al., 2009)
IT-Ro1	Fl	DBF	42.4081	11.9300	2002-2008	(Rey et al., 2002)
IT-Ro2	Fl	DBF	42.3903	11.9209	2002-2008 2010-2012	(Tedeschi et al., 2006)
IT-SR2	Fl	ENF	43.7320	10.2910	2013-2014	(Hoshika et al., 2017)
IT-SRo	Fl	ENF	43.7279	10.2844	1999-2012	(Chiesi et al., 2005)
IT-Tor	Fl	GRA	45.8444	7.5781	2008-2014	(Galvagno et al., 2013)
JP-MBF	Fl	DBF	44.3869	142.3186	2003-2005	(Matsumoto et al., 2008a)
JP-SMF	Fl	MF	35.2617	137.0788	2002-2006	(Matsumoto et al., 2008b)
NL-Ca1	La	GRA	51.9710	4.9270	2003-2006	(Gilmanov et al., 2007)
NL-Hor	Fl	GRA	52.2404	5.0713	2004-2011	(Jacobs et al., 2007)
NL-Lan	La	CRO	51.9536	4.9029	2005-2005	--
NL-Loo	Fl	ENF	52.1666	5.7436	1996-2013	(Moors, 2012)
NO-Adv	Fl	WET	78.1860	15.9230	2012-2014	--
NO-Blv	Fl	SNO	78.9216	11.8311	2008-2009	--
PL-Wet	La	WET	52.7622	16.3094	2004-2005	(Chojnicki et al., 2007)
PT-Esp	La	EBF	38.6394	-8.6018	2002-2006	--
PT-Mi1	La	EBF	38.5407	-8.0004	2005-2005	(Reichstein et al., 2003)
PT-Mi2	La	GRA	38.4756	-8.0246	2005-2006	(Gilmanov et al., 2007)
RU-Che	Fl	WET	68.6130	161.3414	2002-2005	(Merbold et al., 2009)
RU-Cok	Fl	OSH	70.8291	147.4943	2003-2014	(Molen et al., 2007)
RU-Fyo	Fl	ENF	56.4615	32.9221	1998-2014	(Kurbatova et al., 2008)
RU-Ha1	Fl	GRA	54.7252	90.0022	2002-2004	(Chevallier et al., 2006)
RU-Zot	La	ENF	60.8008	89.3508	2002-2003	(Tanja et al., 2003)
SD-Dem	Fl	SAV	13.2829	30.4783	2005-2005 2007-2009	(Ardo et al., 2008)
SE-Deg	La	WET	64.1833	19.5500	2001-2005	(Chevallier et al., 2006)
SE-Fla	La	ENF	64.1128	19.4569	1996-1998 2001-2002	(Tanja et al., 2003)
SN-Dhr	Fl	SAV	15.4028	-15.4322	2010-2013	(Tagesson et al., 2014)
UK-Esa	La	CRO	55.9069	-2.8586	2003-2005	(Groenendijk et al., 2011)
UK-Gri	La	ENF	56.6072	-3.7981	1997-1998 2000-2001 2005-2006	(Arain et al., 2005)
UK-Ham	La	DBF	51.1535	-0.8583	2004-2005	--
UK-PL3	La	DBF	51.4500	-1.2667	2005-2006	--
US-AR1	Fl	GRA	36.4267	-99.4200	2009-2012	(Raz-Yaseef et al., 2015b)
US-AR2	Fl	GRA	36.6358	-99.5975	2009-2012	(Raz-Yaseef et al., 2015c)
US-ARb	Fl	GRA	35.5497	-98.0402	2005-2006	(Raz-Yaseef et al., 2015a)
US-ARc	Fl	GRA	35.5465	-98.0400	2005-2006	(Raz-Yaseef et al., 2015d)
US-ARM	Fl	CRO	36.6058	-97.4888	2003-2012	(Fischer et al., 2007)
US-Aud	La	GRA	31.5907	-110.5104	2002-2006	(Baldocchi et al., 2015)

US-Bar	La	DBF	44.0646	-71.2881	2005-2005	(Jenkins et al., 2007)
US-Bkg	La	GRA	44.3453	-96.8362	2004-2006	(Gilmanov et al., 2005)
US-Blo	Fl	ENF	38.8953	-120.6328	1997-2007	(Goldstein et al., 2000)
US-Bo1	La	CRO	40.0062	-88.2904	1996-2007	(Baldocchi et al., 2015)
US-Cop	Fl	GRA	38.0900	-109.3900	2001-2003 2006-2007	--
US-FPe	La	GRA	48.3077	-105.1019	2000-2006	(Yi et al., 2010)
US-GBT	Fl	ENF	41.3658	-106.2397	1999-2006	(Zeller and Nikolov, 2000)
US-GLE	Fl	ENF	41.3665	-106.2399	2004-2014	(Frank et al., 2014)
US-Goo	La	GRA	34.2547	-89.8735	2002-2006	(Yi et al., 2010)
US-Ha1	Fl	DBF	43.5378	-72.1715	1991-2012	(Urbanski et al., 2007)
US-Ho1	La	ENF	45.2041	-68.7402	1996-2004	(Hollinger et al., 2004)
US-Ks2	Fl	ENF	28.6086	-80.6715	2003-2006	(Powell et al., 2006)
US-Los	Fl	WET	46.0827	-89.9792	2000-2008 2010-2010 2014-2014	(Sulman et al., 2009)
US-Me1	Fl	ENF	44.5794	-121.5000	2004-2005	(Irvine et al., 2007)
US-Me2	Fl	ENF	44.4523	-121.5574	2002-2014	(Irvine et al., 2008)
US-Me4	La	ENF	44.4992	-121.6224	1996-2000	(Sun et al., 2004)
US-Me6	Fl	ENF	44.3233	-121.6078	2010-2014	(Ruehr et al., 2012)
US-MMS	Fl	DBF	39.3232	-86.4131	1999-2014	(Schmid et al., 2000)
US-MOz	La	DBF	38.7441	-92.2000	2005-2006	(Gu et al., 2006)
US-Myb	Fl	WET	38.0498	-121.7651	2010-2014	(Matthes et al., 2014)
US-Ne1	Fl	CRO	41.1651	-96.4766	2001-2013	(Richardson et al., 2006)
US-Ne2	Fl	CRO	41.1649	-96.4701	2001-2013	(Richardson et al., 2006)
US-Ne3	Fl	CRO	41.1797	-96.4397	2001-2013	(Richardson et al., 2006)
US-NR1	Fl	ENF	40.0329	-105.5464	1998-2014	(Monson et al., 2002)
US-Orv	Fl	WET	40.0201	-83.0183	2011-2011	(Morin et al., 2014)
US-PFa	Fl	MF	45.9459	-90.2723	1995-2014	(Davis et al., 2003)
US-Prr	Fl	ENF	65.1237	-147.4876	2010-2013	(Nakai et al., 2013)
US-Sp1	La	ENF	29.7381	-82.2188	2005-2005	(Migliavacca et al., 2011)
US-Sp2	La	ENF	29.7648	-82.2448	1998-2004	(Migliavacca et al., 2011)
US-Sp3	La	ENF	29.7548	-82.1633	1999-2004	(Migliavacca et al., 2011)
US-SRG	Fl	GRA	31.7894	-110.8277	2008-2014	(Scott et al., 2015a)
US-SRM	Fl	WSA	31.8214	-110.8661	2004-2014	(Scott et al., 2009)
US-Syv	Fl	MF	46.2420	-89.3477	2001-2008 2012-2014	(Desai et al., 2005)
US-Ton	Fl	SAV	38.4316	-120.9660	2001-2014	(Baldocchi et al., 2010)
US-Tw1	Fl	WET	38.1074	-121.6469	2012-2014	(Oikawa et al., 2017)
US-Tw2	Fl	CRO	38.1047	-121.6433	2012-2013	(Knox et al., 2016)
US-Tw3	Fl	CRO	38.1159	-121.6467	2013-2014	(Baldocchi et al., 2015)
US-Tw4	Fl	WET	38.1030	-121.6414	2013-2014	(Baldocchi, 2016)
US-Twt	Fl	CRO	38.1087	-121.6530	2009-2014	(Hatala et al., 2012)
US-UMB	Fl	DBF	45.5598	-84.7138	2000-2014	(Gough et al., 2008)
US-UMd	Fl	DBG	45.5625	-84.6975	2007-2014	(Gough et al., 2013)
US-Var	Fl	GRA	38.4133	-120.9507	2000-2014	(Ma et al., 2007)

US-WCr	Fl	DBF	45.8059	-90.0799	1999-2006 2010-2014	(Cook et al., 2004)
US-Whs	Fl	OSH	31.7438	-110.0522	2007-2014	(Scott et al., 2015b)
US-Wi0	Fl	ENF	46.6188	-91.0814	2002-2002	(Noormets et al., 2007a)
US-Wi3	Fl	DBF	46.6347	-91.0987	2002-2004	(Noormets et al., 2007b)
US-Wi4	Fl	ENF	46.7393	-91.1663	2002-2004	(Noormets et al., 2007c)
US-Wi6	Fl	OSH	46.6249	-91.2982	2002-2003	(Noormets et al., 2007d)
US-Wi9	Fl	ENF	46.6188	-91.0814	2004-2005	(Noormets et al., 2007e)
US-Wkg	Fl	GRA	31.7365	-109.9419	2004-2014	(Scott et al., 2010)
ZA-Kru	Fl	SAV	-25.0197	31.4969	2000-2010	(Archibald et al., 2009)
ZM-Mon	Fl	DBF	-15.4378	23.2528	2000-2000 2007-2009	(Merbold et al., 2009)

References

- Acosta, M., Pavelka, M., Montagnani, L., Kutsch, W., Lindroth, A., Juszczak, R. and Janouš, D.: Soil surface CO₂ efflux measurements in Norway spruce forests: Comparison between four different sites across Europe - from boreal to alpine forest, *Geoderma*, 192, 295–303, <https://doi.org/10.1016/j.geoderma.2012.08.027>, 2013.
- Ammann, C., Flechard, C. R., Leifeld, J., Neftel, A. and Fuhrer, J.: The carbon budget of newly established temperate grassland depends on management intensity, *Agr. Ecosyst. Environ.*, 121(1-2), 5-20, 2007.
- Anthoni, P. M., Knohl, A., Rebmann, C., Freibauer, A., Mund, M., Ziegler, W., Kolle, O. and Schulze, E. D.: Forest and agricultural land-use-dependent CO₂ exchange in Thuringia, Germany, *Glob. Change Biol.*, 10(12), 2005-2019, 2004.
- Arain, M. A. and Restrepo-Coupe, N.: Net ecosystem production in a temperate pine plantation in southeastern Canada, *Agric. For Meteorol.*, 128, 223–241, <https://doi.org/10.1016/j.agrformet.2004.10.003>, 2005.
- Archibald, S. A., Kirton, A., van der Merwe, M. R., Scholes, R. J., Williams, C. A. and Hanan, N.: Drivers of inter-annual variability in Net Ecosystem Exchange in a semi-arid savanna ecosystem, South Africa, *Biogeosciences*, 6, 251–266, <https://doi.org/10.5194/bg-6-251-2009>, 2009.
- Ardo, J., Molder, M., El-Tahir, B. A. and Elkhidir, H. A. M.: Seasonal variation of carbon fluxes in a sparse 103 savanna in semi arid Sudan, *Carbon Balance and Management*, 3(1), 7, <https://doi.org/10.1186/1750-0680-3-7>, 2008.
- Aubinet, M., Chermanne, B., Vandenhaute, M., Longdoz, B., Yernaux, M. and Laitat, E.: Long term carbon dioxide exchange above a mixed forest in the Belgian Ardennes, *Agr. Forest Meteorol.*, 108(4) 293-315, 2001.
- Aurela, M., Laurila, T., and Tuovinen, J. P.: Annual CO₂ balance of a subarctic fen in northern Europe: Importance of the winter-time efflux. *J. Geophys. Res.*, 107, 4607, <https://doi.org/10.1029/2002JD002055>, 2002.
- Aurela, M., Lohila, A., Tuovinen, J. P., Hatakka, J., Penttilä, T. and Laurila, T.: Carbon dioxide and energy flux measurements in four northern-boreal ecosystems at Pallas, *Boreal Environ. Res.*, 20, 455–473, 2015.
- Baldocchi, D.: AmeriFlux US-Tw4 Twitchell East End Wetland from 2013-Present,

<https://doi.org/10.17190/AMF/1246151>, 2016

Baldocchi, D., Chen, Q., Chen, X., Ma, S., Miller, G., Ryu, Y., Xiao, J., Wenk, R. and Battles, J.: The Dynamics of Energy, Water, and Carbon Fluxes in a Blue Oak (*Quercus douglasii*) Savanna in California, *Ecosystem Function in Savannas*, pp. 135–151, <https://doi.org/10.1201/b10275-10>, 2010.

Baldocchi, D. and Sturtevant, C.: Does day and night sampling reduce spurious correlation between canopy photosynthesis and ecosystem respiration?, *Agric. For. Meteorol.*, 207, 117–126, <https://doi.org/10.1016/j.agrformet.2015.03.010>, 2015.

Berbigier, P., Bonnefond, J. M. and Mellmann, P.: CO₂ and water vapour fluxes for 2 years above Euroflux forest site, *Agr. Forest Meteorol.*, 108(3), 183-197, 2001.

Beringer, J., Hutley, L. B., Hacker, J. M., Neininger, B. and U. K. T. P.: Patterns and processes of carbon, 127 water and energy cycles across northern Australian landscapes: From point to region, *Agr. Forest Meteorol.*, 151(11), 1409–1416, <https://doi.org/10.1016/j.agrformet.2011.05.003>, 2011.

Beringer, J., Hutley, L. B., Tapper, N. J., and Cernusak, L. A.: Savanna fires and their impact on net ecosystem productivity in North Australia, *Glob. Change Biol.*, 13(5), 990-1004, 2007.

Beringer, J., Livesley, S. J., Randle, J. and Hutley, L. B.: Carbon dioxide fluxes dominate the greenhouse gas exchanges of a seasonal wetland in the wet-dry tropics of Northern Australia., *Agric. For. Meteorol.*, 182–183, 239–247, <https://doi.org/10.1016/j.agrformet.2013.06.008>, 2013.

Beringer, J. et al.:An introduction to the Australian and New Zealand flux tower network - OzFlux. *Biogeosciences*, 13, 5895–5916, <https://doi.org/10.5194/bg-13-5895-2016>, 2016.

Bergeron, O., Margolis, H. A., Black, T. A., Coursolle, C., Dunn, A. L., Barr, A. G. and Wofsy, S. C.: Comparison of carbon dioxide fluxes over three boreal black spruce forests in Canada, *Glob. Change Biol.*, 13(1), 89-107, 2007.

Bonal, D. et al.: Impact of severe dry season on net ecosystem exchange in the Neotropical rainforest of French Guiana, *Glob. Chang. Biol.*, 14, 1917–1933, <https://doi.org/10.1111/j.1365-2486.2008.01610.x>, 2008.

Bristow, M., Hutley, L. B., Beringer, J., Livesley, S. J., Edwards, A. C. and Arndt, S. K.: Quantifying the relative importance of greenhouse gas emissions from current and future savanna land use change across northern Australia, *Biogeosciences Discuss.*, 1–47, <https://doi.org/10.5194/bg-2016-191>, 2016.

Carrara, A., Janssens, I. A., Yuste, J. C. and Ceulemans, R.: Seasonal changes in photosynthesis, respiration and NEE of a mixed temperate forest, *Agr. Forest Meteorol.*, 126(1-2), 15–31, <https://doi.org/10.1016/j.agrformet.2004.05.002>, 2004.

Cernusak, L. A., Hutley, L. B., Beringer, J., Holtum, J. A. M. and Turner, B. L.: Photosynthetic physiology of eucalypts along a sub-continental rainfall gradient in northern Australia, *Agric. For. Meteorol.*, 151, 1462–1470, <https://doi.org/10.1016/j.agrformet.2011.01.006>, 2011.

Cleverly, J., Eamus, D., Van Gorsel, E., Chen, C., Rumman, R., Luo, Q., Coupe, N. R., Li, L., Kljun, N., Faux, R., Yu, Q. and Huete, A.: Productivity and evapotranspiration of two contrasting semiarid ecosystems following the 2011 global carbon land sink anomaly, *Agr. Forest Meteorol.*, 220, 151–159, <https://doi.org/10.1016/j.agrformet.2016.01.086>, 2016.

Cleverly, J. et al.: Dynamics of component carbon fluxes in a semi-arid Acacia woodland, central Australia, *J. Geophys. Res-Bioge.*, 118, 1168–1185, <https://doi.org/10.1002/jgrg.20101>, 2013.

Chen, S. P., Chen, J. Q., Lin, G. H., Zhang, W. L., Miao, H. X., Wei, L., Huang, J. H. and Han, X.G.: Energy balance and partition in Inner Mongolia steppe ecosystems with different land use types, *Agr. Forest Meteorol.*, 149(11), 1800-1809, 2009.

Chen, B., Ge, Q., Fu, D., Yu, G., Sun, X., Wang, S. and Wang, H.: A data-model fusion approach for upscaling gross ecosystem productivity to the landscape scale based on remote sensing and flux footprint modelling, *Biogeosciences*, 7(9), 2943-2958, 2010.

Chevallier, F., Viovy, N., Reichstein, M. and Ciais P.: On the assignment of prior errors in Bayesian inversions of CO₂ surface fluxes, *Geophys. Res. Lett.*, 33(13), 2006.

Chiesi, M., Maselli, F., Bindi, M., Fibbi, L., Cherubini, P., Arlotta, E., Tirone, G., Matteucci, G. and Seufert, G.: Modelling carbon budget of Mediterranean forests using ground and remote sensing measurements. *Agric. For. Meteorol.*, 135, 22–34, <https://doi.org/10.1016/j.agrformet.2005.09.011>, 2015.

Chojnicki, B. H., Ukbaniak, M., Jozefczyk, D., Augustin, J. and Olejnik, J.: Measurements of gas and heat fluxes at Rzecin wetland. *Proc. Monogr. Eng. Wate.*, 125-132, 2007.

Cook, B. D. et al.: Carbon exchange and venting anomalies in an upland deciduous forest in northern Wisconsin, USA, *Agric. For. Meteorol.*, 126, 271–295, <https://doi.org/10.1016/j.agrformet.2004.06.008>,

2004.

Davis, K. J., Bakwin, P. S., Yi, C. X., Berger, B. W., Zhao, C.L., Teclaw, R. M. and Isebrands, J. G.: The annual cycles of CO₂ and H₂O exchange over a northern mixed forest as observed from a very tall tower, *Glob. Change Biol.*, 9(9), 1278-1293, 2003.

Delpierre, N., Berveiller, D., Granda, E. and Dufrêne, E.: Wood phenology, not carbon input, controls the interannual variability of wood growth in a temperate oak forest, *New Phytol.*, 210(2), 459-470, 2016.

Desai, A. R., Bolstad, P. V., Cook, B. D., Davis, K. J. and Carey, E. V.: Comparing net ecosystem exchange of carbon dioxide between an old-growth and mature forest in the upper Midwest, USA, *Agric. For. Meteorol.*, 128, 33–55, <https://doi.org/10.1016/j.agrformet.2004.09.005>, 2005.

Dietiker, D., Buchmann, N. and Eugster W.: Testing the ability of the DNDC model to predict CO₂ and water vapour fluxes of a Swiss cropland site, *Agric. Ecosyst. Environ.*, 139, 396–401, <https://doi.org/10.1016/j.agee.2010.09.002>, 2010

Don, A., Rebmann, C., Kolle, O., Scherer-Lorenzen, M. and Schulze, E. D.: Impact of afforestation-associated management changes on the carbon balance of grassland, *Glob. Change Biol.*, 15(8), 1990-2002, 2009.

Dunn, A. L., Barford, C. C., Wofsy, S. C., Goulden, M. L. and Daube, B. C.: A long-term record of carbon exchange in a boreal black spruce forest: means, responses to interannual variability, and decadal trends, *Glob. Change Biol.*, 13(3), 577-590, 2007.

Dušek, J., Čížková, H., Stellner, S., Czerný, R. and Květ, J.: Fluctuating water table affects gross ecosystem production and gross radiation use efficiency in a sedge-grass marsh, *Hydrobiologia*, 692, 57–66, <https://doi.org/10.1007/s10750-012-0998-z>, 2012.

Etzold, S., Ruehr, N. K., Zweifel, R., Dobbertin, M., Zingg, A., Pluess, P., Häsler, R., Eugster, W. and Buchmann, N.: The Carbon Balance of Two Contrasting Mountain Forest Ecosystems in Switzerland: Similar Annual Trends, but Seasonal Differences, *Ecosystems*, 14, 1289–1309, <https://doi.org/10.1007/s10021-011-9481-3>, 2011.

Fares, S., Savi, F., Muller, J., Matteucci, G. and Paoletti, E.: Simultaneous measurements of above and below canopy ozone fluxes help partitioning ozone deposition between its various sinks in a Mediterranean Oak Forest, *Agric. For. Meteorol.*, 198, 181–191, <https://doi.org/10.1016/j.agrformet.2014.08.014>, 2014.

Ferréa, C., Zenone, T., Comolli, R. and Seufert, G.: Estimating heterotrophic and autotrophic soil respiration in a semi-natural forest of Lombardy, Italy, *Pedobiologia*, 55(6), 285–294, doi:10.1016/j.pedobi.2012.05.001, 2012.

Fischer, M. L., Billesbach, D. P., Berry, J. A., Riley, W. J. and Torn, M. S.: Spatiotemporal variations in growing season exchanges of CO₂, H₂O, and sensible heat in agricultural fields of the Southern Great Plains, *Earth Interact.*, 11, 1–21, <https://doi.org/10.1175/EI231.1>, 2007.

Frank, J. M., Massman, W. J., Ewers, B. E., Huckaby, L. S. and Negrón, J. F.: Ecosystem CO₂/H₂O fluxes are explained by hydraulically limited gas exchange during tree mortality from spruce bark beetles, *J. Geophys. Res. Biogeosciences*, 119, 1195–1215, <https://doi.org/10.1002/2013JG002597>, 2014.

Galvagno, M. et al.: Phenology and carbon dioxide source/sink strength of a subalpine grassland in response to an exceptionally short snow season, *Environ. Res. Lett.*, 8, 25008, <https://doi.org/10.1088/1748-9326/8/2/025008>, 2013.

Garbulsky, M. F., Penuelas, J., Papale, D. and Filella, I.: Remote estimation of carbon dioxide uptake by a Mediterranean forest, *Glob. Change Biol.*, 14(12), 2860–2867, 2008.

Giasson, M. A., Coursolle, C. and Margolis, H. A.: Ecosystem-level CO₂ fluxes from a boreal cutover in eastern Canada before and after scarification, *Agr. Forest Meteorol.*, 140(1–4), 23–40, 2006.

Gilmanov, T. G., Soussana, J. E., Aires, L., Allard, V., Ammann, C., Balzarolo, M., Barcza, Z., Bernhofer, C., Campbell, C. L., Cernusca, A., Cescatti, A., Clifton-Brown, J., Dirks, B. O. M., Dore, S., Eugster, W., Fuhrer, J., Gimeno, C., Gruenwald, T., Haszpra, L., Hensen, A., Ibrom, A., Jacobs, A. F. G., Jones, M. B., Lanigan, G., Laurila, T., Lohila, A., Manca, G., Marcolla, B., Nagy, Z., Pilegaard, K., Pinter, K., Pio, C., Raschi, A., Rogiers, N., Sanz, M. J., Stefani, P., Sutton, M., Tuba, Z., Valentini, R., Williams, M. L., and Wohlfahrt, G.: Partitioning European grassland net ecosystem CO₂ exchange into gross primary productivity and ecosystem respiration using light response function analysis, *Agr. Ecosyst. Environ.*, 121(1–2), 93–120, 2007.

Gilmanov, T. G., Tieszen, L. L., Wylie, B. K., Flanagan, L. B., Frank, A. B., Haferkamp, M. R., Meyers, T. P. and Morgan, J. A.: Integration of CO₂ flux and remotely-sensed data for primary production and ecosystem respiration analyses in the Northern Great Plains: potential for quantitative spatial extrapolation, *Global Ecol. Biogeogr.*, 14(3), 271–292, 2005.

Goldstein, A. H., Hultman, N. E., Fracheboud, J. M., Bauer, M. R., Panek, J. A., Xu, M., Qi, Y., Guenther, A. B. and Baugh, W.: Effects of climate variability on the carbon dioxide, water, and sensible heat fluxes above a ponderosa pine plantation in the Sierra Nevada (CA), *Agr. Forest Meteorol.*, 101(2-3), 113-129, 2000.

Gough, C. M., Hardiman, B. S., Nave, L. E., Bohrer, G., Maurer, K. D., Vogel, C. S., Nadelhoffer, K. J. and Curtis, P. S.: 2013 Sustained carbon uptake and storage following moderate disturbance in a Great Lakes forest, *Ecol. Appl.*, 23, 1202–1215, <https://doi.org/10.1890/12-1554.1>, 2013.

Gough, C. M., Vogel, C. S., Schmid, H. P., Su, H. B. and Curtis, P. S.: Multi-year convergence of biometric and meteorological estimates of forest carbon storage, *Agr. Forest Meteorol.*, 148(2), 158-170, 2008.

Goulden, M. L., Miller, S. D. and da Rocha, H. R.: 2006. Nocturnal cold air drainage and pooling in a tropical forest, *J. Geophys. Res-Atmos.*, 111(D8), <https://doi.org/10.1029/2005jd006037>, 2006.

Granier, A., Ceschia, E., Damesin, C., Dufrene, E., Epron, D., Gross, P., Lebaube, S., Le Dantec, V., Le Goff, N., Lemoine, D., Lucot, E., Ottorini, J. M., Pontailler, J. Y. and Saugier, B.: The carbon balance of a young Beech forest, *Funct. Ecol.*, 14(3), 312-325, 2000.

Groenendijk, M., Dolman, A. J., van der Molen, M. K., Leuning, R., Arneth, A., Delpierre, N., Gash, J. H., Lindroth, A., Richardson, A. D., Verbeeck, H. and Wohlfahrt, G.: Assessing parameter variability in a photosynthesis model within and between plant functional types using global fluxnet eddy covariance data, *Agr. Forest Meteorol.*, 151: 22-38, 2011.

Grünwald, T. and Bernhofer, C.: A decade of carbon, water and energy flux measurements of an old spruce forest at the Anchor Station Tharandt, *Tellus, Ser. B Chem. Phys. Meteorol.*, 59, 387–396, <https://doi.org/10.1111/j.1600-0889.2007.00259.x>, 2007

Gu, Y., Liou, K. N., Xue, Y., Mechoso, C. R., Li, W. and Luo, Y.: Climatic effects of different aerosol types in China simulated by the UCLA general circulation model, *J. Geophys. Res-Atmos.*, 111(D15), <https://doi.org/10.1029/2005jd006312>, 2006.

Guan, D. X., Wu, J. B., Zhao, X. S., Han, S. J., Yu, G. R., Sun, X. M. and Jin, C.J.: CO₂ fluxes over an old, temperate mixed forest in northeastern China, *Agr. Forest Meteorol.*, 137(3-4), 138-149, 2006.

Hatala, J. A., Detto, M., Sonnentag, O., Deverel, S. J., Verfaillie, J., Baldocchi, D. D.: Greenhouse gas (CO₂, CH₄, H₂O) fluxes from drained and flooded agricultural peatlands in the Sacramento-San Joaquin

Delta, *Agric. Ecosyst. Environ.*, 150, 1–18, <https://doi.org/10.1016/j.agee.2012.01.009>, 2012.

Hinko-Najera, N., Isaac, P., Beringer, J., Gorsel, E. van, Ewenz, C., McHugh, I., Exbrayat, J. F., Livesley, S. J. and Arndt, S. K.: Net ecosystem carbon exchange of a dry temperate eucalypt forest, *Biogeosciences*, 14, 3781–3800, <https://doi.org/10.5194/bg-14-3781-2017>, 2017.

Hirano, T., Segah, H., Harada, T., Limin, S., June, T., Hirata, R. and Osaki, M.: Carbon dioxide balance of a tropical peat swamp forest in Kalimantan, Indonesia, *Glob. Change Biol.*, 13(2), 412–425, 2007.

Hollinger, D. Y., Aber, J., Dail, B., Davidson, E. A., Goltz, S. M., Hughes, H., Leclerc, M. Y., Lee, J. T., Richardson, A. D., Rodrigues, C., Scott, N. A., Achuatavari, D. and Walsh, J.: Spatial and temporal variability in forest-atmosphere CO₂ exchange, *Glob. Change Biol.*, 10(10), 1689–1706, 2004.

Hommeltenberg, J., Schmid, H. P., Drösler, M. and Werle, P.: Can a bog drained for forestry be a stronger carbon sink than a natural bog forest?, *Biogeosciences*, 11, 3477–3493, <https://doi.org/10.5194/bg-11-3477-2014>, 2014.

Hoshika, Y., Fares, S., Savi, F., Gruening, C., Goded, I., De Marco, A., Sicard, P. and Paoletti E.: Stomatal conductance models for ozone risk assessment at canopy level in two Mediterranean evergreen forests, *Agric. For. Meteorol.*, 234, 212–221, <https://doi.org/10.1016/j.agrformet.2017.01.005>, 2017.

Hutley, L. B., Beringer, J., Isaac, P. R., Hacker, J. M. and Cernusak, L. A.: A sub-continental scale living laboratory: Spatial patterns of savanna vegetation over a rainfall gradient in northern Australia, *Agric. For. Meteorol.*, 151, 1417–1428, <https://doi.org/10.1016/j.agrformet.2011.03.002>, 2011.

Imer, D., Merbold, L., Eugster, W. and Buchmann, N.: Temporal and spatial variations of soil CO₂, CH₄ and N₂O fluxes at three differently managed grasslands, *Biogeosciences*, 10, 5931–5945, <https://doi.org/10.5194/bg-10-5931-2013>, 2013.

Irvine, J., Law, B. E., Hibbard, K. A.: Postfire carbon pools and fluxes in semiarid ponderosa pine in Central Oregon, *Glob. Chang. Biol.*, 13, 1748–1760, <https://doi.org/10.1111/j.1365-2486.2007.01368.x>, 2007.

Irvine, J., Law, B. E., Martin, J. G. and Vickers, D.: Interannual variation in soil CO₂ efflux and the response of root respiration to climate and canopy gas exchange in mature ponderosa pine, *Glob. Chang. Biol.*, 14, 2848–2859, [doi:10.1111/j.1365-2486.2008.01682.x](https://doi.org/10.1111/j.1365-2486.2008.01682.x), 2008.

Jacobs, C. M. J. et al.: Variability of annual CO₂ exchange from Dutch grasslands. *Biogeosciences*, 4, 803–816, <https://doi.org/10.5194/bg-4-803-2007>, 2007.

Jaksic, V., Kiely, G., Albertson, J., Oren, R., Katul, G., Leahy, P. and Byrne, K. A.: Net ecosystem exchange of grassland in contrasting wet and dry years, *Agr. Forest Meteorol.*, 139(3-4), 323-334, 2006.

Jenkins, J. P., Richardson, A. D., Braswell, B. H., Ollinger, S. V., Hollinger, D. Y. and Smith, M. L.: Refining light-use efficiency calculations for a deciduous forest canopy using simultaneous tower-based carbon flux and radiometric measurements, *Agr. Forest Meteorol.*, 143(1-2), 64-79, 2007.

Kato, T., Tang, Y., Gu, S., Hirota, M., Du, M., Li, Y. and Zhao X. Temperature and biomass influences on interannual changes in CO₂ exchange in an alpine meadow on the Qinghai-Tibetan Plateau, *Glob. Chang. Biol.*, 12, 1285–1298, <https://doi.org/10.1111/j.1365-2486.2006.01153.x>, 2006.

Kilinc, M., Beringer, J., Hutley, L. B., Tapper, N. J. and McGuire, D. A.: Carbon and water exchange of the world's tallest angiosperm forest, *Agric. For. Meteorol.*, 182–183, 215–224, <https://doi.org/10.1016/j.agrformet.2013.07.003>, 2013.

Knohl, A., Schulze, E. D., Kolle, O. and Buchmann, N.: Large carbon uptake by an unmanaged 250-year-old deciduous forest in Central Germany, *Agr. Forest Meteorol.*, 118(3-4), 151-167, 2003.

Knox, S. H., Matthes, J. H., Sturtevant, C., Oikawa, P. Y., Verfaillie, J. and Baldocchi, D.: Biophysical controls on interannual variability in ecosystem-scale CO₂ and CH₄ exchange in a California rice paddy, *J. Geophys. Res., Biogeosciences*, 121, 978–1001, <https://doi.org/10.1002/2015JG003247>, 2016.

Kurbatova, J., Li, C., Varlagin, A., Xiao, X. and Vygodskaya, N.: Modeling carbon dynamics in two adjacent spruce forests with different soil conditions in Russia, *Biogeosciences*, 5, 969–980, <https://doi.org/10.5194/bg-5-969-2008>, 2008.

Lafleur, P. M., Roulet, N. T., Bubier, J. L., Frolking, S. and Moore, T. R.: Interannual variability in the peatland-atmosphere carbon dioxide exchange at an ombrotrophic bog, *Global Biogeochem. Cy.*, 17(2), <https://doi.org/10.1029/2002gb001983>, 2003.

Lindauer, M., Schmid, H. P., Grote, R., Mauder, M., Steinbrecher, R. and Wolpert, B.: Net ecosystem exchange over a non-cleared wind-throw-disturbed upland spruce forest-Measurements and simulations, *Agric. For. Meteorol.*, 197, 219–234, <https://doi.org/10.1016/j.agrformet.2014.07.005>, 2014.

Lohila, A., Aurela, M., Tuovinen, J. P. and Laurila, T.: Annual CO₂ exchange of a peat field growing spring barley or perennial forage grass, *J. Geophys. Res-Atmos.*, 109, <https://doi.org/10.1029/2004JD004715>, 2004.

Loubet, B. et al.: Carbon, nitrogen and Greenhouse gases budgets over a four years crop rotation in northern France, *Plant Soil*, 343, 109–137, <https://doi.org/10.1007/s11104-011-0751-9>, 2011.

Lund, M., Falk, J. M., Friborg, T., Mbufong, H. N., Sigsgaard, C., Soegaard, H. and Tamstorf, M. P.: Trends in CO₂ exchange in a high Arctic tundra heath, 2000-2010, *J. Geophys. Res. Biogeosciences*, 117, <https://doi.org/10.1029/2011JG001901>, 2012.

Ma, S., Baldocchi, D. D., Xu, L. and Hehn, T.: Inter-annual variability in carbon dioxide exchange of an oak/grass savanna and open grassland in California, *Agric. For. Meteorol.*, 147, 157–171, <https://doi.org/10.1016/j.agrformet.2007.07.008>, 2007.

Matsumoto, K. et al.: Energy consumption and evapotranspiration at several boreal and temperate forests in the Far East, *Agric. For. Meteorol.*, 148, 1978–1989, <https://doi.org/10.1016/j.agrformet.2008.09.008>, 2008.

Matthes, J. H., Sturtevant, C., Verfaillie, J., Knox, S. and Baldocchi, D.: Parsing the variability in CH₄ flux at a spatially heterogeneous wetland: Integrating multiple eddy covariance towers with high-resolution flux footprint analysis, *J. Geophys. Res. Biogeosciences*, 119, 1322–1339, <https://doi.org/10.1002/2014JG002642>, 2014.

Mkhabela, M. S. et al.: Comparison of carbon dynamics and water use efficiency following fire and harvesting in Canadian boreal forests, *Agric. For. Meteorol.*, 149, 783–794, <https://doi.org/10.1016/j.agrformet.2008.10.025>, 2009.

Marcolla, B., Pitacco, A. and Cescatti, A.: Canopy architecture and turbulence structure in a coniferous forest. *Bound-Lay. Meteorol.* 108, 39–59, <https://doi.org/10.1023/A:1023027709805>, 2003.

Mauder, M., Cuntz, M., Drüe, C., Graf, A., Rebmann, C., Schmid, H. P., Schmidt, M and Steinbrecher, R.: A strategy for quality and uncertainty assessment of long-term eddy-covariance measurements, *Agric. For. Meteorol.*, 169, 122–135, <https://doi.org/10.1016/j.agrformet.2012.09.006>, 2013.

Merbold, L., Eugster, W., Stieger, J., Zahniser, M., Nelson, D. and Buchmann, N.: Greenhouse gas budget

(CO₂, CH₄ and N₂O) of intensively managed grassland following restoration, *Glob. Chang. Biol.*, 20, 1913–1928, <https://doi.org/10.1111/gcb.12518>, 2014.

Merbold, L., Kutsch, W. L., Corradi, C., Kolle, O., Rebmann, C., Stoy, P. C., Zimov, S. A. and Schulze, E. D.: Artificial drainage and associated carbon fluxes (CO₂/CH₄) in a tundra ecosystem, *Glob. Chang. Biol.*, 15, 2599–2614, <https://doi.org/10.1111/j.1365-2486.2009.01962.x>, 2009.

Merbold, L. et al.: Precipitation as driver of carbon fluxes in 11 African ecosystems, *Biogeosciences*, 6, 1027–1041, <https://doi.org/10.5194/bg-6-1027-2009>, 2009.

Meyer, W. S., Kondrlovà, E. and Koerber, G. R.: Evaporation of perennial semi-arid woodland in southeastern Australia is adapted for irregular but common dry periods, *Hydrol. Process.*, 29, 3714–3726, <https://doi.org/10.1002/hyp.10467>, 2015.

McHugh, I. D., Beringer, J., Cunningham, S. C., Baker, P. J., Cavagnaro, T. R., MacNally, R. and Thompson, R. M.: Interactions between nocturnal turbulent flux, storage and advection at an ‘ideal’ eucalypt woodland site, *Biogeosciences*, 14, 3027–3050, <https://doi.org/10.5194/bg-14-3027-2017>, 2017.

Migliavacca, M., Meroni, M., Busetto, L., Colombo, R., Zenone, T., Matteucci, G., Manca, G. and Seufert, G.: Modeling gross primary production of agro-forestry ecosystems by assimilation of satellite-derived information in a process-based model, *Sensors* 9, 922–942, <https://doi.org/10.3390/s90200922>, 2009.

Migliavacca, M., Reichstein, M., Richardson, A. D., Colombo, R., Sutton, M. A., Lasslop, G., Tomelleri, E., Wohlfahrt, G., Carvalhais, N., Cescatti, A., Mahecha, M. D., Montagnani, L., Papale, D., Zaehle, S., Arain, A., Arneth, A., Black, T.A., Carrara, A., Dore, S., Gianelle, D., Helfter, C., Hollinger, D., Kutsch, W. L., Lafleur, P. M., Nouvellon, Y., Rebmann, C., da Rocha, H. R., Rodeghiero, M., Rouspard, O., Sebastia, M. T., Seufert, G., Soussana, J. F., van der Molen, M. K.: Semiempirical modeling of abiotic and biotic factors controlling ecosystem respiration across eddy covariance sites, *Glob. Change Biol.*, 17(1), 390–409, 2011.

Monson, R. K., Turnipseed, A. A., Sparks, J. P., Harley, P. C., Scott-Denton, L. E., Sparks, K. and Huxman, T. E.: Carbon sequestration in a high-elevation, subalpine forest, *Glob. Chang. Biol.*, 8, 459–478, <https://doi.org/10.1046/j.1365-2486.2002.00480.x>, 2002.

Montagnani, L. et al.: A new mass conservation approach to the study of CO₂ advection in an alpine forest, *J. Geophys. Res. Atmos.*, 114, <https://doi.org/10.1029/2008JD010650>, 2009.

Moors, E. J.: Water Use of Forests in The Netherlands, Vrije Universiteit Amsterdam, 2012.

Morin, T. H., Bohrer, G., Frasson, R. P. D. M., Naor-Azreli, L., Mesi, S., Stefanik, K. C. and Schäfer, K. V. R.: Environmental drivers of methane fluxes from an urban temperate wetland park, *J. Geophys. Res.-Biogeo.*, 119, 2188–2208, <https://doi.org/10.1002/2014JG002750>, 2014.

Moureaux, C., Debacq, A., Bodson, B., Heinesch, B. and Aubinet, M.: Annual net ecosystem carbon exchange by a sugar beet crop, *Agr. Forest Meteorol.*, 139(1-2), 25-39, 2006.

Nakai, T., Kim, Y., Busey, R. C., Suzuki, R., Nagai, S., Kobayashi, H., Park, H., Sugiura, K. and Ito, A.: Characteristics of evapotranspiration from a permafrost black spruce forest in interior Alaska, *Polar Sci.*, 7, 136–148. <https://doi.org/10.1016/j.polar.2013.03.003>, 2013.

Noormets, A., Chen, J. and Crow, T. R. Age-dependent changes in ecosystem carbon fluxes in managed forests in northern Wisconsin, USA, *Ecosystems*, 10, 187–203, <https://doi.org/10.1007/s10021-007-9018-y>, 2007.

Oikawa, P. Y., Jenerette, G. D., Knox, S. H., Sturtevant, C., Verfaillie, J., Dronova, I., Poindexter, C. M., Eichelmann, E. and Baldocchi, D. D.: Evaluation of a hierarchy of models reveals importance of substrate limitation for predicting carbon dioxide and methane exchange in restored wetlands, *J. Geophys. Res.-Biogeo.*, 122, 145–167, <https://doi.org/10.1002/2016JG003438>, 2017.

Pilegaard, K., Mikkelsen, T. N., Beier, C., Jensen, N. O., Ambus, P. and Ro-Poulsen, H.: Field measurements of atmosphere-biosphere interactions in a Danish beech forest, *Boreal Environ. Res.*, 8(4): 315-333, 2003.

Pinter, K., Barcza, Z., Balogh, J., Czobel, S., Csintalan, Z., Tuba, Z. and Nagy, Z.: Interannual variability of grasslands' carbon balance depends on soil type, *Community Ecol.*, 9, 43-48, 2008.

Posse, G., Lewczuk, N., Richter, K. and Cristiano, P.: Carbon and water vapor balance in a subtropical pine plantation, *IForest*, 9, 736–742, <https://doi.org/10.3832/ifor1815-009>, 2016.

Post, H., Hendricks Franssen, H. J., Graf, A., Schmidt, M. and Vereecken, H.: Uncertainty analysis of eddy covariance CO₂ flux measurements for different EC tower distances using an extended two-tower approach, *Biogeosciences*, 12, 1205–1221, <https://doi.org/10.5194/bg-12-1205-2015>, 2015.

Powell, T. L., Bracho, R., Li, J., Dore, S., Hinkle, C. R. and Drake, B. G.: Environmental controls over net

ecosystem carbon exchange of scrub oak in central Florida, *Agric. For. Meteorol.*, 141, 19–34, <https://doi.org/10.1016/j.agrformet.2006.09.002>, 2006.

Prescher, A. K., Grünwald, T. and Bernhofer, C.: Land use regulates carbon budgets in eastern Germany: From NEE to NBP, *Agric. For. Meteorol.*, 150, 1016–1025, <https://doi.org/10.1016/j.agrformet.2010.03.008>, 2010.

Prober, S. M., Thiele, K. R., Rundel, P. W., Yates, C. J., Berry, S. L., Byrne, M., Christidis, L., Gosper, C. R., Grierson, P. F., Lemson, K. and Lyons, T.: Facilitating adaptation of biodiversity to climate change: a conceptual framework applied to the world's largest Mediterranean-climate woodland, *Climatic Change*, 110(1-2), 227-48, 2012

Rambal, S., Joffre, R., Ourcival, J. M., Cavender-Bares, J. and Rocheteau, A.: The growth respiration component in eddy CO₂ flux from a *Quercus ilex* mediterranean forest, *Glob. Change Biol.*, 10(9), 1460-1469, 2004.

Raz-Yaseef, N., Billesbach, D. P., Fischer, M. L., Biraud, S. C., Gunter, S. A., Bradford, J. A. and Torn, M. S.: Vulnerability of crops and native grasses to summer drying in the U.S. Southern Great Plains, *Agric. Ecosyst. Environ.*, 213, 209–218, <https://doi.org/10.1016/j.agee.2015.07.021>, 2015.

Rebmann, C., Zeri, M., Lasslop, G., Mund, M., Kolle, O., Schulze, E. D. and Feigenwinter, C. Treatment and assessment of the CO₂-exchange at a complex forest site in Thuringia, Germany. *Agr. Forest Meteorol.*, 150(5): 684-691, 2010.

Reichstein, M., Falge, E., Baldocchi, D., Papale, D., Aubinet, M., Berbigier, P., Bernhofer, C., Buchmann, N., Gilmanov, T., Granier, A., Grunwald, T., Havrankova, K., Ilvesniemi, H., Janous, D., Knohl, A., Laurila, T., Lohila, A., Loustau, D., Matteucci, G., Meyers, T., Miglietta, F., Ourcival, J. M., Pumpanen, J., Rambal, S., Rotenberg, E., Sanz, M., Tenhunen, J., Seufert, G., Vaccari, F., Vesala, T., Yakir, D. and Valentini, R.: On the separation of net ecosystem exchange into assimilation and ecosystem respiration: review and improved algorithm, *Glob. Change Biol.*, 11(9), 1424-1439, 2005.

Reichstein, M., Rey, A., Freibauer, A., Tenhunen, J., Valentini, R., Banza, J., Casals, P., Cheng, Y. F., Grunzweig, J. M., Irvine, J., Joffre, R., Law, B. E., Loustau, D., Miglietta, F., Oechel, W., Ourcival, J. M., Pereira, J. S., Peressotti, A., Ponti, F., Qi, Y., Rambal, S., Rayment, M., Romanya, J., Rossi, F., Tedeschi, V., Tirone, G., Xu, M. and Yakir, D.: Modeling temporal and large-scale spatial variability of soil respiration from soil water availability, temperature and vegetation productivity indices, *Global Biogeochem. Cy.*, 17(4), <https://doi.org/10.1029/2003gb002035>, 2003.

Reverter, B. R., Sánchez-Cañete, E. P., Resco, V., Serrano-Ortiz, P., Oyonarte, C. and Kowalski, A. S.: Analyzing the major drivers of NEE in a Mediterranean alpine shrubland, *Biogeosciences*, 7, 2601–2611, <https://doi.org/10.5194/bg-7-2601-2010>, 2010.

Rey, A., Pegoraro, E., Tedeschi, V., De Parri, I., Jarvis, P. G. and Valentini, R.: Annual variation in soil respiration and its components in a coppice oak forest in Central Italy, *Glob. Chang. Biol.*, 8, 851–866, <https://doi.org/10.1046/j.1365-2486.2002.00521.x>, 2002.

Richardson, A. D., Hollinger, D. Y., Burba, G. G., Davis, K. J., Flanagan, L. B., Katul, G. G., Munger, J. W., Ricciuto, D. M., Stoy, P. C., Suyker, A. E., Verma, S. B. and Wofsy, S. C.: A multi-site analysis of random error in tower-based measurements of carbon and energy fluxes, *Agr. Forest Meteorol.*, 136(1-2), 1-18, 2006.

Ruehr, N. K., Martin, J. G. and Law, B. E.: Effects of water availability on carbon and water exchange in a young ponderosa pine forest: Above- and belowground responses, *Agric. For. Meteorol.*, 164, 136–148, <https://doi.org/10.1016/j.agrformet.2012.05.015>, 2012.

Sabbatini, S. et al.: Greenhouse gas balance of cropland conversion to bioenergy poplar short-rotation coppice, *Biogeosciences*, 13, 95–113, <https://doi.org/10.5194/bg-13-95-2016>, 2016.

Schmid, H. P., Grimmer, C. S. B., Cropley, F., Offerle, B. and Su, H. B.: Measurements of CO₂ and energy fluxes over a mixed hardwood forest in the mid-western United States, *Agr. Forest Meteorol.*, 103(4), 357-374, 2000.

Schmidt, M., Reichenau, T. G., Fiener, P. and Schneider K.: The carbon budget of a winter wheat field: An eddy covariance analysis of seasonal and inter-annual variability, *Agric. For. Meteorol.*, 165, 114–126, <https://doi.org/10.1016/j.agrformet.2012.05.012>, 2012.

Schroder, I., Kuske, T., Zegelin and S.: Eddy Covariance Dataset for Arcturus (2011-2013), Geoscience Australia, Canberra. <https://doi.org/10.1002/100/14249>, 2014.

Scott, R. L., Biederman, J. A., Hamerlynck, E. P. and Barron-Gafford, G. A.: The carbon balance pivot point of southwestern U.S. semiarid ecosystems: Insights from the 21st century drought, *J. Geophys. Res. Biogeosciences*, 120, 2612–2624, <https://doi.org/10.1002/2015JG003181>, 2015.

Scott, R. L., Hamerlynck, E. P., Jenerette, G. D., Moran, M. S. and Barron-Gafford, G. A.: Carbon dioxide

exchange in a semidesert grassland through drought-induced vegetation change, *J. Geophys. Res-Bioge.*, 115, <https://doi.org/10.1029/2010JG001348>, 2010.

Scott, R. L., Jenerette, G. D., Potts, D. L. and Huxman, T. E.: Effects of seasonal drought on net carbon dioxide exchange from a woody-plant-encroached semiarid grassland, *J. Geophys. Res-Bioge.*, 114, <https://doi.org/10.1029/2008JG000900>, 2009.

Serrano-Ortiz, P., Marañón-Jiménez, S., Reverter, B. R., Sánchez-Cañete, E. P., Castro, J., Zamora, R. and Kowalski, A. S.: Post-fire salvage logging reduces carbon sequestration in Mediterranean coniferous forest, *Forest Ecol. Manag.*, 262(12), 2287–2296, <https://doi.org/10.1016/j.foreco.2011.08.023>, 2011.

Shi, P., Sun, X., Xu, L., Zhang, X., He, Y., Zhang, D. and Yu, G.: Net ecosystem CO₂ exchange and controlling factors in a steppe—Kobresia meadow on the Tibetan Plateau, *Sci. China Ser. D Earth Sci.*, 49, 207–218, <https://doi.org/10.1007/s11430-006-8207-4>, 2006.

Shao, C., Chen, J., Li, L., Dong, G., Han, J., Abraha, M. and John, R.: Grazing effects on surface energy fluxes 500 in a desert steppe on the Mongolian Plateau. *Ecol. Appl.*, 27(2), 485–502, <https://doi.org/10.1002/eap.1459>, 501, 2017.

Stevens, R. M., Ewenz, C. M., Grigson, G. and Conner, S. M.: Water use by an irrigated almond orchard, *Irrigation Sci.*, 30(3), 189–200, <https://doi.org/10.1007/s00271-011-0270-8>, 2011.

Stiegler, C., Lund, M., Røjle Christensen, T., Mastepanov, M. and Lindroth, A.: Two years with extreme and little snowfall: Effects on energy partitioning and surface energy exchange in a high-Arctic tundra ecosystem, *Cryosphere*, 10, 1395–1413, <https://doi.org/10.5194/tc-10-1395-2016>, 2016.

Sulman, B. N., Desai, A. R., Cook, B. D., Saliendra, N. and MacKay, D. S.: Contrasting carbon dioxide fluxes between a drying shrub wetland in Northern Wisconsin, USA, and nearby forests, *Biogeosciences*, 6, 1115–1126, <https://doi.org/10.5194/bg-6-1115-2009>, 2009.

Sun, O. J., Campbell J, Law, B. E. and Wolf, V.: Dynamics of carbon stocks in soils and detritus across chronosequences of different forest types in the Pacific Northwest, USA, *Glob. Change Biol.*, 10(9), 1470–1481, 2004.

Suni, T., Rinne, J., Reissell, A., Altimir, N., Keronen, P., Rannik, U., Dal Maso, M., Kulmala, M. and Vesala, T.: Long-term measurements of surface fluxes above a Scots pine forest in Hyytiala, southern Finland, 1996–2001, *Boreal Environ. Res.*, 8(4), 287–301, 2003.

Tagesson, T., Fensholt, R., Guiro, I., Rasmussen, M. O., Huber, S., Mbow, C., Garcia, M., Horion, S., Sandholt, I., Holm-Rasmussen, B., Götsche, F. M., Ridler, M.-E., Olén, N., Olsen, J. L., Ehammer, A., Madsen, M., Olesen, F. S. and Ardö, J.: Ecosystem properties of semiarid savanna grassland in West Africa and its relationship with environmental variability, *Glob. Change Biol.*, 21(1), 250–264, <https://doi.org/10.1111/gcb.12734>, 2014.

Tanja, S., Berninger, F., Vesala, T., Markkanen, T., Hari, P., Makela, A., Ilvesniemi, H., Hanninen, H., Nikinmaa, E., Huttula, T., Laurila, T., Aurela, M., Grelle, A., Lindroth, A., Arneth, A., Shibistova, O. and Lloyd, J.: Air temperature triggers the recovery of evergreen boreal forest photosynthesis in spring, *Glob. Change Biol.*, 9(10), 1410-1426, 2003.

Tedeschi, V., Rey, A., Manca, G., Valentini, R., Jarvis, P. J. and Borghetti, M.: Soil respiration in a Mediterranean oak forest at different developmental stages after coppicing, *Glob. Chang. Biol.*, 12, 110–121, <https://doi.org/10.1111/j.1365-2486.2005.01081.x>, 2006.

Thum, T., Aalto, T., Laurila, T., Aurela, M., Kolari, P. and Hari, P.: Parametrization of two photosynthesis models at the canopy scale in a northern boreal Scots pine forest, *Tellus, Ser. B Chem. Phys. Meteorol.*, 59, 874–890, <https://doi.org/10.1111/j.1600-0889.2007.00305.x>, 2007.

Ulke, A. G., Gattinoni, N. N. and Posse, G.: Analysis and modelling of turbulent fluxes in two different ecosystems in Argentina, *Int. J. Environ. and Pollut.*, 58(1/2), 52, 529 <https://doi.org/10.1504/ijep.2015.076583>, 2015.

Urbanski, S. et al.: Factors controlling CO₂ exchange on timescales from hourly to decadal at Harvard Forest, *J. Geophys. Res. Biogeosciences*, 112, <https://doi.org/10.1029/2006JG000293>, 2007.

Valentini, R., De Angelis, P., Matteucci, G., Monaco, R., Dore, S. and Scarascia Mugnozza, G. E.: Seasonal net carbon dioxide exchange of a beech forest with the atmosphere, *Glob. Chang. Biol.*, 2, 199–207, <https://doi.org/10.1111/j.1365-2486.1996.tb00072.x>, 1996.

Valentini, R., Matteucci, G., Dolman, A. J., Schulze, E. D., Rebmann, C., Moors, E. J., Granier, A., Gross, P., Jensen, N. O., Pilegaard, K., Lindroth, A., Grelle, A., Bernhofer, C., Grunwald, T., Aubinet, M., Ceulemans, R., Kowalski, A. S., Vesala, T., Rannik, U., Berbigier, P., Loustau, D., Guomundsson, J., Thorgeirsson, H., Ibrom, A., Morgenstern, K., Clement, R., Moncrieff, J., Montagnani, L., Minerbi, S. and Jarvis, P. G.: Respiration as the main determinant of carbon balance in European forests, *Nature*, 404(6780), 861-865, 2000.

van der Molen, M. K., Van Huissteden, J., Parmentier, F. J. W., Petrescu, A. M. R., Dolman, A. J., Maximov, T. C., Kononov, A. V., Karsanaev, S. V. and Suzdalov, D. A.: The growing season greenhouse gas balance of a continental tundra site in the Indigirka lowlands, NE Siberia, *Biogeosciences*, 4, 985–1003, <https://doi.org/10.5194/bg-4-985-2007>, 2007.

van Gorsel, E., Leuning, R., Cleugh, H. A., Keith, H., Kirschbaum, M. U. F. and Suni, T.: Application of an alternative method to derive reliable estimates of nighttime respiration from eddy covariance measurements in moderately complex topography, *Agr. Forest Meteorol.*, 148(6-7), 1174-1180, 2008.

Veenendaal, E. M., Kolle, O. and Lloyd, J.: Seasonal variation in energy fluxes and carbon dioxide exchange for a broad-leaved semi-arid savanna (Mopane woodland) in Southern Africa, *Glob. Change Biol.*, 10(3), 318-328, 2004.

Vitale, L., Tommasi, P. D., D'Urso, G. and Magliulo, V.: The response of ecosystem carbon fluxes to 534 LAI and environmental drivers in a maize crop grown in two contrasting seasons, *Int. J. Biometeorol.*, 60(3), 411–420, <https://doi.org/10.1007/s00484-015-1038-2>, 2015.

Wen, X. F., Wang, H. M., Wang, J. L., Yu, G. R. and Sun, X. M.: Ecosystem carbon exchanges of a subtropical 537 evergreen coniferous plantation subjected to seasonal drought, 2003-2007, *Biogeosciences*, 7(1), 357–369, 538, <https://doi.org/10.5194/bg-7-357-2010>, 2010.

Westergaard-Nielsen, A., Lund, M., Hansen, B. U. and Tamstorf, M. P.: Camera derived vegetation greenness index as proxy for gross primary production in a low Arctic wetland area, *ISPRS J. Photogramm. Remote Sens.*, 86, 89–99, <https://doi.org/10.1016/j.isprsjprs.2013.09.006>, 2013.

Wick, B., Veldkamp, E., de Mello, W. Z., Keller, M. and Crill, P.: Nitrous oxide fluxes and nitrogen cycling along a pasture chronosequence in Central Amazonia, Brazil, *Biogeosciences*, 2, 175–187, <https://doi.org/10.5194/bg-2-175-2005>, 2005.

Wohlfahrt, G., Hammerle, A., Haslwanter, A., Bahn, M., Tappeiner, U. and Cernusca, A.: Seasonal and inter-annual variability of the net ecosystem CO₂ exchange of a temperate mountain grassland: Effects of weather and management, *J. Geophys. Res-Atmos.*, 113(D8), 2008.

Yan, J., Zhang, Y., Yu, G., Zhou, G., Zhang, L., Li, K., Tan, Z. and Sha, L.: Seasonal and inter-annual 551 variations in net ecosystem exchange of two old-growth forests in southern China, *Agr. Forest Meteorol.*, 182-183, 257–265, <https://doi.org/10.1016/j.agrformet.2013.03.002>, 2013.

Yee, M. S., Pauwels, V. R. N., Daly, E., Beringer, J., Rüdiger, C., McCabe, M. F. and Walker, J. P.: A comparison of optical and microwave scintillometers with eddy covariance derived surface heat fluxes, *Agric. For. Meteorol.*, 213, 226–239, <https://doi.org/10.1016/j.agrformet.2015.07.004>, 2015.

Yi, C., Ricciuto, D., Li, R. et al.: Climate control of terrestrial carbon exchange across biomes and continents, *Environ. Res. Lett.*, 5, 1-10, 2010.

Zeller, K. F. and Nikolov, N. T.: Quantifying simultaneous fluxes of ozone, carbon dioxide and water vapor above a subalpine forest ecosystem, *Environ. Pollut.*, 107, 1–20, [https://doi.org/10.1016/S0269-7491\(99\)00156-6](https://doi.org/10.1016/S0269-7491(99)00156-6), 2000.

Zielis, S., Etzold, S., Zweifel, R., Eugster, W., Haeni, M. and Buchmann, N.: NEP of a Swiss subalpine forest is significantly driven not only by current but also by previous year's weather, *Biogeosciences*, 11, 1627–1635, <https://doi.org/10.5194/bg-11-1627-2014>, 2014.