Data set 1. Elevated CO_2 studies reporting N_2O emissions that were used in the meta-analysis

Citation	Site location	n (ambient CO_2)	n (elevated CO_2)	n_{site}	mean (ambient CO_2, $\mu g\ N_2O\text{-}N\ m^{-2}\ day^{-1}$)	mean (elevated CO_2, $\mu g\ N_2O\text{-}N\ m^{-2}\ day^{-1}$)	ambient CO_2 concentration (p.p.m.v.)	elevated CO_2 concentration (p.p.m.v.)	dCO_2 (p.p.m.v.)	Duration	Land use type	lnR	Weight	Group	Experiental conditions	Species	N fertilizer ($g\ m^{-2}$)	Other Treatment
Arnone III and Bohlen, 1998	Switzerland	12	12	1	604.32	1167.12	350	600	250	150 days	Grassland	0.66	6.00	B	Greenhouse	Bromus erectus and other 14 spiecies	2	
Baggs et al., 2003	Switzerland	3	3	8	1221.92	904.11	360	600	240	1 year	Grassland	-0.30	0.19	B	FACE	Lolium	14	low N
Baggs et al., 2003	Switzerland	3	3	8	1194.52	939.73	360	600	240	1 year	Grassland	-0.24	0.19	B	FACE	Lolium/Trifolium	14	low N
Baggs et al., 2003	Switzerland	3	3	8	1454.79	1372.60	360	600	240	1 year	Grassland	-0.06	0.19	B	FACE	Trifolium	14	low N
Baggs et al., 2003	Switzerland	3	3	8	1619.18	2627.40	360	600	240	1 year	Grassland	0.48	0.19	B	FACE	Lolium	56	high N
Baggs et al., 2003	Switzerland	3	3	8	1578.08	2205.48	360	600	240	1 year	Grassland	0.33	0.19	B	FACE	Lolium/Trifolium	56	high N
Baggs et al., 2003	Switzerland	3	3	8	2487.67	2523.29	360	600	240	1 year	Grassland	0.01	0.19	B	FACE	Trifolium	56	high N
Baggs and Blum 2004	Switzerland	3	3	8	5643.84	7136.99	360	600	240	1 year	Grassland	0.23	0.19	B	FACE	Lolium perenne	14	low N
Baggs and Blum 2004	Switzerland	3	3	8	51041.10	74273.97	360	600	240	1 year	Grassland	0.38	0.19	B	FACE	Lolium perenne	56	high N
Billings et al., 2002	USA	3	3	1	26.43	29.42	360	550	190	1 year	Grassland	0.11	1.50	B	FACE	Larrea tridentata (DC.) Cov., and so on	-	
Brenzinger et al., 2017	Germany	9	9	3	240.00	504.00	364	399	35	12 years	Grassland	0.74	1.50	A	FACE	Arrhenatheretum elatioris Br. Bl. Filipendula ulmaria	4	
Cantarel et al., 2011	French	5	5	1	245.76	237.84	380	600	220	1 year	Grassland	-0.03	1.00	B	FACE	Festuca arundinaceae, Elytrigia repens, Poa pratensis	-	
Carter et al., 2011	Denmark	6	6	7	80.88	77.76	380	510	130	1.25 year	Grassland	-0.04	0.43	A	FACE	Calluna vulgaris (L.), Deschampsia flexuosa (L.) and	1.25	
Carter et al., 2011	Denmark	6	6	7	83.04	140.16	380	510	130	1.25 year	Grassland	0.52	0.43	A	FACE	Calluna vulgaris (L.), Deschampsia flexuosa (L.) and	1.25	warming
Carter et al., 2011	Denmark	6	6	7	79.92	102.24	380	510	130	1.25 year	Grassland	0.25	0.43	A	FACE	Calluna vulgaris (L.), Deschampsia flexuosa (L.) and	1.25	warming and drought

Deltedesco et al., 2019	Austria	7	3	4	34320.00	9600.00	-	-	150	2 years	Grassland	-1.27	0.53	A	mini FACE	Arrhenatherum elatius L.,Poa pratensis L.	9	
Deltedesco et al., 2019	Austria	7	3	4	34320.00	21600.00	-	-	300	2 years	Grassland	-0.46	0.53	B	mini FACE	Arrhenatherum elatius L.,Poa pratensis L.	9	
Deltedesco et al., 2019	Austria	3	2	4	6000.00	17040.00	-	-	150	2 years	Grassland	1.04	0.30	A	mini FACE	Arrhenatherum elatius L.,Poa pratensis L.	9	warming
Deltedesco et al., 2019	Austria	3	6	4	9360.00	13440.00	-	-	300	2 years	Grassland	0.36	0.50	B	mini FACE	Arrhenatherum elatius L.,Poa pratensis L.	9	warming
Dijkstra et al. 2010	USA	4	4	12	14.13	17.59	400	780	380	150 days	Grassland	0.22	0.17	C	Greenhouse	Artemisia frigida	-	
Dijkstra et al. 2010	USA	4	4	12	17.74	14.66	400	780	380	150 days	Grassland	-0.19	0.17	C	Greenhouse	Bouteloua gracilis	-	
Dijkstra et al. 2010	USA	4	4	12	13.43	11.71	400	780	380	150 days	Grassland	-0.14	0.17	C	Greenhouse	Linaria dalmatica	-	
Dijkstra et al. 2010	USA	4	4	12	16.58	18.20	400	780	380	150 days	Grassland	0.09	0.17	C	Greenhouse	Pascopyrum smithii	-	
Dijkstra et al. 2010	USA	4	4	12	34.86	30.31	400	780	380	150 days	Grassland	-0.14	0.17	C	Greenhouse	Hesperostipa comata	-	
Dijkstra et al. 2010	USA	4	4	12	13.80	21.82	400	780	380	150 days	Grassland	0.46	0.17	C	Greenhouse	All 5 species combined	-	
Dijkstra et al. 2010	USA	4	4	12	20.00	25.77	400	780	380	150 days	Grassland	0.25	0.17	C	Greenhouse	Artemisia frigida	-	$+H_2O$
Dijkstra et al. 2010	USA	4	4	12	28.30	29.55	400	780	380	150 days	Grassland	0.04	0.17	C	Greenhouse	Bouteloua gracilis	-	$+H_2O$
Dijkstra et al. 2010	USA	4	4	12	16.15	13.45	400	780	380	150 days	Grassland	-0.18	0.17	C	Greenhouse	Linaria dalmatica	-	$+H_2O$
Dijkstra et al. 2010	USA	4	4	12	26.67	16.70	400	780	380	150 days	Grassland	-0.47	0.17	C	Greenhouse	Pascopyrum smithii	-	$+H_2O$
Dijkstra et al. 2010	USA	4	4	12	82.43	86.45	400	780	380	150 days	Grassland	0.05	0.17	C	Greenhouse	Hesperostipa comata	-	$+H_2O$
Dijkstra et al. 2010	USA	4	4	12	16.59	15.55	400	780	380	150 days	Grassland	-0.06	0.17	C	Greenhouse	All 5 species combined	-	$+H_2O$
Dijkstra et al., 2013	USA	5	5	2	23.32	35.33	384	600	216	5 years	Grassland	0.42	1.25	B	FACE	Pascopyrum smithii	0.5	without plant

Dijkstra et al., 2013	*USA*	*5*	*5*	*2*	*13.13*	*12.48*	*384*	*600*	*216*	*5 years*	*Grassland*	*-0.05*	*1.25*	*B*	*FACE*	*Pascopyrum smithii*	*0.5*	*warming and without plant*
Hall et al. 1998	*Scotland*	*5*	*5*	*3*	*642.63*	*205.57*	*450*	*720*	*270*	*14 days*	*Grassland*	*-1.14*	*0.83*	*B*	*Groth chamber*	*Lolium perenne L. Melinda*	*-*	*pH=5.9*
Hall et al. 1998	*Scotland*	*5*	*5*	*3*	*2313.37*	*1462.21*	*450*	*720*	*270*	*14 days*	*Grassland*	*-0.46*	*0.83*	*B*	*Groth chamber*	*Lolium perenne L. Melinda*	*-*	*pH=7.0*
Hall et al. 1998	*Scotland*	*5*	*5*	*3*	*3017.18*	*4534.18*	*450*	*720*	*270*	*14 days*	*Grassland*	*0.41*	*0.83*	*B*	*Groth chamber*	*Lolium perenne L. Melinda*	*-*	*pH=4.3*
Hungate et al., 1997	*USA*	*4*	*4*	*2*	*266.40*	*211.20*	*360*	*720*	*360*	*150 days*	*Grassland*	*-0.23*	*1.00*	*C*	*OTC*	*Avena barbata and Bromus hordeaceus*	*-*	
Hungate et al., 1997	*USA*	*4*	*4*	*2*	*1195.20*	*1029.60*	*360*	*720*	*360*	*150 days*	*Grassland*	*-0.15*	*1.00*	*C*	*OTC*	*Avena barbata and Bromus hordeaceus*	*20*	*N addition*
Ineson et al., 1998	*Switzerland*	*3*	*3*	*1*	*41040.00*	*51840.00*	*360*	*600*	*240*	*11 days*	*Grassland*	*0.23*	*1.50*	*B*	*FACE*	*Lolium perenne*	*14*	
Kammann et al., 2008	*Germany*	*3*	*3*	*3*	*247.12*	*567.12*	*370*	*463*	*93*	*8.7 years*	*Grassland*	*0.83*	*0.50*	*A*	*FACE*	*Arrhenatheretum elatioris Br.-Bl*	*4*	
Kanerva et al., 2007	*Finland*	*3*	*3*	*14*	*172.46*	*152.97*	*409*	530	121	*2 years*	*Grassland*	*-0.12*	*0.11*	*A*	*OTC*	*Agrostis capillaris L. and other 6 spiecies*	*-*	
Kanerva et al., 2007	*Finland*	*3*	*3*	*14*	*174.58*	*148.31*	*412*	527	115	*2 years*	*Grassland*	*-0.16*	*0.11*	*A*	*OTC*	*Agrostis capillaris L. and other 6 spiecies*	*-*	
Kettunen et al., 2005	*Finland*	*6*	*6*	*14*	*2115.68*	*2367.57*	*360*	720	360	*150 days*	*Grassland*	*0.11*	*0.21*	*C*	*Greenhouse*	*P. pratense*	*2*	
Kettunen et al., 2005	*Finland*	*6*	*6*	*14*	*2564.46*	*2353.57*	*360*	720	360	*150 days*	*Grassland*	*-0.09*	*0.21*	*C*	*Greenhouse*	*P. pratense*	*6*	
Kettunen et al., 2005	*Finland*	*6*	*6*	*14*	*2115.68*	*1837.92*	*360*	720	360	*150 days*	*Grassland*	*-0.14*	*0.21*	*C*	*Greenhouse*	*P. pratense*	*10*	
Kettunen et al., 2006	*Finland*	*8*	*8*	*14*	*4195.69*	*5209.04*	*360*	720	360	*150 days*	*Grassland*	*0.22*	*0.29*	*C*	*Growth chamber*	*Phleum pratense*	*60*	*peat soil, same watering*
Kettunen et al., 2006	*Finland*	*9*	*9*	*14*	*2619.58*	*2102.80*	*360*	720	360	*150 days*	*Grassland*	*-0.22*	*0.32*	*C*	*Growth chamber*	*Phleum pratense*	*80*	*sandy soil, same watering*
Kettunen et al., 2006	*Finland*	*8*	*8*	*14*	*8644.40*	*6504.70*	*360*	720	360	*150 days*	*Grassland*	*-0.28*	*0.29*	*C*	*Growth chamber*	*Phleum pratense*	*60*	*peat soil, same moisture*
Kettunen et al., 2006	*Finland*	*9*	*9*	*14*	*1465.76*	*3017.96*	*360*	720	360	*150 days*	*Grassland*	*0.72*	*0.32*	*C*	*Growth chamber*	*Phleum pratense*	*80*	*sandy soil, same moisture*

Kettunen et al., 2007a	Finland	9	9	14	2301.37	2210.17	360	720	360	150 days	Grassland	-0.04	0.32	C	Greenhouse	Phleum pratense/Trifolium	15	
Kettunen et al., 2007a	Finland	9	9	14	2929.02	1807.84	360	720	360	150 days	Grassland	-0.48	0.32	C	Greenhouse	Phleum pratense/Trifolium	30	
Kettunen et al., 2007b	Finland	6	6	14	2841.90	3570.53	360	720	360	150 days	Grassland	0.23	0.21	C	Greenhouse	Phleum pratense	15	
Kettunen et al., 2007b	Finland	6	6	14	3363.79	2802.45	360	720	360	150 days	Grassland	-0.18	0.21	C	Greenhouse	Phleum pratense	30	
Kettunen et al., 2007b	Finland	6	6	14	4319.52	3998.78	360	720	360	150 days	Grassland	-0.08	0.21	C	Greenhouse	Phleum pratense	45	
Larsen et al., 2011	Denmark	6	6	7	43.84	139.73	380	510	130	1 year	Grassland	1.16	0.43	A	FACE	the evergreen dwarf shrub Calluna vulgaris (L.) the	-	warming
Larsen et al., 2011	Denmark	6	6	7	90.41	90.41	380	510	130	1 year	Grassland	0.00	0.43	A	FACE	the evergreen dwarf shrub Calluna vulgaris (L.) the	-	warming and drought
Larsen et al., 2011	Denmark	6	6	7	84.93	65.75	380	510	130	1 year	Grassland	-0.26	0.43	A	FACE	the evergreen dwarf shrub Calluna vulgaris (L.) the	-	
Larsen et al., 2011	Denmark	6	6	7	76.71	82.19	380	510	130	1 year	Grassland	0.07	0.43	A	FACE	the evergreen dwarf shrub Calluna vulgaris (L.) the	-	drought
Moiser et al., 2002	USA	3	3	1	40.80	40.80	370	720	350	1 year	Grassland	0.00	1.50	C	OTC	native shortgrass steppe (over 25 species)	0.5	
Moser et al., 2018	Germany	3	3	3	48496.14	139473.68	380	456	76	266 days	Grassland	1.06	0.50	A		Arrhenaterum elatius, Galium album and Geranium	-	
Niboyet et al. 2011	USA	4	4	12	73.02	62.50	380	680	300	210 days	Grassland	-0.16	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	-	burned
Niboyet et al. 2011	USA	4	4	12	57.31	69.60	380	680	300	210 days	Grassland	0.19	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	-	burned, increased precipitation
Niboyet et al. 2011	USA	4	4	12	93.86	228.74	380	680	300	210 days	Grassland	0.89	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	7	burned, N addition,
Niboyet et al. 2011	USA	4	4	12	112.40	132.35	380	680	300	210 days	Grassland	0.16	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	7	burned, N addition, increased precipitation
Niboyet et al. 2011	USA	4	4	12	37.12	25.99	380	680	300	210 days	Grassland	-0.36	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	-	
Niboyet et al. 2011	USA	4	4	12	27.62	40.53	380	680	300	210 days	Grassland	0.38	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	-	increased precipitation

Niboyet et al. 2011	USA	4	4	12	27.72	29.47	380	680	300	210 days	Grassland	0.06	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	7	N addition
Niboyet et al. 2011	USA	4	4	12	26.41	43.69	380	680	300	210 days	Grassland	0.50	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	7	N addition, increased precipitation
Niboyet et al. 2011	USA	4	4	12	30.97	56.97	380	680	300	210 days	Grassland	0.61	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	-	warming
Niboyet et al. 2011	USA	4	4	12	15.06	25.92	380	680	300	210 days	Grassland	0.54	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	-	increased precipitation, warming
Niboyet et al. 2011	USA	4	4	12	51.93	38.05	380	680	300	210 days	Grassland	-0.31	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	7	N addition, warming
Niboyet et al. 2011	USA	4	4	12	55.98	47.32	380	680	300	210 days	Grassland	-0.17	0.17	B	FACE	Avena barbata, Bromus hordeaceus, Geranium	7	increased precipitation, N addition, warming
Rütting et al., 2010	New Zealand	6	6	1	560.24	602.53	380	475	95	150 days	Grassland	0.07	3.00	A	FACE		-	
Bhattacharyya et al., 2013	India	2	2	1	744.68	914.89	394	550	156	98 days	Cropland	0.21	1.00	B	OTC	Rice	10	
Cheng et al. 2006	Japan	3	3	1	135.34	121.05	414.5	743	328.5	134 days	Cropland	-0.07	1.50	C	Groth chamber	Rice		pH=4.3
Daripa et al., 2014	India	3	3	1	0.65	0.75	385	550	165	5 months	Cropland	0.14	1.50	B	OTC	Maize	12	
Decock et al., 2012	USA	4	4	2	0.01	0.00	360	550	190	2 years	Cropland	-0.73	1.00	B	FACE	Maize and soybean	16	
Decock et al., 2012	USA	4	4	2	0.00	0.01	360	550	190	2 years	Cropland	0.39	1.00	B	FACE	Maize and soybean	16	O_3
Lam et al., 2011	China	36	36	3	576.00	921.60	420	565	145	150 days	Cropland	0.47	6.00	A	FACE	Wheat (Triticum aestivum L. cv. Zhongmai 175)	16	conservation till
Lam et al. 2013	Australia	4	4	2	28.00	53.00	390	550	160	4 months	Cropland	0.64	1.00	B	FACE	Wheat	10	
Lam et al. 2013	Australia	4	4	2	16.00	37.00	390	550	160	4 months	Cropland	0.84	1.00	B	FACE	Wheat	10	irrigation
Li et al., 2013	China	4	4	3	0.36	0.51	415	550	135	2 years	Cropland	0.36	0.67	A	FACE	Winter Wheat	18.8	
Li et al., 2016	China	3	3	3	1044.00	1749.60	400	550	150	1 crop season	Cropland	0.52	0.50	A	OTC	Wheat	18.8	

Martin-Olmedo et al. 2002	*Scotland*	*4*	*4*	*1*	*823.56*	*943.56*	*369*	*716*	*347*	*25 days*	*Cropland*	*0.14*	*2.00*	*C*	*Groth chamber*	*Barley*		
Pereira et al., 2013	*Portugal*	*3*	*3*	*1*	*670.56*	*899.53*	*375*	550	175	*2 years*	*Cropland*	*0.29*	*1.50*	*B*	*OTC*	*Rice*	*11*	*warming*
Pleijel et al., 1998	*Sweden*	*3*	*3*	*1*	*43.84*	*38.95*	*350*	700	350	*150 days*	*Cropland*	*-0.12*	*1.50*	*C*	*OTC*	*Spring wheat*	*11*	
Smith et al., 2010	*USA*	*3*	*3*	*2*	*39270.00*	*52240.00*	*375*	683	308	*10 years*	*Cropland*	*0.29*	*0.75*	*C*	*OTC*	*sorghum and soybean*	*27.04*	
Smith et al., 2010	*USA*	*3*	*3*	*2*	*19890.00*	*126000.00*	*375*	683	308	*10 years*	*Cropland*	*1.85*	*0.75*	*C*	*OTC*	*crimson clover, sorghum, sunn hemp, wheat and soybean*	*27.04*	*conventional till*
Wang et al., 2018	*China*	*3*	*3*	*2*	*1434.81*	*3287.86*	-	-	60	*2 years*	*Cropland*	*0.83*	*0.75*	*A*	*FACE*	*Riice*	*18*	
Wang et al., 2018	*China*	*3*	*3*	*2*	*1467.44*	*2178.78*	-	-	60	*2 years*	*Cropland*	*0.40*	*0.75*	*A*	*FACE*	*Riice*	*18*	*warming*
Welzmiller et al., 2008	*USA*	*4*	*4*	*2*	*159.04*	*258.70*	*370*	550	180	*2 years*	*Cropland*	*0.49*	*1.00*	*B*	*FACE*	*sorghum*	*27.2*	
Welzmiller et al., 2008	*USA*	*4*	*4*	*2*	*85.15*	*74.34*	*370*	550	180	*2 years*	*Cropland*	*-0.14*	*1.00*	*B*	*FACE*	*sorghum*	*27.2*	*irrigation*
Ambus and Robertson 1999	*USA*	*5*	*5*	*3*	*7.61*	*8.59*	*350*	*700*	350	*150 days*	*Forest*	*0.12*	*0.83*	*C*	*OTC*	*Populus tremuloides Michx.*	-	*unfertile soil*
Ambus and Robertson 1999	*USA*	*5*	*5*	*3*	*15.19*	*15.16*	*350*	*700*	350	*150 days*	*Forest*	*0.00*	*0.83*	*C*	*OTC*	*Populus tremuloides Michx.*	-	*fertile soil*
Carnol et al. 2002	*Germany*	*5*	*5*	*1*	*7.90*	*11.00*	*350*	*750*	*400*	*4 year*	*Forest*	*0.33*	*2.50*	*C*	*OTC*	*Scots pine*	-	
Hagedorn et al. 2000	*Switzerland*	*4*	*4*	*4*	*21.15*	*23.62*	*370*	*570*	*200*	*1 growing season*	*Forest*	*0.11*	*0.50*	*B*	*OTC*	*Fagus sylvatica / Picea abies*	-	*acidic loam*
Hagedorn et al. 2000	*Switzerland*	*4*	*4*	*4*	*24.93*	*26.93*	*370*	*570*	*200*	*1 growing season*	*Forest*	*0.08*	*0.50*	*B*	*OTC*	*Fagus sylvatica / Picea abies*	-	*acidic loam*
Hagedorn et al. 2000	*Switzerland*	*4*	*4*	*4*	*38.38*	*40.99*	*370*	*570*	*200*	*1 growing season*	*Forest*	*0.07*	*0.50*	*B*	*OTC*	*Fagus sylvatica / Picea abies*	-	*calcareous sand*
Hagedorn et al. 2000	*Switzerland*	*4*	*4*	*4*	*71.34*	*56.47*	*370*	*570*	*200*	*1 growing season*	*Forest*	*-0.23*	*0.50*	*B*	*OTC*	*Fagus sylvatica / Picea abies*	-	*calcareous sand*
Martins et al., 2016	*Australia*	*6*	*6*	*5*	*16.45*	*19.87*	*400*	600	200	*9 month*	*Forest*	*-0.11*	*0.60*	*B*	*Growth chamber*	*Eucalyptus*	-	*rosemary soil*

Martins et al., 2016	*Australia*	*6*	*6*	*5*	*7.74*	*26.52*	*400*	600	200	*9 month*	*Forest*	*1.23*	*0.60*	*B*	*Growth chamber*	*Eucalyptus*	-	*rosemary soil, warming*
Martins et al., 2016	*Australia*	*6*	*6*	*5*	*50.81*	*5.52*	*400*	600	200	*9 month*	*Forest*	*-2.22*	*0.60*	*B*	*Growth chamber*	*Eucalyptus*	-	*camerons soil, warming*
Martins et al., 2016	*Australia*	*6*	*6*	*5*	*101.65*	*47.52*	*400*	600	200	*9 month*	*Forest*	*-0.76*	*0.60*	*B*	*Growth chamber*	*Eucalyptus*	-	*driftway soil*
Martins et al., 2016	*Australia*	*6*	*6*	*5*	*138.10*	*177.87*	*400*	600	200	*9 month*	*Forest*	*0.25*	*0.60*	*B*	*Growth chamber*	*Eucalyptus*	-	*driftway soil, warming*
Phillips et al., 2001	*USA*	*3*	*3*	*3*	*18.00*	*20.00*	*365*	560	195	*2 years*	*Forest*	*0.11*	*0.50*	*B*	*OTC*	*loblolly pine (Pinus taeda L.)*	-	
Sun et al., 2017	*China*	*3*	*3*	*1*	*31.47*	*51.14*	-	-	180	*10 years*	*Forest*	*0.49*	*1.50*	*B*	*OTC*	*oak*	-	

NOTE: we categorized elevated CO_2 (dC) into three groups. A means $0<dC \leqslant 150$, B means $150<dC \leqslant 300$ and C means $300<dC \leqslant 450$.
n_{site} was the number of observations from the same site

Data set 2. Elevated temperature studies reporting N_2O emissions that were used in the meta-analysis

Citation	Site location	n (ambient temperature)	n (elevated temperature)	n_{site}	mean (ambient temperature, $\mu g\ N_2O\text{-}N\ m^{-2}\ day^{-1}$)	mean (elevated temperature, $\mu g\ N_2O\text{-}N\ m^{-2}\ day^{-1}$)	dT (℃)	Duration	Land use type	lnRT	Weght	Group	Species	N fertilizer ($g\ m^{-2}$)	Other Treatment
Bijoor et al., 2008	USA	3	3	2	16.80	32.60	3.5	16 months	Grassland	0.19	0.33	>2	Cool season: C_3, Schedonorus phoenix (Scop.) Holub.Warm Season: C_4 Digitaria Haller	-	
Bijoor et al., 2008	USA	3	3	2	11.40	16.30	3.5	16 months	Grassland	0.10	0.33	>2	Cool season: C_3, Schedonorus phoenix (Scop.) Holub.Warm Season: C_4 Digitaria Haller	-	N addition
Brown et al., 2012	USA	6	6	4	1.76	1.54	0.9	6 years	Grassland	-0.15	0.08	⩽2	Avena barbata, Avena fatua, Bromus hordeaceus, and Lolium multiflorum	-	
Brown et al., 2012	USA	6	6	4	2.82	1.52	0.9	6 years	Grassland	-0.69	0.08	⩽2	Avena barbata, Avena fatua, Bromus hordeaceus, and Lolium multiflorum	-	elevated precipitation
Brown et al., 2012	USA	6	6	4	2.11	0.86	0.9	6 years	Grassland	-1.00	0.08	⩽2	Avena barbata, Avena fatua, Bromus hordeaceus, and Lolium multiflorum	7	N addition
Brown et al., 2012	USA	6	6	4	2.83	3.94	0.9	6 years	Grassland	0.37	0.08	⩽2	Avena barbata, Avena fatua, Bromus hordeaceus, and Lolium multiflorum	7	elevated precipitation and N addition
Cantarel et al., 2011	French	5	5	1	195.84	275.52	3.5	2 years	Grassland	0.10	0.40	>2	Festuca arundinaceae, Elytrigia repens, Poa pratensis	-	
Carter et al., 2011	Denmark	6	6	7	80.88	83.04	0.39	14 months	Grassland	0.07	0.05	⩽2	Calluna vulgaris (L.), Deschampsia flexuosa (L.)	1.25	
Carter et al., 2011	Denmark	6	6	7	77.76	140.16	0.39	14 months	Grassland	1.51	0.05	⩽2	Calluna vulgaris (L.), Deschampsia flexuosa (L.)	1.25	CO_2 enrichment
Carter et al., 2011	Denmark	6	6	7	98.16	79.92	0.39	14 months	Grassland	-0.53	0.05	⩽2	Calluna vulgaris (L.), Deschampsia flexuosa (L.)	1.25	drought
Chen et al., 2017	China	3	3	2	27040.00	197360.00	4	4 years	Grassland	0.50	0.33	>2	Kobresia pygmaea, Kobresia humilis and Kobresia capillifolia	-	

Chen et al., 2017	China	3	3	2	40080.00	289280.00	4	4 years	Grassland	0.49	0.33	>2	Kobresia pygmaea, Kobresia humilis and Kobresia capillifolia	4	N addition
Deltedesco et al., 2019	Austria	7	3	4	34.32	6.00	1.5	3 years	Grassland	-1.16	0.53	⩽2	Arrhenatherum elatius L.,Poa pratensis L.	9	
Deltedesco et al., 2019	Austria	7	3	4	34.32	9.36	3	3 years	Grassland	-0.43	0.53	>2	Arrhenatherum elatius L.,Poa pratensis L.	9	
Deltedesco et al., 2019	Austria	3	2	4	9.60	17.04	1.5	3 years	Grassland	0.38	0.30	⩽2	Arrhenatherum elatius L.,Poa pratensis L.	9	CO_2 enrichment
Deltedesco et al., 2019	Austria	3	6	4	21.60	13.44	3	3 years	Grassland	-0.16	0.50	>2	Arrhenatherum elatius L.,Poa pratensis L.	9	CO_2 enrichment
Dijkstra et al., 2013	USA	5	5	2	23.32	13.13	1.9	4 years	Grassland	-0.30	0.20	⩽2		0.5	without plant
Dijkstra et al., 2013	USA	5	5	2	35.33	12.48	1.9	4 years	Grassland	-0.55	0.20	⩽2	Bouteloua gracilis, Pascopyrum smithii and Hesperostipa comata	0.5	CO_2 enrichment
Gong et al., 2019	Canada	4	4	2	1200.00	1008.00	0.8	2 years	Grassland	-0.22	0.25	⩽2	Trichophorum cespitosum, Carex chordorrhiza	-	
Gong et al., 2019	Canada	4	4	2	1337.89	843.05	1.2	2 years	Grassland	-0.38	0.25	⩽2	Trichophorum cespitosum, Carex chordorrhiza	6.4	N addition
Hu et al., 2010	China	8	8	9	2421.60	3290.40	1.8	3 years	Grassland	0.17	0.03	⩽2	Kobresia humilis,Festuca ovina,Elymusnutans	-	befor grazing
Hu et al., 2010	China	4	4	9	804.00	924.00	1.8	3 years	Grassland	0.08	0.06	⩽2	Kobresia humilis,Festuca ovina,Elymusnutans	-	No grazing
Hu et al., 2010	China	4	4	9	900.00	900.00	1.8	3 years	Grassland	0.00	0.06	⩽2	Kobresia humilis,Festuca ovina,Elymusnutans	-	grazing
Hu et al., 2010	China	4	4	9	115.20	136.80	1.8	3 years	Grassland	0.10	0.06	⩽2	Kobresia humilis,Festuca ovina,Elymusnutans	-	growing season, No grazing

Hu et al., 2010	China	4	4	9	170.40	182.40	1.8	3 years	Grassland	0.04	0.06	⩽2	Kobresia humilis,Festuca ovina,Elymusnutans	-	growing season, Grazing
Hu et al., 2010	China	4	4	9	79.20	4.80	3	3 years	Grassland	-0.93	0.06	>2	Kobresia humilis,Festuca ovina,Elymusnutans	-	no growing season,No grazing
Hu et al., 2010	China	4	4	9	132.00	12.00	3	3 years	Grassland	-0.80	0.06	>2	Kobresia humilis,Festuca ovina,Elymusnutans	-	no growing season, grazing
Kamp et al., 1998	German	5	5	2	715.35	745.16	2.9	20 months	Grassland	0.01	0.20	>2	Phacelia tanacetifolia	10	
Larson et al., 2011	Denmark	6	6	7	84.93	43.84	0.76	2 years	Grassland	-0.87	0.05	⩽2	the evergreen dwarf shrub Calluna vulgaris (L.), the perennial grass Deschampsia flexuosa (L.)	-	
Larson et al., 2011	Denmark	6	6	7	76.71	90.41	0.76	2 years	Grassland	0.22	0.05	⩽2	the evergreen dwarf shrub Calluna vulgaris (L.), the perennial grass Deschampsia flexuosa (L.)	-	drought
Larson et al., 2011	Denmark	6	6	7	65.75	139.73	0.76	2 years	Grassland	0.99	0.05	⩽2	the evergreen dwarf shrub Calluna vulgaris (L.), the perennial grass Deschampsia flexuosa (L.)	-	CO_2 enrichment
Larson et al., 2011	Denmark	6	6	7	82.19	90.41	0.76	2 years	Grassland	0.13	0.05	⩽2	the evergreen dwarf shrub Calluna vulgaris (L.), the perennial grass Deschampsia flexuosa (L.)	-	CO_2 enrichment and drought
Martins et al., 2016	Australia	6	6	5	22.10	7.74	1.07	9 months	Grassland	-0.98	0.07	⩽2	Eucalyptus tereticornis	-	Armidale R
Martins et al., 2016	Australia	6	6	5	19.87	26.45	2.58	9 months	Grassland	0.11	0.07	>2	Eucalyptus tereticornis	-	CO_2 enrichment, Armidale R
Martins et al., 2016	Australia	6	6	5	57.45	5.52	2.15	9 months	Grassland	-1.09	0.07	>2	Eucalyptus tereticornis	-	CO_2 enrichment, Armidale C
Martins et al., 2016	Australia	6	6	5	101.65	138.10	1.07	9 months	Grassland	0.29	0.07	⩽2	Eucalyptus tereticornis	-	Richmond D
Martins et al., 2016	Australia	6	6	5	47.52	177.87	2.58	9 months	Grassland	0.51	0.07	>2	Eucalyptus tereticornis	-	CO_2 enrichment, Richmond D

Shi et al., 2012	China	5	5	2	47040.00	68640.00	1	3 months	Grassland	0.38	0.20	⩽2	Elymus nutans, Deschampsia cespitosa, and Festuca ovina	-	
Shi et al., 2012	China	5	5	2	19680.00	25440.00	1	3 months	Grassland	0.26	0.20	⩽2	Elymus nutans, Deschampsia cespitosa, and Festuca ovina	-	drying
Voigt et al., 2017	Russia	5	5	1	0.46	0.62	0.95	2 years	Grassland	0.31	0.40	⩽2	Ledum decumbens and Rubus chamaemorus L.	-	
Wang et al, 2011	China	6	6	2	0.00	0.00	1.3	15 months	Grassland	0.23	0.17	⩽2	Stipa breviflora Griseb., Artemisia frigida Willd and Cleistogenes songorica (Roshev.) Ohwi	-	
Wang et al, 2011	China	6	6	2	0.00	0.00	1.3	15 months	Grassland	0.01	0.17	⩽2	Stipa breviflora Griseb., Artemisia frigida Willd and Cleistogenes songorica (Roshev.) Ohwi	10	N addition
Wang et al., 2018b	China	10	10	1	56.40	56.40	1.65	2 years	Grassland	0.00	0.20	>2	Stipa purpurea and Carex duriuscula subsp. Stenophylloides	-	
Ward et al., 2013	England	4	4	2	158880.00	47760.00	0.46	1 year	Grassland	-2.61	0.25	⩽2	C. vulgaris, Hypnum jutlandicum Holm. & Warncke	-	
Ward et al., 2013	England	4	4	2	240480.00	329520.00	0.46	1 year	Grassland	0.68	0.25	⩽2		-	without plant
Zhao et al., 2017	China	3	3	2	61440.00	1680.00	2	1 year	Grassland	-1.80	0.33	⩽2	Kobresia capillifolia	-	
Zhao et al., 2017	China	3	3	2	69192.00	51432.00	2	1 year	Grassland	-0.15	0.33	⩽2	Kobresia capillifolia	0.8	N addition
Zhu et al., 2015	China	4	4	3	58.32	60.72	1.3	5 years	Grassland	0.03	0.17	⩽2	Kobresia humilis, Festuca ovina, and Elymus nutans	-	no grazing and no fertilization
Zhu et al., 2015	China	4	4	3	71.28	103.92	1.3	3 years	Grassland	0.29	0.17	⩽2	Kobresia humilis, Festuca ovina, and Elymus nutans	4	no grazing N addition
Zhu et al., 2015	China	4	4	3	89.76	109.20	1.3	5 years	Grassland	0.15	0.17	⩽2	Kobresia humilis, Festuca ovina, and Elymus nutans	-	grazing and no fertilization

Zhu et al., 2015	*China*	*4*	*4*	*9*	*99.12*	*129.60*	*1.3*	*3 years*	*Grassland*	*0.21*	*0.06*	*⩽2*	*Kobresia humilis, Festuca ovina, and Elymus nutans*	*4*	*grazing and N addition*
Bamminger et al., 2014	*German*	*4*	*4*	*2*	*68.38*	*78.36*	*2.5*	*2 years*	*Cropland*	*0.05*	*0.25*	*>2*	*Rapeseed and wheat*	*7*	
Bamminger et al., 2014	*German*	*4*	*4*	*2*	*62.95*	*104.52*	*2.5*	*2 years*	*Cropland*	*0.20*	*0.25*	*>2*	*Rapeseed and wheat*	*7*	*biochar addition*
Hantschel et al., 1995	*German*	*5*	*5*	*1*	*314.86*	*78.38*	*3*	*1 yeat*	*Cropland*	*-0.46*	*0.40*	*>2*	*Wheat*	*-*	
Hu et al., 2013	*China*	*3*	*3*	*3*	*887.28*	*1040.88*	*2.2*	*4 months*	*Cropland*	*0.07*	*0.22*	*>2*	*Soybean*	*-*	
Hu et al., 2019	*China*	*3*	*3*	*3*	*643.01*	*647.12*	*2*	*3 years*	*Cropland*	*0.00*	*0.22*	*⩽2*	*Wheat and soybean*	*-*	*rainfall redution*
Hu et al., 2019	*China*	*3*	*3*	*3*	*643.01*	*590.59*	*2*	*3 years*	*Cropland*	*-0.04*	*0.22*	*⩽2*	*Wheat and soybean*	*-*	*rainfall redution*
Kamp et al., 1998	*German*	*5*	*5*	*2*	*1192.25*	*1132.64*	*2.9*	*21 months*	*Cropland*	*-0.02*	*0.20*	*>2*	*Wheat*	*0.8*	
Li et al., 2019	*China*	*3*	*3*	*4*	*236.30*	*388.96*	*2*	*3 years*	*Cropland*	*0.25*	*0.17*	*⩽2*	*Wheat and maize*	*12*	
Li et al., 2019	*China*	*3*	*3*	*4*	*531.37*	*662.77*	*2*	*3 years*	*Cropland*	*0.11*	*0.17*	*⩽2*	*Wheat and maize*	*12*	*high irrigation*
Liu et al., 2016	*China*	*3*	*3*	*4*	*243.81*	*270.48*	*1.5*	*5 years*	*Cropland*	*0.07*	*0.17*	*⩽2*	*Wand soybean*	*-*	
Liu et al., 2016	*China*	*3*	*3*	*4*	*556.19*	*323.81*	*1.5*	*5 years*	*Cropland*	*-0.36*	*0.17*	*⩽2*	*Wand soybean*	*31.5*	*N addition*
Patil et al., 2010	*Denmark*	*2*	*2*	*1*	*18.18*	*59.09*	*5*	*11 months*	*Cropland*	*0.24*	*1.00*	*>2*	*Wheat*	*17*	

Pereira et al., 2013	Portugal	3	3	1	898.38	898.28	2	2 years	Cropland	0.00	0.67	⩽2	Rice	11	
Qiu et al., 2018	USA	3	3	1	326.14	823.53	3.6	3 months	Cropland	0.26	0.67	>2	Soybean	-	
Tu et al., 2017	China	4	4	2	908.75	1005.14	1.7	3 years	Cropland	0.06	0.25	⩽2	Winter wheat	28.5	Convential tillage
Tu et al., 2017	China	4	4	2	886.39	765.09	1.4	3 years	Cropland	-0.11	0.25	⩽2	Winter wheat	28.5	No tillage
Xu et al., 2016	China	4	4	2	142.86	164.84	3.3	100 days	Cropland	0.04	0.25	>2	Vegetables such as cucumber cabbages and tomatoes	-	
Xu et al., 2016	China	4	4	2	2923.08	2054.95	3.3	100 days	Cropland	-0.11	0.25	>2	Vegetables such as cucumber cabbages and tomatoes	40	N addition
Wang et al., 2018a	China	3	3	2	1550.29	1587.35	2	2 years	Cropland	0.01	0.33	⩽2	Rice	-	
Wang et al., 2018a	China	3	3	2	3551.47	2359.41	2	2 years	Cropland	-0.20	0.33	⩽2	Rice	-	CO_2 enrichment
Cui et al., 2018	China	3	3	2	184.56	189.36	0.6	3 years	Forest	0.04	0.33	⩽2	B. fruticosa	-	
Cui et al., 2018	China	3	3	2	44.88	68.16	0.6	3 years	Forest	0.70	0.33	⩽2	L. palustre	-	
Laine et al., 2019	Finland	5	5	6	2400.00	4800.00	1.4	144 days	Forest	0.50	0.07	⩽2	Carex nigra, C. canescens,Comarum palustre, Equisetum	-	undrained
Laine et al., 2019	Finland	5	5	6	4800.00	4800.00	1.4	144 days	Forest	0.00	0.07	⩽2	Carex nigra, C. canescens,Comarum palustre, Equisetum	-	undrained
Laine et al., 2019	Finland	5	5	6	4800.00	7200.00	1.4	144 days	Forest	0.29	0.07	⩽2	Vaccinium uliginosum, V. vitis-idaea, Salix repens	-	drained

Laine et al., 2019	*Finland*	*5*	*5*	*6*	*4800.00*	*7200.00*	*1.4*	*144 days*	*Forest*	*0.29*	*0.07*	*⩽2*	*Vaccinium uliginosum, V. vitis-idaea, Salix repens*	*-*	*drained*
Laine et al., 2019	*Finland*	*5*	*5*	*6*	*4800.00*	*4800.00*	*1.4*	*144 days*	*Forest*	*0.00*	*0.07*	*⩽2*	*Salix repens*	*-*	*restored*
Laine et al., 2019	*Finland*	*5*	*5*	*6*	*7200.00*	*4800.00*	*1.4*	*144 days*	*Forest*	*-0.29*	*0.07*	*⩽2*	*Salix repens*	*-*	*restored*
Martins et al., 2017	*USA*	*3*	*3*	*4*	*12.84*	*52.00*	*3.4*	*6 month*	*Forest*	*0.41*	*0.17*	*>2*	*Pine, spruce and other species*	*-*	*Cloquet, Closed canopy*
Martins et al., 2017	*USA*	*3*	*3*	*4*	*42.39*	*96.39*	*3.4*	*6 month*	*Forest*	*0.24*	*0.17*	*>2*	*Pine, spruce and other species*	*-*	*Cloquet, open canopy*
Martins et al., 2017	*USA*	*3*	*3*	*4*	*58.87*	*39.68*	*3.4*	*6 month*	*Forest*	*-0.12*	*0.17*	*>2*	*Pine, spruce and other species*	*-*	*Cloquet, open canopy, reduced rainfall*
Martins et al., 2017	*USA*	*3*	*3*	*4*	*88.33*	*40.87*	*3.4*	*6 month*	*Forest*	*-0.23*	*0.17*	*>2*	*Pine, spruce and other species*	*-*	*Ely, open canopy, reduced rainfall*
McHale ET AL.., 1998	*USA*	*6*	*6*	*3*	*59.28*	*56.16*	*2.5*	*2 years*	*Forest*	*-0.02*	*0.11*	*>2*	*American beech and red maple*	*-*	
McHale ET AL.., 1998	*USA*	*6*	*6*	*3*	*59.28*	*131.88*	*5*	*2 years*	*Forest*	*0.16*	*0.11*	*>2*	*American beech and red maple*	*-*	
McHale ET AL.., 1998	*USA*	*6*	*6*	*3*	*59.28*	*77.40*	*7.5*	*2 years*	*Forest*	*0.04*	*0.11*	*>2*	*American beech and red maple*	*-*	

NOTE: n_{site} was the number of observations from the same site

Data set 3. The combination of elevated CO_2 and warming studies reporting N_2O emissions that were used in the meta-analysis

Citation	Site location	n (ambient CO_2)	n (elevated CO_2)	n_{site}	mean (ambient CO_2, $\mu g\ N_2O\text{-}N\ m^{-2}\ day^{-1}$)	mean (elevated CO_2, $\mu g\ N_2O\text{-}N\ m^{-2}\ day^{-1}$)	dT (℃)	ambient CO_2 concentration (p.p.m.v.)	elevated CO_2 concentration (p.p.m.v.)	dCO_2 (p.p.m.v.)	Duration	Land use tpe	lnR	Weight	Experiental conditions	Species	N fertilizer ($g\ m^{-2}$)	Other Treatment
Bhattacharyya et al., 2013	India	2	2	1	744.68	914.89	2	394	550	156	98 days	Cropland	0.21	1	OTC	Rice	10	
Carter et al., 2011	Denmark	6	6	3	80.88	140.16	0.39	380	510	130	1.25 year	Grassland	0.25	1	FACE	Calluna vulgaris (L.), Deschampsia flexuosa (L.) and	1.25	warming and drought
Deltedesco et al., 2019	Austria	7	2	4	34320.00	17040.00	1.5	-	-	150	3 years	Grassland	-0.70	0.39	mini FACE	Arrhenatherum elatius L.,Poa pratensis L.	9	
Deltedesco et al., 2019	Austria	2	6	4	17040.00	13440.00	1.5	-	-	150	3 years	Grassland	-0.24	0.38	mini FACE	Arrhenatherum elatius L.,Poa pratensis L.	9	
Deltedesco et al., 2019	Austria	3	6	4	9600.00	13440.00	3	-	-	150	3 years	Grassland	0.34	0.5	mini FACE	Arrhenatherum elatius L.,Poa pratensis L.	9	
Deltedesco et al., 2019	Austria	3	6	4	6000.00	13440.00	1.5	-	-	300	3 years	Grassland	0.81	0.5	mini FACE	Arrhenatherum elatius L.,Poa pratensis L.	9	
Dijkstra et al., 2013	USA	5	5	1	23.32	12.48	1.9	384	600	216	5 year	Grassland	0.42	2.5	FACE	Arrhenatherum elatius L.,Poa pratensis L.	0.5	without plant
Larsen et al., 2011	Denmark	6	6	3	84.93	139.73	0.76	380	510	130	1 year	Grassland	0.50	1	FACE	Calluna vulgaris (L.), Deschampsia	-	
Larsen et al., 2011	Denmark	6	6	3	76.71	90.41	0.76	380	510	130	1 year	Grassland	0.16	1	FACE	Calluna vulgaris (L.), Deschampsia	-	drought
Martins et al., 2016	Australia	6	6	2	16.45	26.52	3	400	600	200	9 month	Forest	1.23	1.5	Growth chamber	Eucalyptus		rosemary soil
Martins et al., 2016	Australia	6	6	2	101.65	177.87	3	400	600	200	9 month	Forest	0.25	1.5	Growth chamber	Eucalyptus		driftway soil
Niboyet et al. 2011	USA	4	4	4	37.12	56.97	0.9	380	680	300	210 days	Grassland	0.61	0.5	FACE	Avena barbata, Bromus hordeaceus, Geranium dissectum		
Niboyet et al. 2011	USA	4	4	4	27.62	25.92	0.9	380	680	300	210 days	Grassland	0.54	0.5	FACE	Avena barbata, Bromus hordeaceus, Geranium dissectum		increased precipitation
Niboyet et al. 2011	USA	4	4	4	27.72	38.05	0.9	380	680	300	210 days	Grassland	-0.31	0.5	FACE	Avena barbata, Bromus hordeaceus, Geranium dissectum	7	N addition
Niboyet et al. 2011	USA	4	4	4	26.41	47.32	0.9	380	680	300	210 days	Grassland	-0.17	0.5	FACE	Avena barbata, Bromus hordeaceus, Geranium dissectum	7	increased precipitation and N
Pereira et al., 2013	Portugal	3	3	1	721.96	899.53	2	375	550	175	2 years	Cropland	0.29	1.5	OTC	Rice	11	
Wang et al., 2018	China	3.00	3.00	1	1434.81	2178.78	1.65	-	-	60.00	2 years	Cropland	0.40	1.5	FACE	Riice	18.00	

NOTE: n_{site} was the number of observations from the same site