**Text S1-S4**

**Text S1:** The keywords and phrases used for the literature search.

The keywords and phrases used for the literature search were, 1) ‘warming’ or ‘temperature’ or ‘heat\*’ or ‘greenhouse’; and, 2) ‘biomass’ or ‘plant’ or ‘allocation’ or ‘root’ or ‘leaf’ or ‘stem’ or ‘photosynthe\*’ or ‘growth’ or ‘aboveground’ or ‘belowground’ or ‘respiration’ or ‘nitrogen’ or ‘soil’ or ‘carbon’ or ‘microb\*’.

**Text S2:** The list of 322 papers from which the data were extracted for this meta-analysis.

Abebe A, Pathak H, Singh SD, Bhatia A, Harit RC, Kumar V (2016) Growth, yield and quality of maize with elevated atmospheric carbon dioxide and temperature in north–west India. *Agriculture, Ecosystems & Environment,* **218**, 66-72.

Aerts R, Cornelissen JHC, Dorrepaal E (2006) Plant performance in a warmer world: general responses of plants from cold, northern biomes and the importance of winter and spring events. *Plant Ecology,* **182**, 66-72.

Albert KR, Ro-Poulsen H, Mikkelsen TN, Michelsen A, Van Der Linden L, Beier C (2011a) Effects of elevated CO2, warming and drought episodes on plant carbon uptake in a temperate heath ecosystem are controlled by soil water status. *Plant Cell Environ,* **34**, 1207-1222.

Albert KR, Ro-Poulsen H, Mikkelsen TN, Michelsen A, Van Der Linden L, Beier C (2011b) Interactive effects of elevated CO2, warming, and drought on photosynthesis of Deschampsia flexuosa in a temperate heath ecosystem. *J Exp Bot,* **62**, 4253-4266.

Allison SD, Mcguire KL, Treseder KK (2010) Resistance of microbial and soil properties to warming treatment seven years after boreal fire. *Soil Biology and Biochemistry,* **42**, 1872-1878.

Allison SD, Treseder KK (2008) Warming and drying suppress microbial activity and carbon cycling in boreal forest soils. *Global Change Biology,* **14**, 2898-2909.

Almagro M, Maestre FT, Martínez-López J, Valencia E, Rey A (2015) Climate change may reduce litter decomposition while enhancing the contribution of photodegradation in dry perennial Mediterranean grasslands. *Soil Biology and Biochemistry,* **90**, 214-223.

Ambebe TF, Dang Q-L, Marfo J (2009) Low soil temperature reduces the positive effects of high nutrient supply on the growth and biomass of white birch seedlings in ambient and elevated carbon dioxide concentrations. *Botany,* **87**, 905-912.

Ambebe TF, Dang QL (2009) Low moisture availability inhibits the enhancing effect of increased soil temperature on net photosynthesis of white birch (Betula papyrifera) seedlings grown under ambient and elevated carbon dioxide concentrations. *Tree Physiol,* **29**, 1341-1348.

An J, Han S, Chang H *et al.* (2017) Physiological and growth responses to experimental warmingin first-year seedlings of deciduous tree species. *Turkish Journal of Agriculture and Forestry,* **41**, 175-182.

Anadon-Rosell A, Ninot JM, Palacio S *et al.* (2017) Four years of experimental warming do not modify the interaction between subalpine shrub species. *Oecologia,* **183**, 1167-1181.

Andresen LC, Michelsen A, Ambus P, Beier C (2010a) Belowground heathland responses after 2 years of combined warming, elevated CO2 and summer drought. *Biogeochemistry,* **101**, 27-42.

Andresen LC, Michelsen A, Jonasson S, Schmidt IK, Mikkelsen TN, Ambus P, Beier C (2010b) Plant nutrient mobilization in temperate heathland responds to elevated CO2, temperature and drought. *Plant and Soil,* **328**, 381-396.

Arnold SS, Fernandez IJ, Rustad LE, Zibilske LM (1999) Microbial response of an acid forest soil to experimental soil warming. *Biology and Fertility of Soils,* **30**, 239-244.

Bai W, Wan S, Niu S *et al.* (2010) Increased temperature and precipitation interact to affect root production, mortality, and turnover in a temperate steppe: implications for ecosystem C cycling. *Global Change Biology,* **16**, 1306-1316.

Bamminger C, Poll C, Marhan S (2018) Offsetting global warming-induced elevated greenhouse gas emissions from an arable soil by biochar application. *Glob Chang Biol,* **24**, e318-e334.

Bamminger C, Poll C, Sixt C, Högy P, Wüst D, Kandeler E, Marhan S (2016) Short-term response of soil microorganisms to biochar addition in a temperate agroecosystem under soil warming. *Agriculture, Ecosystems & Environment,* **233**, 308-317.

Bannayan M, Tojo Soler CM, Garcia Y. Garcia A, Guerra LC, Hoogenboom G (2008) Interactive effects of elevated [CO2] and temperature on growth and development of a short- and long-season peanut cultivar. *Climatic Change,* **93**, 389-406.

Barnard R, Le Roux X, Hungate BA, Cleland EE, Blankinship JC, Barthes L, Leadley PW (2006) Several components of global change alter nitrifying and denitrifying activities in an annual grassland. *Functional Ecology,* **20**, 557-564.

Bassirirad H, Tissue DT, Reynolds JF, Chapin FS (1996) Response of Eriophorum vaginatum to CO2 enrichment at different soil temperatures: Effects on growth, root respiration and PO43- uptake kinetics. *New Phytologist,* **133**, 423-430.

Belay-Tedla A, Zhou X, Su B, Wan S, Luo Y (2009) Labile, recalcitrant, and microbial carbon and nitrogen pools of a tallgrass prairie soil in the US Great Plains subjected to experimental warming and clipping. *Soil Biology and Biochemistry,* **41**, 110-116.

Bergner B, Johnstone J, Treseder KK (2004) Experimental warming and burn severity alter soil CO2 flux and soil functional groups in a recently burned boreal forest. *Global Change Biology,* **10**, 1996-2004.

Biasi C, Meyer H, Rusalimova O *et al.* (2008) Initial effects of experimental warming on carbon exchange rates, plant growth and microbial dynamics of a lichen-rich dwarf shrub tundra in Siberia. *Plant and Soil,* **307**, 191-205.

Birgander J, Rousk J, Olsson PA (2017) Warmer winters increase the rhizosphere carbon flow to mycorrhizal fungi more than to other microorganisms in a temperate grassland. *Global Change Biology,* **23**, 5372-5382.

Bjork RG, Majdi H, Klemedtsson L, Lewis-Jonsson L, Molau U (2007) Long-term warming effects on root morphology, root mass distribution, and microbial activity in two dry tundra plant communities in northern Sweden. *New Phytol,* **176**, 862-873.

Black CK, Davis SC, Hudiburg TW, Bernacchi CJ, Delucia EH (2017) Elevated CO2 and temperature increase soil C losses from a soybean-maize ecosystem. *Glob Chang Biol,* **23**, 435-445.

Bloor JMG, Pichon P, Falcimagne R, Leadley P, Soussana J-F (2010) Effects of warming, summer drought, and CO2 enrichment on aboveground biomass production, flowering phenology, and community structure in an upland grassland ecosystem. *Ecosystems,* **13**, 888-900.

Boelman NT, Stieglitz M, Rueth HM, Sommerkorn M, Griffin KL, Shaver GR, Gamon JA (2003) Response of NDVI, biomass, and ecosystem gas exchange to long-term warming and fertilization in wet sedge tundra. *Oecologia,* **135**, 414-421.

Bokhorst S, Bjerke JW, Melillo J, Callaghan TV, Phoenix GK (2010) Impacts of extreme winter warming events on litter decomposition in a sub-Arctic heathland. *Soil Biology and Biochemistry,* **42**, 611-617.

Bokhorst S, Huiskes A, Convey P, Aerts R (2007) Climate change effects on organic matter decomposition rates in ecosystems from the Maritime Antarctic and Falkland Islands. *Global Change Biology,* **13**, 2642-2653.

Bracho R, Natali S, Pegoraro E *et al.* (2016) Temperature sensitivity of organic matter decomposition of permafrost-region soils during laboratory incubations. *Soil Biology and Biochemistry,* **97**, 1-14.

Bradford MA, Davies CA, Frey SD *et al.* (2008) Thermal adaptation of soil microbial respiration to elevated temperature. *Ecol Lett,* **11**, 1316-1327.

Briones MJI, Ostle NJ, Mcnamara NP, Poskitt J (2009) Functional shifts of grassland soil communities in response to soil warming. *Soil Biology and Biochemistry,* **41**, 315-322.

Bronson DR, Gower ST, Tanner M, Linder S, Van Herk I (2007) Response of soil surface CO2 flux in a boreal forest to ecosystem warming. *Global Change Biology,* **14**, 856-867.

Broughton KJ, Smith RA, Duursma RA, Tan DKY, Payton P, Bange MP, Tissue DT (2017) Warming alters the positive impact of elevated CO2 concentration on cotton growth and physiology during soil water deficit. *Funct Plant Biol,* **44**, 267-278.

Cai C, Yin X, He S *et al.* (2016) Responses of wheat and rice to factorial combinations of ambient and elevated CO2 and temperature in FACE experiments. *Glob Chang Biol,* **22**, 856-874.

Cao J, Ruan H (2015) Responses of the submerged macrophyte Vallisneria natans to elevated CO2 and temperature. *Aquatic Biology,* **23**, 119-127.

Carrera N, Barreal ME, Rodeiro J, Briones MJI (2011) Interactive effects of temperature, soil moisture and enchytraeid activities on C losses from a peatland soil. *Pedobiologia,* **54**, 291-299.

Carrillo Y, Dijkstra FA, Pendall E, Morgan JA, Blumenthal DM (2012) Controls over Soil Nitrogen Pools in a Semiarid Grassland Under Elevated CO2 and Warming. *Ecosystems,* **15**, 761-774.

Carrillo Y, Pendall E, Dijkstra FA, Morgan JA, Newcomb JM (2011) Response of soil organic matter pools to elevated CO2 and warming in a semi-arid grassland. *Plant and Soil,* **347**, 339-350.

Carter EB, Theodorou MK, Morris P (1999) Responses of Lotus corniculatus to environmental change. 2. Effect of elevated CO2, temperature and drought on tissue digestion in relation to condensed tannin and carbohydrate accumulation. *Journal of the Science of Food and Agriculture,* **79**, 1431-1440.

Chang R, Wang G, Yang Y, Chen X (2017) Experimental warming increased soil nitrogen sink in the Tibetan permafrost. *Journal of Geophysical Research: Biogeosciences,* **122**, 1870-1879.

Chapin FS, Iii, Shaver GR, Giblin AE, Nadelhoffer KJ, Laundre JA (1995) Response of arctic tundra to experimental and observed changes in climate. *Ecology (Washington D C),* **76**, 694-711.

Charles H, Dukes JS (2009) Effects of warming and altered precipitation on plant and nutrient dynamics of a New England salt marsh. *Ecological Applications,* **19**, 1758-1773.

Chen H, Rygiewicz PT, Johnson MG, Harmon ME, Tian H, Tang JW (2008) Chemistry and long-term decomposition of roots of Douglas-fir grown under elevated atmospheric carbon dioxide and warming conditions. *J Environ Qual,* **37**, 1327-1336.

Chen J, Luo Y, Xia J *et al.* (2016a) Differential responses of ecosystem respiration components to experimental warming in a meadow grassland on the Tibetan Plateau. *Agricultural and Forest Meteorology,* **220**, 21-29.

Chen X, Wang G, Zhang T, Mao T, Wei D, Hu Z, Song C (2017a) Effects of warming and nitrogen fertilization on GHG flux in the permafrost region of an alpine meadow. *Atmospheric Environment,* **157**, 111-124.

Chen X, Wang G, Zhang T *et al.* (2017b) Effects of warming and nitrogen fertilization on GHG flux in an alpine swamp meadow of a permafrost region. *Sci Total Environ,* **601-602**, 1389-1399.

Chen Z, Zhang J, Xiong Z, Pan G, Müller C (2016b) Enhanced gross nitrogen transformation rates and nitrogen supply in paddy field under elevated atmospheric carbon dioxide and temperature. *Soil Biology and Biochemistry,* **94**, 80-87.

Cheng H, Ren W, Ding L, Liu Z, Fang C (2013) Responses of a rice–wheat rotation agroecosystem to experimental warming. *Ecological Research,* **28**, 959-967.

Cheng X, Luo Y, Su B *et al.* (2010) Experimental warming and clipping altered litter carbon and nitrogen dynamics in a tallgrass prairie. *Agriculture, Ecosystems & Environment,* **138**, 206-213.

Chivers MR, Turetsky MR, Waddington JM, Harden JW, Mcguire AD (2009) Effects of Experimental Water Table and Temperature Manipulations on Ecosystem CO2 Fluxes in an Alaskan Rich Fen. *Ecosystems,* **12**, 1329-1342.

Choi E-Y, Seo T-C, Lee S-G, Cho I-H, Stangoulis J (2011) Growth and physiological responses of Chinese cabbage and radish to long-term exposure to elevated carbon dioxide and temperature. *Horticulture, Environment, and Biotechnology,* **52**, 376-386.

Christensen TR, Michelsen A, Jonasson S, Schmidt IK (1997) Carbon dioxide and methane exchange of a subarctic heath in response to climate change related environmental manipulations. *Oikos,* **79**, 34-44.

Christiansen CT, Haugwitz MS, Prieme A *et al.* (2017) Enhanced summer warming reduces fungal decomposer diversity and litter mass loss more strongly in dry than in wet tundra. *Glob Chang Biol,* **23**, 406-420.

Clausen SK, Frenck G, Linden LG, Mikkelsen TN, Lunde C, Jørgensen RB (2011) Effects of Single and Multifactor Treatments with Elevated Temperature, CO2 and Ozone on Oilseed Rape and Barley. *Journal of Agronomy and Crop Science,* **197**, 442-453.

Clemmensen KE, Michelsen A (2006) Integrated long-term responses of an arctic–alpine willow and associated ectomycorrhizal fungi to an altered environment. *Canadian Journal of Botany,* **84**, 831-843.

Coldren GA, Barreto CR, Wykoff DD, Morrissey EM, Langley JA, Feller IC, Chapman SK (2016) Chronic warming stimulates growth of marsh grasses more than mangroves in a coastal wetland ecotone. *Ecology,* **97**, 3167-3175.

Comstedt D, Boström B, Marshall JD, Holm A, Slaney M, Linder S, Ekblad A (2007) Effects of elevated atmospheric carbon dioxide and temperature on soil respiration in a boreal forest using δ13C as a labeling tool. *Ecosystems,* **9**, 1266-1277.

D'imperio L, Nielsen CS, Westergaard-Nielsen A, Michelsen A, Elberling B (2017) Methane oxidation in contrasting soil types: responses to experimental warming with implication for landscape-integrated CH4 budget. *Glob Chang Biol,* **23**, 966-976.

Darrouzet-Nardi A, Reed SC, Grote EE, Belnap J (2015) Observations of net soil exchange of CO2 in a dryland show experimental warming increases carbon losses in biocrust soils. *Biogeochemistry,* **126**, 363-378.

Day TA, Ruhland CT, Xiong FS (2008) Warming increases aboveground plant biomass and C stocks in vascular-plant-dominated Antarctic tundra. *Global Change Biology,* **14**, 1827-1843.

De Boeck HJ, Lemmens CM, Vicca S *et al.* (2007) How do climate warming and species richness affect CO2 fluxes in experimental grasslands? *New Phytol,* **175**, 512-522.

De Dato GD, De Angelis P, Sirca C, Beier C (2009) Impact of drought and increasing temperatures on soil CO2 emissions in a Mediterranean shrubland (gariga). *Plant and Soil,* **327**, 153-166.

De Valpine P, Harte J (2001) Plant responses to experimental warming in a montane meadow. *Ecology,* **82**, 637-648.

Deane-Coe KK, Mauritz M, Celis G, Salmon V, Crummer KG, Natali SM, Schuur EaG (2015) Experimental Warming Alters Productivity and Isotopic Signatures of Tundra Mosses. *Ecosystems,* **18**, 1070-1082.

Delarue F, Gogo S, Buttler A, Bragazza L, Jassey VEJ, Bernard G, Laggoun-Défarge F (2014) Indirect effects of experimental warming on dissolved organic carbon content in subsurface peat. *Journal of Soils and Sediments,* **14**, 1800-1805.

Dijkstra FA, Blumenthal D, Morgan JA, Pendall E, Carrillo Y, Follett RF (2010) Contrasting effects of elevated CO2 and warming on nitrogen cycling in a semiarid grassland. *New Phytol,* **187**, 426-437.

Domínguez MT, Holthof E, Smith AR, Koller E, Emmett BA (2017) Contrasting response of summer soil respiration and enzyme activities to long-term warming and drought in a wet shrubland (NE Wales, UK). *Applied Soil Ecology,* **110**, 151-155.

Dukes JS, Chiariello NR, Cleland EE *et al.* (2005) Responses of grassland production to single and multiple global environmental changes. *PLoS Biol,* **3**, e319.

Dunne JA, Saleska SR, Fischer ML, Harte J (2004) Integrating experimental and gradient methods in ecological climate change research. *Ecology,* **85**, 904-916.

Edwards EJ, Benham DG, Marland LA, Fitter AH (2004) Root production is determined by radiation flux in a temperate grassland community. *Global Change Biology,* **10**, 209-227.

Edwards EJ, Unwin D, Kilmister R, Treeby M (2017) Multi-seasonal effects of warming and elevated CO2 on the physiology, growth and production of mature, field grown, Shiraz grapevines. *Oeno One,* **51**, 127-132.

Edwards NT, Norby RJ (1999) Below-ground respiratory responses of sugar maple and red maple saplings to atmospheric CO2 enrichment and elevated air temperature. *Plant and Soil,* **206**, 85-97.

Emmett BA, Beier C, Estiarte M *et al.* (2004) The Response of Soil Processes to Climate Change: Results from Manipulation Studies of Shrublands Across an Environmental Gradient. *Ecosystems,* **7**.

Erice G, Irigoyen JJ, Perez P, Martinez-Carrasco R, Sanchez-Diaz M (2006) Effect of elevated CO2, temperature and drought on photosynthesis of nodulated alfalfa during a cutting regrowth cycle. *Physiologia Plantarum,* **126**, 458-468.

Fang C, Ye JS, Gong Y *et al.* (2017) Seasonal responses of soil respiration to warming and nitrogen addition in a semi-arid alfalfa-pasture of the Loess Plateau, China. *Sci Total Environ,* **590-591**, 729-738.

Farfan-Vignolo ER, Asard H (2012) Effect of elevated CO2 and temperature on the oxidative stress response to drought in Lolium perenne L. and Medicago sativa L. *Plant Physiol Biochem,* **59**, 55-62.

Fenner N, Freeman C, Lock MA, Harmens H, Reynolds B, Sparks T (2007) Interactions between elevated CO2 and warming could amplify DOC exports from peatland catchments. *Environmental Science & Technology,* **41**, 3146-3152.

Fernandez CW, Nguyen NH, Stefanski A *et al.* (2017) Ectomycorrhizal fungal response to warming is linked to poor host performance at the boreal-temperate ecotone. *Glob Chang Biol,* **23**, 1598-1609.

Ferreira V, Chauvet E, Canhoto C (2015) Effects of experimental warming, litter species, and presence of macroinvertebrates on litter decomposition and associated decomposers in a temperate mountain stream. *Canadian Journal of Fisheries and Aquatic Sciences,* **72**, 206-216.

Fu G, Zhang X, Zhang Y *et al.* (2013) Experimental warming does not enhance gross primary production and above-ground biomass in the alpine meadow of Tibet. *Journal of Applied Remote Sensing,* **7**.

Fujimura KE, Egger KN, Henry GH (2008) The effect of experimental warming on the root-associated fungal community of Salix arctica. *ISME J,* **2**, 105-114.

Shi F, Wu N, Luo P (2008) Effect of temperature enhancement on community structure and biomass of subaipine meadow in Northwestern Sichuan. *Acta Ecologica Sinica,* **28**, 5286-5293.

Ganjurjav H, Gao Q, Gornish ES *et al.* (2016) Differential response of alpine steppe and alpine meadow to climate warming in the central Qinghai–Tibetan Plateau. *Agricultural and Forest Meteorology,* **223**, 233-240.

Garten CT, Classen AT, Norby RJ (2008) Soil moisture surpasses elevated CO2 and temperature as a control on soil carbon dynamics in a multi-factor climate change experiment. *Plant and Soil,* **319**, 85-94.

Ge Z-M, Zhou X, Kellomäki S *et al.* (2012) Measured and modeled biomass growth in relation to photosynthesis acclimation of a bioenergy crop (Reed canary grass) under elevated temperature, CO2 enrichment and different water regimes. *Biomass and Bioenergy,* **46**, 251-262.

Ge ZM, Zhou X, Kellomaki S, Wang KY, Peltola H, Martikainen PJ (2011) Responses of leaf photosynthesis, pigments and chlorophyll fluorescence within canopy position in a boreal grass (Phalaris arundinacea L.) to elevated temperature and CO2 under varying water regimes. *Photosynthetica,* **49**, 172-184.

Gong S, Zhang T, Guo R, Cao H, Shi L, Guo J, Sun W (2015) Response of soil enzyme activity to warming and nitrogen addition in a meadow steppe. *Soil Research,* **53**.

Gonzalez-Meler MA, Silva LB, Dias-De-Oliveira E, Flower CE, Martinez CA (2017) Experimental Air Warming of a Stylosanthes capitata, Vogel Dominated Tropical Pasture Affects Soil Respiration and Nitrogen Dynamics. *Front Plant Sci,* **8**, 46.

Gorissen A, Tietema A, Joosten NN *et al.* (2004) Climate Change Affects Carbon Allocation to the Soil in Shrublands. *Ecosystems,* **7**.

Graham SL, Hunt JE, Millard P, Mcseveny T, Tylianakis JM, Whitehead D (2014) Effects of soil warming and nitrogen addition on soil respiration in a New Zealand tussock grassland. *PLoS One,* **9**, e91204.

Grogan P, Chapin Iii FS (2000) Initial effects of experimental warming on above- and belowground components of net ecosystem CO2 exchange in arctic tundra. *Oecologia,* **125**, 512-520.

Guoju X, Qiang Z, Fengju Z *et al.* (2016) Warming influences the yield and water use efficiency of winter wheat in the semiarid regions of Northwest China. *Field Crops Research,* **199**, 129-135.

Hagedorn F, Martin M, Rixen C *et al.* (2009) Short-term responses of ecosystem carbon fluxes to experimental soil warming at the Swiss alpine treeline. *Biogeochemistry,* **97**, 7-19.

Hakala K (1998) Growth and yield potential of spring wheat in a simulated changed climate with increased CO2 and higher temperature. *European Journal of Agronomy,* **9**, 41-52.

Han S, Lee SJ, Yoon TK *et al.* (2015) Species-specific growth and photosynthetic responses of first-year seedlingsof four coniferous species to open-field experimental warming. *Turkish Journal of Agriculture and Forestry,* **39**, 342-349.

Harte J, Saleska SR, Levy C (2015) Convergent ecosystem responses to 23-year ambient and manipulated warming link advancing snowmelt and shrub encroachment to transient and long-term climate-soil carbon feedback. *Glob Chang Biol,* **21**, 2349-2356.

Hartley AE, Neill C, Melillo JM, Crabtree R, Bowles FP (1999) Plant performance and soil nitrogen mineralization in response to simulated climate change in subarctic dwarf shrub heath. *Oikos,* **86**, 331-343.

Hartley IP, Heinemeyer A, Evans SP, Ineson P (2007a) The effect of soil warming on bulk soil vs. rhizosphere respiration. *Global Change Biology,* **13**, 2654-2667.

Hartley IP, Heinemeyer A, Ineson P (2007b) Effects of three years of soil warming and shading on the rate of soil respiration: substrate availability and not thermal acclimation mediates observed response. *Global Change Biology,* **13**, 1761-1770.

Haugwitz MS, Bergmark L, Priemé A, Christensen S, Beier C, Michelsen A (2013) Soil microorganisms respond to five years of climate change manipulations and elevated atmospheric CO2 in a temperate heath ecosystem. *Plant and Soil,* **374**, 211-222.

Hayden HL, Mele PM, Bougoure DS *et al.* (2012) Changes in the microbial community structure of bacteria, archaea and fungi in response to elevated CO2 and warming in an Australian native grassland soil. *Environ Microbiol,* **14**, 3081-3096.

He J, Austin PT, Lee SK (2010) Effects of elevated root zone CO2 and air temperature on photosynthetic gas exchange, nitrate uptake, and total reduced nitrogen content in aeroponically grown lettuce plants. *J Exp Bot,* **61**, 3959-3969.

Henry HaL, Brizgys K, Field CB (2008) Litter Decomposition in a California Annual Grassland: Interactions Between Photodegradation and Litter Layer Thickness. *Ecosystems,* **11**, 545-554.

Henry HaL, Hutchison JS, Kim MK, Mcwhirter BD (2014) Context Matters for Warming: Interannual Variation in Grass Biomass Responses to 7 Years of Warming and N Addition. *Ecosystems,* **18**, 103-114.

Heskel MA, Greaves HE, Turnbull MH, O'sullivan OS, Shaver GR, Griffin KL, Atkin OK (2014) Thermal acclimation of shoot respiration in an Arctic woody plant species subjected to 22 years of warming and altered nutrient supply. *Glob Chang Biol,* **20**, 2618-2630.

Hicks Pries CE, Van Logtestijn RS, Schuur EA, Natali SM, Cornelissen JH, Aerts R, Dorrepaal E (2015) Decadal warming causes a consistent and persistent shift from heterotrophic to autotrophic respiration in contrasting permafrost ecosystems. *Glob Chang Biol,* **21**, 4508-4519.

Hill PW, Garnett MH, Farrar J, Iqbal Z, Khalid M, Soleman N, Jones DL (2015) Living roots magnify the response of soil organic carbon decomposition to temperature in temperate grassland. *Global Change Biology,* **21**, 1368-1375.

Hines J, Reyes M, Gessner MO (2016) Density constrains cascading consequences of warming and nitrogen from invertebrate growth to litter decomposition. *Ecology,* **97**, 1635-1642.

Hobbie SE, Chapin FS (1998) Response of tundra plant biomass, aboveground production, nitrogen, and CO(2) flux to experimental warming. *Ecology,* **79**, 1526-1544.

Hou R, Ouyang Z, Maxim D, Wilson G, Kuzyakov Y (2016) Lasting effect of soil warming on organic matter decomposition depends on tillage practices. *Soil Biology and Biochemistry,* **95**, 243-249.

Hou Y, Qu J, Luo Z, Zhang C, Wang K (2011) Morphological Mechanism of Growth Response in Treeline Species Minjiang Fir to Elevated CO2 and Temperature. *Silva Fennica,* **45**, 181-195.

Hovenden MJ, Wills KE, Chaplin RE, Vander Schoor JK, Williams AL, Osanai YUI, Newton PCD (2008) Warming and elevated CO2 affect the relationship between seed mass, germinability and seedling growth in Austrodanthonia caespitosa, a dominant Australian grass. *Global Change Biology,* **14**, 1633-1641.

Hu H-W, Macdonald CA, Trivedi P *et al.* (2016) Effects of climate warming and elevated CO2 on autotrophic nitrification and nitrifiers in dryland ecosystems. *Soil Biology and Biochemistry,* **92**, 1-15.

Huang G, Rymer PD, Duan H, Smith RA, Tissue DT (2015) Elevated temperature is more effective than elevated [CO2] in exposing genotypic variation in Telopea speciosissima growth plasticity: implications for woody plant populations under climate change. *Glob Chang Biol,* **21**, 3800-3813.

Huang S, Jia X, Zhao Y, Chang Y, Bai B (2016) Response of Robinia pseudoacacia L. rhizosphere microenvironment to Cd and Pb contamination and elevated temperature. *Applied Soil Ecology,* **108**, 269-277.

Huttunen L, Aphalo PJ, Lehto T, Niemelä P, Kuokkanen K, Kellomäki S (2009) Effects of elevated temperature, elevated CO2 and fertilization on quality and subsequent decomposition of silver birch leaf litter. *Soil Biology and Biochemistry,* **41**, 2414-2421.

Illeris L, Konig SM, Grogan P, Jonasson S, Michelsen A, Ro-Poulsen H (2004) Growing-season carbon dioxide flux in a dry subarctic heath: Responses to long-term manipulations. *Arctic Antarctic and Alpine Research,* **36**, 456-463.

Jansen-Willems AB, Lanigan GJ, Grunhage L, Muller C (2016) Carbon cycling in temperate grassland under elevated temperature. *Ecol Evol,* **6**, 7856-7868.

Jarvi MP, Burton AJ (2013) Acclimation and soil moisture constrain sugar maple root respiration in experimentally warmed soil. *Tree Physiol,* **33**, 949-959.

Jassey VE, Signarbieux C, Hattenschwiler S *et al.* (2015) An unexpected role for mixotrophs in the response of peatland carbon cycling to climate warming. *Sci Rep,* **5**, 16931.

Jiang L, Wang S, Luo C *et al.* (2016) Effects of warming and grazing on dissolved organic nitrogen in a Tibetan alpine meadow ecosystem. *Soil and Tillage Research,* **158**, 156-164.

Johnson LC, Shaver GR, Cades DH *et al.* (2000) Plant carbon-nutrient interactions control CO2 exchange in Alaskan wet sedge tundra ecosystems. *Ecology,* **81**, 453-469.

Jonasson S, Michelsen A, Schmidt IK, Nielsen EV (1999) Responses in microbes and plants to changed temperature, nutrient, and light regimes in the arctic. *Ecology,* **80**, 1828-1843.

Jónsdóttir IS, Khitun O, Stenström A (2005) Biomass and nutrient responses of a clonal tundra sedge to climate warming. *Canadian Journal of Botany,* **83**, 1608-1621.

Kandeler E, Tscherko D, Bardgett RD, Hobbs PJ, Kampichler C, Jones TH (1998) The response of soil microorganisms and roots to elevated CO2 and temperature in a terrestrial model ecosystem. *Plant and Soil,* **202**, 251-262.

Kardol P, Campany CE, Souza L, Norby RJ, Weltzin JF, Classen AT (2010) Climate change effects on plant biomass alter dominance patterns and community evenness in an experimental old-field ecosystem. *Global Change Biology,* **16**, 2676-2687.

Kim H-Y, Lim S-S, Kwak J-H, Lee D-S, Lee S-M, Ro H-M, Choi W-J (2010) Dry matter and nitrogen accumulation and partitioning in rice (*Oryza sativa* L.) exposed to experimental warming with elevated CO2. *Plant and Soil,* **342**, 59-71.

King JS, Thomas RB, Strain BR (1996) Growth and carbon accumulation in root systems of Pinus taeda and Pinus ponderosa seedlings as affected by varying CO2, temperature and nitrogen. *Tree Physiology,* **16**, 635-642.

Kivimaenpaa M, Sutinen S, Valolahti H *et al.* (2017) Warming and elevated ozone differently modify needle anatomy of Norway spruce (Picea abies) and Scots pine (Pinus sylvestris). *Canadian Journal of Forest Research,* **47**, 488-499.

Kreyling J, Schuerings J, Malyshev AV, Vogt L, Werner C, Jentsch A (2015) Nitrogen leaching is enhanced after a winter warm spell but mainly controlled by vegetation composition in temperate zone mesocosms. *Plant and Soil,* **396**, 85-96.

Kuster TM, Schleppi P, Hu B, Schulin R, Gunthardt-Goerg MS (2013) Nitrogen dynamics in oak model ecosystems subjected to air warming and drought on two different soils. *Plant Biol (Stuttg),* **15**, 220-229.

Lee J-S (2011) Combined effect of elevated CO2 and temperature on the growth and phenology of two annual C3 and C4 weedy species. *Agriculture, Ecosystems & Environment,* **140**, 484-491.

Lewis JD, Lucash M, Olszyk DM, Tingey DT (2004) Relationships between needle nitrogen concentration and photosynthetic responses of Douglas-fir seedlings to elevated CO2 and temperature. *New Phytologist,* **162**, 355-364.

Li D, Zhou X, Wu L, Zhou J, Luo Y (2013) Contrasting responses of heterotrophic and autotrophic respiration to experimental warming in a winter annual-dominated prairie. *Glob Chang Biol,* **19**, 3553-3564.

Li F, Peng Y, Natali SM *et al.* (2017a) Warming effects on permafrost ecosystem carbon fluxes associated with plant nutrients. *Ecology,* **98**, 2851-2859.

Li G, Kim S, Han S, Chang H, Son Y (2017b) Effect of Soil Moisture on the Response of Soil Respiration to Open-Field Experimental Warming and Precipitation Manipulation. *Forests,* **8**.

Li Y, Sun D, Li D, Xu Z, Zhao C, Lin H, Liu Q (2015) Effects of warming on ectomycorrhizal colonization and nitrogen nutrition of Picea asperata seedlings grown in two contrasting forest ecosystems. *Sci Rep,* **5**, 17546.

Liancourt P, Boldgiv B, Song DS, Spence LA, Helliker BR, Petraitis PS, Casper BB (2015) Leaf-trait plasticity and species vulnerability to climate change in a Mongolian steppe. *Glob Chang Biol,* **21**, 3489-3498.

Lin GH, Ehleringer JR, Rygiewicz PT, Johnson MG, Tingey DT (1999) Elevated CO2 and temperature impacts on different components of soil CO2 efflux in Douglas-fir terracosms. *Global Change Biology,* **5**, 157-168.

Lin GH, Rygiewicz PT, Ehleringer JR, Johnson MG, Tingey DT (2001) Time-dependent responses of soil CO2 efflux components to elevated atmospheric CO2 and temperature in experimental forest mesocosms. *Plant and Soil,* **229**, 259-270.

Lin X, Wang S, Hu Y, Luo C, Zhang Z, Niu H, Xie Z (2014) Experimental Warming Increases Seasonal Methane Uptake in an Alpine Meadow on the Tibetan Plateau. *Ecosystems,* **18**, 274-286.

Lin X, Zhang Z, Wang S *et al.* (2011) Response of ecosystem respiration to warming and grazing during the growing seasons in the alpine meadow on the Tibetan plateau. *Agricultural and Forest Meteorology,* **151**, 792-802.

Litvak ME, Constable JV, Monson RK (2002) Supply and demand processes as controls over needle monoterpene synthesis and concentration in Douglas fir [Pseudotsuga menziesii (Mirb.) Franco]. *Oecologia,* **132**, 382-391.

Liu C, Zou D (2014) Do increased temperature and CO2 levels affect the growth, photosynthesis, and respiration of the marine macroalga Pyropia haitanensis (Rhodophyta)? An experimental study. *Hydrobiologia,* **745**, 285-296.

Liu D, Llusia J, Ogaya R, Estiarte M, Llorens L, Yang X, Penuelas J (2016a) Physiological adjustments of a Mediterranean shrub to long-term experimental warming and drought treatments. *Plant Sci,* **252**, 53-61.

Liu L, Hu C, Olesen JE, Ju Z, Zhang X (2016b) Effect of warming and nitrogen addition on evapotranspiration and water use efficiency in a wheat-soybean/fallow rotation from 2010 to 2014. *Climatic Change,* **139**, 565-578.

Liu L, Hu C, Yang P, Ju Z, Olesen JE, Tang J (2015a) Effects of experimental warming and nitrogen addition on soil respiration and CH4 fluxes from crop rotations of winter wheat–soybean/fallow. *Agricultural and Forest Meteorology,* **207**, 38-47.

Liu Q, Yin H, Chen J, Zhao C, Cheng X, Wei Y, Lin B (2011) Belowground responses of Picea asperata seedlings to warming and nitrogen fertilization in the eastern Tibetan Plateau. *Ecological Research,* **26**, 637-648.

Liu T, Xu Z-Z, Hou Y-H, Zhou G-S (2015b) Effects of warming and changing precipitation rates on soil respiration over two years in a desert steppe of northern China. *Plant and Soil,* **400**, 15-27.

Liu W, Zhang ZHE, Wan S (2009) Predominant role of water in regulating soil and microbial respiration and their responses to climate change in a semiarid grassland. *Global Change Biology,* **15**, 184-195.

Liu X, Yang Z, Lin C *et al.* (2017a) Will nitrogen deposition mitigate warming-increased soil respiration in a young subtropical plantation? *Agricultural and Forest Meteorology,* **246**, 78-85.

Liu Y, Li M, Zheng J *et al.* (2014) Short-term responses of microbial community and functioning to experimental CO2 enrichment and warming in a Chinese paddy field. *Soil Biology and Biochemistry,* **77**, 58-68.

Liu Y, Liu S, Wan S, Wang J, Luan J, Wang H (2016c) Differential responses of soil respiration to soil warming and experimental throughfall reduction in a transitional oak forest in central China. *Agricultural and Forest Meteorology,* **226-227**, 186-198.

Liu Y, Liu S, Wan S, Wang J, Wang H, Liu K (2017b) Effects of experimental throughfall reduction and soil warming on fine root biomass and its decomposition in a warm temperate oak forest. *Science of The Total Environment,* **574**, 1448-1455.

Liu Y, Liu X, Cheng K *et al.* (2016d) Responses of Methanogenic and Methanotrophic Communities to Elevated Atmospheric CO2 and Temperature in a Paddy Field. *Front Microbiol,* **7**, 1895.

Liu Y, Zhou H, Wang J *et al.* (2015c) Short-term response of nitrifier communities and potential nitrification activity to elevated CO2 and temperature interaction in a Chinese paddy field. *Applied Soil Ecology,* **96**, 88-98.

Lu S, Wang Q, Katahata S, Naramoto M, Mizunaga H (2014) Soil Microbial Activities in Beech Forests Under Natural Incubation Conditions as Affected by Global Warming. *Pedosphere,* **24**, 709-721.

Luan J, Liu S, Chang SX, Wang J, Zhu X, Liu K, Wu J (2014) Different effects of warming and cooling on the decomposition of soil organic matter in warm–temperate oak forests: a reciprocal translocation experiment. *Biogeochemistry,* **121**, 551-564.

Luo C, Xu G, Chao Z *et al.* (2010) Effect of warming and grazing on litter mass loss and temperature sensitivity of litter and dung mass loss on the Tibetan plateau. *Global Change Biology,* **16**, 1606-1617.

Luo C, Xu G, Wang Y *et al.* (2009a) Effects of grazing and experimental warming on DOC concentrations in the soil solution on the Qinghai-Tibet plateau. *Soil Biology and Biochemistry,* **41**, 2493-2500.

Luo Y, Sherry R, Zhou X, Wan S (2009b) Terrestrial carbon-cycle feedback to climate warming: experimental evidence on plant regulation and impacts of biofuel feedstock harvest. *GCB Bioenergy,* **1**, 62-74.

Ma S, Zhu X, Zhang J *et al.* (2015) Warming decreased and grazing increased plant uptake of amino acids in an alpine meadow. *Ecol Evol,* **5**, 3995-4005.

Marchand FL, Nijs I, De Boeck HJ, Kockelbergh F, Mertens S, Beyens L (2004) Increased turnover but little change in the carbon balance of High-Arctic tundra exposed to whole growing season warming. *Arctic Antarctic and Alpine Research,* **36**, 298-307.

Matsunami T, Otera M, Amemiya S, Kokubun M, Okada M (2009) Effect of CO2 concentration, temperature and N fertilization on biomass production of soybean genotypes differing in N fixation capacity. *Plant Production Science,* **12**, 156-167.

Mcdaniel MD, Kaye JP, Kaye MW, Bruns MA (2014) Climate change interactions affect soil carbon dioxide efflux and microbial functioning in a post-harvest forest. *Oecologia,* **174**, 1437-1448.

Mchale PJ, Mitchell MJ, Bowles FP (1998) Soil warming in a northern hardwood forest: trace gas fluxes and leaf litter decomposition. *Canadian Journal of Forest Research-Revue Canadienne De Recherche Forestiere,* **28**, 1365-1372.

Melillo JM, Butler S, Johnson J *et al.* (2011) Soil warming, carbon-nitrogen interactions, and forest carbon budgets. *Proc Natl Acad Sci U S A,* **108**, 9508-9512.

Melillo JM, Steudler PA, Aber JD *et al.* (2002) Soil warming and carbon-cycle feedbacks to the climate system. *Science,* **298**, 2173-2176.

Michelsen A, Jonasson S, Sleep D, Havstrom M, Callaghan TV (1996) Shoot biomass, delta C-13, nitrogen and chlorophyll responses of two arctic dwarf shrubs to in situ shading, nutrient application and warming simulating climatic change. *Oecologia,* **105**, 1-12.

Morgado LN, Semenova TA, Welker JM, Walker MD, Smets E, Geml J (2015) Summer temperature increase has distinct effects on the ectomycorrhizal fungal communities of moist tussock and dry tundra in Arctic Alaska. *Global Change Biology,* **21**, 959-972.

Morgan JA, Lecain DR, Pendall E *et al.* (2011) C4 grasses prosper as carbon dioxide eliminates desiccation in warmed semi-arid grassland. *Nature,* **476**, 202-205.

Natali SM, Schuur EaG, Mauritz M *et al.* (2015) Permafrost thaw and soil moisture driving CO2 and CH4 release from upland tundra. *Journal of Geophysical Research: Biogeosciences,* **120**, 525-537.

Nie M, Pendall E, Bell C, Gasch CK, Raut S, Tamang S, Wallenstein MD (2013) Positive climate feedbacks of soil microbial communities in a semi-arid grassland. *Ecol Lett,* **16**, 234-241.

Nielsen CS, Michelsen A, Strobel BW, Wulff K, Banyasz I, Elberling B (2017) Correlations between substrate availability, dissolved CH4, and CH4 emissions in an arctic wetland subject to warming and plant removal. *Journal of Geophysical Research: Biogeosciences,* **122**, 645-660.

Niinistö SM, Silvola J, Kellomäki S (2004) Soil CO2efflux in a boreal pine forest under atmospheric CO2 enrichment and air warming. *Global Change Biology,* **10**, 1363-1376.

Niu S, Sherry RA, Zhou X, Luo Y (2013) Ecosystem Carbon Fluxes in Response to Warming and Clipping in a Tallgrass Prairie. *Ecosystems,* **16**, 948-961.

Niu S, Wu M, Han Y, Xia J, Li L, Wan S (2008) Water-mediated responses of ecosystem carbon fluxes to climatic change in a temperate steppe. *New Phytol,* **177**, 209-219.

Noh NJ, Lee SJ, Jo W *et al.* (2016) Effects of experimental warming on soil respiration and biomass in Quercus variabilis Blume and Pinus densiflora Sieb. et Zucc. seedlings. *Annals of Forest Science,* **73**, 533-545.

Norby RJ, Long TM, Hartz-Rubin JS, O'neill EG (2000) Nitrogen resorption in senescing tree leaves in a warmer, CO2-enriched atmosephere. *Plant and Soil,* **224**, 15-29.

Norby RJ, Luo Y (2004) Evaluating ecosystem responses to rising atmospheric CO2 and global warming in a multi-factor world. *New Phytologist,* **162**, 281-293.

Oberbauer SF, Tweedie CE, Welker JM *et al.* (2007) Tundra CO2 fluxes in response to experimental warming across latitudinal and moisture gradients. *Ecological Monographs,* **77**, 221-238.

Olszyk DM, Johnson MG, Tingey DT *et al.* (2003) Whole-seedling biomass allocation, leaf area, and tissue chemistry for Douglas-fir exposed to elevated CO2 and temperature for 4 years. *Canadian Journal of Forest Research,* **33**, 269-278.

Osanai Y, Janes JK, Newton PCD, Hovenden MJ (2015) Warming and elevated CO2 combine to increase microbial mineralisation of soil organic matter. *Soil Biology and Biochemistry,* **85**, 110-118.

Pajari B (1995) Soil respiration in a poor upland site of Scots pine stand subjected to elevated temperatures and atmospheric carbon concentration. *Plant and Soil,* **168-169**, 563-570.

Pearson M, Penttila T, Harjunpaa L *et al.* (2015) Effects of temperature rise and water-table-level drawdown on greenhouse gas fluxes of boreal sedge fens. *Boreal Environment Research,* **20**, 489-505.

Peltoniemi K, Laiho R, Juottonen H *et al.* (2016) Responses of methanogenic and methanotrophic communities to warming in varying moisture regimes of two boreal fens. *Soil Biology and Biochemistry,* **97**, 144-156.

Peltoniemi K, Laiho R, Juottonen H *et al.* (2015) Microbial ecology in a future climate: effects of temperature and moisture on microbial communities of two boreal fens. *FEMS Microbiol Ecol,* **91**.

Pendall E, Osanai YUI, Williams AL, Hovenden MJ (2011) Soil carbon storage under simulated climate change is mediated by plant functional type. *Global Change Biology,* **17**, 505-514.

Peng F, Xue X, You Q, Xu M, Chen X, Guo J, Wang T (2016) Intensified plant N and C pool with more available nitrogen under experimental warming in an alpine meadow ecosystem. *Ecol Evol,* **6**, 8546-8555.

Peng F, Xue X, You Q, Zhou X, Wang T (2014a) Warming effects on carbon release in a permafrost area of Qinghai-Tibet Plateau. *Environmental Earth Sciences,* **73**, 57-66.

Peng F, You Q, Xu M, Guo J, Wang T, Xue X (2014b) Effects of warming and clipping on ecosystem carbon fluxes across two hydrologically contrasting years in an alpine meadow of the Qinghai-Tibet Plateau. *PLoS One,* **9**, e109319.

Peng F, You Q, Xue X, Guo J, Wang T (2015) Evapotranspiration and its source components change under experimental warming in alpine meadow ecosystem on the Qinghai-Tibet plateau. *Ecological Engineering,* **84**, 653-659.

PeÑuelas J, Prieto P, Beier C *et al.* (2007) Response of plant species richness and primary productivity in shrublands along a north–south gradient in Europe to seven years of experimental warming and drought: reductions in primary productivity in the heat and drought year of 2003. *Global Change Biology,* **13**, 2563-2581.

Peterjohn WT, Melillo JM, Bowles FP, Steudler PA (1993) Soil warming and trace gas fluxes: experimental design and preliminary flux results. *Oecologia,* **93**, 18-24.

Piggott JJ, Salis RK, Lear G, Townsend CR, Matthaei CD (2015) Climate warming and agricultural stressors interact to determine stream periphyton community composition. *Glob Chang Biol,* **21**, 206-222.

Press MC, Potter JA, Burke MJW, Callaghan TV, Lee JA (1998) Responses of a subarctic dwarf shrub heath community to simulated environmental change. *Journal of Ecology,* **86**, 315-327.

Pugliese M, Gullino ML, Garibaldi A (2010) Effects of elevated CO2 and temperature on interactions of grapevine and powdery mildew: first results under phytotron conditions. *Journal of Plant Diseases and Protection,* **117**, 9-14.

Pugliese M, Liu J, Titone P, Garibaldi A, Gullino ML (2012) Effects of elevated CO2 and temperature on interactions of zucchini and powdery mildew. *Phytopathologia Mediterranea,* **51**, 480-487.

Qiao M, Zhang Z, Li Y, Xiao J, Yin H, Yue B, Liu Q (2015) Experimental warming effects on root nitrogen absorption and mycorrhizal infection in a subalpine coniferous forest. *Scandinavian Journal of Forest Research,* **31**, 347-354.

Qin Y, Yi S, Chen J, Ren S, Wang X (2015) Responses of ecosystem respiration to short-term experimental warming in the alpine meadow ecosystem of a permafrost site on the Qinghai–Tibetan Plateau. *Cold Regions Science and Technology,* **115**, 77-84.

Quentin AG, Crous KY, Barton CV, Ellsworth DS (2015) Photosynthetic enhancement by elevated CO2 depends on seasonal temperatures for warmed and non-warmed Eucalyptus globulus trees. *Tree Physiol,* **35**, 1249-1263.

Rakshit R, Patra AK, Pal D, Kumar M, Singh R (2012) Effect of Elevated CO2 and Temperature on Nitrogen Dynamics and Microbial Activity During Wheat (Triticum aestivumL.) Growth on a Subtropical Inceptisol in India. *Journal of Agronomy and Crop Science,* **198**, 452-465.

Rasheed MU, Kasurinen A, Kivimäenpää M *et al.* (2017) The responses of shoot-root-rhizosphere continuum to simultaneous fertilizer addition, warming, ozone and herbivory in young Scots pine seedlings in a high latitude field experiment. *Soil Biology and Biochemistry,* **114**, 279-294.

Ravn NR, Ambus P, Michelsen A (2017) Impact of decade-long warming, nutrient addition and shading on emission and carbon isotopic composition of CO2 from two subarctic dwarf shrub heaths. *Soil Biology and Biochemistry,* **111**, 15-24.

Reich PB, Sendall KM, Rice K, Rich RL, Stefanski A, Hobbie SE, Montgomery RA (2015) Geographic range predicts photosynthetic and growth response to warming in co-occurring tree species. *Nature Climate Change,* **5**, 148-152.

Reynaud S, Leclercq N, Romaine-Lioud S, Ferrier-Pages C, Jaubert J, Gattuso JP (2003) Interacting effects of CO2 partial pressure and temperature on photosynthesis and calcification in a scleractinian coral. *Global Change Biology,* **9**, 1660-1668.

Richardson SJ, Press MC, Parsons AN, Hartley SE (2002) How do nutrients and warming impact on plant communities and their insect herbivores? A 9-year study from a sub-Arctic heath. *Journal of Ecology,* **90**, 544-556.

Rillig MC, Wright SF, Shaw MR, Field CB (2002) Artificial climate warming positively affects arbuscular mycorrhizae but decreases soil aggregate water stability in an annual grassland. *Oikos,* **97**, 52-58.

Rinnan R, Michelsen A, BÅÅth E, Jonasson S (2007a) Fifteen years of climate change manipulations alter soil microbial communities in a subarctic heath ecosystem. *Global Change Biology,* **13**, 28-39.

Rinnan R, Michelsen A, Bååth E, Jonasson S (2007b) Mineralization and carbon turnover in subarctic heath soil as affected by warming and additional litter. *Soil Biology and Biochemistry,* **39**, 3014-3023.

Rinnan R, Michelsen A, Jonasson S (2008) Effects of litter addition and warming on soil carbon, nutrient pools and microbial communities in a subarctic heath ecosystem. *Applied Soil Ecology,* **39**, 271-281.

Rinnan R, Stark S, Tolvanen A (2009) Responses of vegetation and soil microbial communities to warming and simulated herbivory in a subarctic heath. *Journal of Ecology,* **97**, 788-800.

Ruess L, Michelsen A, Schmidt IK, Jonasson S (1999) Simulated climate change affecting microorganisms, nematode density and biodiversity in subarctic soils. *Plant and Soil,* **212**, 63-73.

Ruiz-Vera UM, Siebers MH, Drag DW, Ort DR, Bernacchi CJ (2015) Canopy warming caused photosynthetic acclimation and reduced seed yield in maize grown at ambient and elevated [CO2]. *Glob Chang Biol,* **21**, 4237-4249.

Rustad LE, Fernandez IJ (1998) Experimental soil warming effects on CO2 and CH4 flux from a low elevation spruce-fir forest soil in Maine, USA. *Global Change Biology,* **4**, 597-605.

Ryan EM, Ogle K, Peltier D *et al.* (2017) Gross primary production responses to warming, elevated CO2 , and irrigation: quantifying the drivers of ecosystem physiology in a semiarid grassland. *Glob Chang Biol,* **23**, 3092-3106.

Ryan EM, Ogle K, Zelikova TJ, Lecain DR, Williams DG, Morgan JA, Pendall E (2015) Antecedent moisture and temperature conditions modulate the response of ecosystem respiration to elevated CO2 and warming. *Glob Chang Biol,* **21**, 2588-2602.

Sager EPS, Hutchinson TC (2005) The effects of UV-B, nitrogen fertilization, and springtime warming on sugar maple seedlings and the soil chemistry of two central Ontario forests. *Canadian Journal of Forest Research,* **35**, 2432-2446.

Saleska SR, Shaw MR, Fischer ML, Dunne JA, Still CJ, Holman ML, Harte J (2002) Plant community composition mediates both large transient decline and predicted long-term recovery of soil carbon under climate warming. *Global Biogeochemical Cycles,* **16**, 3-1-3-18.

Sardans J, Penuelas J, Estiarte M (2008a) Warming and drought change trace element bioaccumulation patterns in a Mediterranean shrubland. *Chemosphere,* **70**, 874-885.

Sardans J, Peñuelas J, Estiarte M (2006) Warming and drought alter soil phosphatase activity and soil P availability in a Mediterranean shrubland. *Plant and Soil,* **289**, 227-238.

Sardans J, Peñuelas J, Estiarte M (2008b) Changes in soil enzymes related to C and N cycle and in soil C and N content under prolonged warming and drought in a Mediterranean shrubland. *Applied Soil Ecology,* **39**, 223-235.

Schindlbacher A, Rodler A, Kuffner M, Kitzler B, Sessitsch A, Zechmeister-Boltenstern S (2011) Experimental warming effects on the microbial community of a temperate mountain forest soil. *Soil Biol Biochem,* **43**, 1417-1425.

Schindlbacher A, Zechmeister-Boltenstern S, Jandl R (2009) Carbon losses due to soil warming: Do autotrophic and heterotrophic soil respiration respond equally? *Global Change Biology,* **15**, 901-913.

Schnecker J, Borken W, Schindlbacher A, Wanek W (2016) Little effects on soil organic matter chemistry of density fractions after seven years of forest soil warming. *Soil Biol Biochem,* **103**, 300-307.

Seo J, Jang I, Jung JY, Lee YK, Kang H (2015) Warming and increased precipitation enhance phenol oxidase activity in soil while warming induces drought stress in vegetation of an Arctic ecosystem. *Geoderma,* **259-260**, 347-353.

Sershen, Mdamba B, Ramdhani S (2017) Propagule and seedling responses of three species naturalised in subtropical South Africa to elevated temperatures. *Flora,* **229**, 80-91.

Shah NH, Paulsen GM (2003) Interaction of drought and high temperature on photosynthesis and grain-filling of wheat. *Plant and Soil,* **257**, 219-226.

Sharkhuu A, Plante AF, Enkhmandal O, Casper BB, Helliker BR, Boldgiv B, Petraitis PS (2013) Effects of open-top passive warming chambers on soil respiration in the semi-arid steppe to taiga forest transition zone in Northern Mongolia. *Biogeochemistry,* **115**, 333-348.

Sharwood RE, Crous KY, Whitney SM, Ellsworth DS, Ghannoum O (2017) Linking photosynthesis and leaf N allocation under future elevated CO2 and climate warming in Eucalyptus globulus. *J Exp Bot,* **68**, 1157-1167.

Shaw MR, Harte J (2001a) Control of litter decomposition in a subalpine meadow-sagebrush steppe ecotone under climate change. *Ecological Applications,* **11**, 1206-1223.

Shaw MR, Harte J (2001b) Response of nitrogen cycling to simulated climate change: differential responses along a subalpine ecotone. *Global Change Biology,* **7**, 193-210.

Shaw MR, Zavaleta ES, Chiariello NR, Cleland EE, Mooney HA, Field CB (2002) Grassland responses to global environmental changes suppressed by elevated CO2. *Science,* **298**, 1987-1990.

Shen W, Reynolds JF, Hui D (2009) Responses of dryland soil respiration and soil carbon pool size to abrupt vs. gradual and individual vs. combined changes in soil temperature, precipitation, and atmospheric [CO2]: a simulation analysis. *Global Change Biology,* **15**, 2274-2294.

Shi F-S, Che H-F, Wu N (2008) Effect of Experimental Warming on Carbon and Nitrogen Content of Sub-alpine Meadow in Northwestern Sichuan. *Bulletin of Botanical Research,* **28**, 730-736.

Shi F-S, Wu N, Wu Y (2010a) Responses of plant growth and substance allocation of three dominant plant species to experimental warming in an alpine grassland, Northwestern Sichuan, China. *Chinese Journal of Plant Ecology,* **34**, 488-497.

Shi F, Chen H, Chen H, Wu Y, Wu N (2012) The combined effects of warming and drying suppress CO2 and N2O emission rates in an alpine meadow of the eastern Tibetan Plateau. *Ecological Research,* **27**, 725-733.

Shi F, Wu N, Wu Y, Wang Q (2010b) Effect of Simulated Temperature Enhancement on Growth and Photosynthesis of *Deschampsia caespitosa* and *Thlaspi arvense* in Northwestern Sichuan, China. *Chinese Journal of Appplied Environmental Biology,* **2009**, 750-755.

Sistla SA, Moore JC, Simpson RT, Gough L, Shaver GR, Schimel JP (2013) Long-term warming restructures Arctic tundra without changing net soil carbon storage. *Nature,* **497**, 615-618.

Sjogersten S, Van Der Wal R, Woodin SJ (2008) Habitat type determines herbivory controls over CO2 fluxes in a warmer arctic. *Ecology,* **89**, 2103-2116.

Song B, Niu S, Wan S (2016) Precipitation regulates plant gas exchange and its long-term response to climate change in a temperate grassland. *Journal of Plant Ecology,* **9**, 531-541.

Song U (2017) Temperature-dependent performance of competitive native and alien invasive plant species. *Acta Oecologica,* **84**, 8-14.

Sorensen PL, Michelsen A, Jonasson S (2008) Nitrogen Uptake During One Year in Subarctic Plant Functional Groups and in Microbes After Long-Term Warming and Fertilization. *Ecosystems,* **11**, 1223-1233.

Sorokin Y, Zelikova TJ, Blumenthal D, Williams DG, Pendall E (2017) Seasonally contrasting responses of evapotranspiration to warming and elevated CO2 in a semiarid grassland. *Ecohydrology,* **10**.

Sowerby A, Emmett B, Beier C *et al.* (2005) Microbial community changes in heathland soil communities along a geographical gradient: interaction with climate change manipulations. *Soil Biology and Biochemistry,* **37**, 1805-1813.

Strebel D, Elberling B, Morgner E, Knicker HE, Cooper EJ (2016) Cold-season soil respiration in response to grazing and warming in High-Arctic Svalbard. *Polar Research,* **29**, 46-57.

Streit K, Hagedorn F, Hiltbrunner D *et al.* (2014) Soil warming alters microbial substrate use in alpine soils. *Glob Chang Biol,* **20**, 1327-1338.

Sullivan PF, Arens SJT, Chimner RA, Welker JM (2007) Temperature and Microtopography Interact to Control Carbon Cycling in a High Arctic Fen. *Ecosystems,* **11**, 61-76.

Sun D-D, Li Y-J, Zhao W-Q, Zhang Z-L, Li D-D, Zhao C-Z, Liu Q (2016) Effects of experimental warming on soil microbial communities in two contrasting subalpine forest ecosystems, eastern Tibetan Plateau, China. *Journal of Mountain Science,* **13**, 1442-1452.

Suseela V, Conant RT, Wallenstein MD, Dukes JS (2012) Effects of soil moisture on the temperature sensitivity of heterotrophic respiration vary seasonally in an old-field climate change experiment. *Global Change Biology,* **18**, 336-348.

Suzuki M, Suminokura N, Tanami K, Yoshitake S, Masuda S, Tomotsune M, Koizumi H (2016) Effects of long-term experimental warming on plants and soil microbes in a cool temperate semi-natural grassland in Japan. *Ecological Research,* **31**, 957-962.

Tang Z, Yin H, Zhou X, Wei Y, Liu Q (2012) Short-term Effects of Night Warming and Nitrogen Addition on Soil Respiration of Subalpine Coniferous,Western Sichuan,China. *Chinese Journal of Appplied Environmental Biology,* **18**.

Tiiva P, Faubert P, Michelsen A, Holopainen T, Holopainen JK, Rinnan R (2008) Climatic warming increases isoprene emission from a subarctic heath. *New Phytol,* **180**, 853-863.

Tokida T, Cheng W, Adachi M, Matsunami T, Nakamura H, Okada M, Hasegawa T (2012) The contribution of entrapped gas bubbles to the soil methane pool and their role in methane emission from rice paddy soil in free-air [CO2] enrichment and soil warming experiments. *Plant and Soil,* **364**, 131-143.

Tscherko D, Kandeler E, Jones TH (2001) Effect of temperature on below-ground N-dynamics in a weedy model ecosystem at ambient and elevated atmospheric CO2 levels. *Soil Biology & Biochemistry,* **33**, 491-501.

Tu C, Li F-D, Qiao Y-F, Zhu N, Gu C-K, Zhao X (2017) Effect of experimental warming on soil respiration under conventional tillage and no-tillage farmland in the North China Plain. *Journal of Integrative Agriculture,* **16**, 967-979.

Tu C, Li F (2017) Responses of greenhouse gas fluxes to experimental warming in wheat season under conventional tillage and no-tillage fields. *J Environ Sci (China),* **54**, 314-327.

Updegraff K, Bridgham SD, Pastor J, Weishampel P, Harth C (2001) Response of CO2 and CH4 emissions from peatlands to warming and water table manipulation. *Ecological Applications,* **11**, 311-326.

Usami T, Lee J, Oikawa T (2001) Interactive effects of increased temperature and CO2 on the growth of Quercus myrsinaefolia saplings. *Plant Cell and Environment,* **24**, 1007-1019.

Uselman SM, Qualls RG, Thomas RB (2000) Effects of increased atmospheric CO2, temperature, and soil N availability on root exudation of dissolved organic carbon by a N-fixing tree (*Robinia pseudoacacia* L.). *Plant and Soil,* **222**, 191-202.

Van Meeteren MJM, Tietema A, Van Loon EE, Verstraten JM (2008) Microbial dynamics and litter decomposition under a changed climate in a Dutch heathland. *Applied Soil Ecology,* **38**, 119-127.

Veteli TO, Kuokkanen K, Julkunen-Tiitto R, Roininen H, Tahvanainen J (2002) Effects of elevated CO2 and temperature on plant growth and herbivore defensive chemistry. *Global Change Biology,* **8**, 1240-1252.

Vicente-Serrano SM, Camarero JJ, Zabalza J, Sanguesa-Barreda G, Lopez-Moreno JI, Tague CL (2015) Evapotranspiration deficit controls net primary production and growth of silver fir: Implications for Circum-Mediterranean forests under forecasted warmer and drier conditions. *Agricultural and Forest Meteorology,* **206**, 45-54.

Vogan PJ, Sage RF (2012) Effects of low atmospheric CO2 and elevated temperature during growth on the gas exchange responses of C3, C3-C4 intermediate, and C4 species from three evolutionary lineages of C4 photosynthesis. *Oecologia,* **169**, 341-352.

Vogel JG, Bronson D, Gower ST, Schuur EaG (2014) The response of root and microbial respiration to the experimental warming of a boreal black spruce forest. *Canadian Journal of Forest Research,* **44**, 986-993.

Voigt C, Lamprecht RE, Marushchak ME *et al.* (2017) Warming of subarctic tundra increases emissions of all three important greenhouse gases - carbon dioxide, methane, and nitrous oxide. *Glob Chang Biol,* **23**, 3121-3138.

Volder A, Edwards EJ, Evans JR, Robertson BC, Schortemeyer M, Gifford RM (2004) Does greater night-time, rather than constant, warming alter growth of managed pasture under under ambient and elevated atmospheric CO2? *New Phytologist,* **162**, 397-411.

Volder A, Gifford RM, Evans JR (2007) Effects of elevated atmospheric CO2, cutting frequency, and differential day/night atmospheric warming on root growth and turnover of Phalaris swards. *Global Change Biology,* **13**, 1040-1052.

Volder A, Gifford RM, Evans JR (2015) Effects of elevated atmospheric CO2 concentrations, clipping regimen and differential day/night atmospheric warming on tissue nitrogen concentrations of a perennial pasture grass. *AoB Plants,* **7**.

Vu JCV, Allen LH, Boote KJ, Bowes G (1997) Effects of elevated CO2 and temperature on photosynthesis and Rubisco in rice and soybean. *Plant Cell and Environment,* **20**, 68-76.

Wan S, Hui D, Wallace L, Luo Y (2005) Direct and indirect effects of experimental warming on ecosystem carbon processes in a tallgrass prairie. *Global Biogeochemical Cycles,* **19**, GB2014.

Wan S, Norby RJ, Ledford J, Weltzin JF (2007) Responses of soil respiration to elevated CO2, air warming, and changing soil water availability in a model old-field grassland. *Global Change Biology,* **13**, 2411-2424.

Wan S, Norby RJ, Pregitzer KS, Ledford J, O'neill EG (2004) CO2 enrichment and warming of the atmosphere enhance both productivity and mortality of maple tree fine roots. *New Phytologist,* **162**, 437-446.

Wang C, Wang G, Wang Y, Zi H, Lerdau M, Liu W (2017a) Effects of long-term experimental warming on plant community properties and soil microbial community composition in an alpine meadow. *Israel Journal of Ecology & Evolution*, 1-12.

Wang C, Zhao X, Zi H, Hu L, Ade L, Wang G, Lerdau M (2017b) The effect of simulated warming on root dynamics and soil microbial community in an alpine meadow of the Qinghai-Tibet Plateau. *Applied Soil Ecology,* **116**, 30-41.

Wang D, Heckathorn SA, Mainali K, Hamilton EW (2008) Effects of N on plant response to heat-wave: a field study with prairie vegetation. *J Integr Plant Biol,* **50**, 1416-1425.

Wang K, Kellomaki S, Laitinen K (1995) Effect of needle age, long-term temperature and CO2 treatments on the photosynthesis of Scots pine. *Tree Physiology,* **15**, 211-218.

Wang X, Nakatsubo T, Nakane K (2012) Impacts of elevated CO2 and temperature on soil respiration in warm temperate evergreen Quercus glauca stands: an open-top chamber experiment. *Ecological Research,* **27**, 595-602.

Ward SE, Ostle NJ, Oakley S, Quirk H, Henrys PA, Bardgett RD (2013) Warming effects on greenhouse gas fluxes in peatlands are modulated by vegetation composition. *Ecol Lett,* **16**, 1285-1293.

Wayne PM, Reekie EG, Bazzaz FA (1998) Elevated CO2 ameliorates birch response to high temperature and frost stress: implications for modeling climate-induced geographic range shifts. *Oecologia,* **114**, 335-342.

Webb EE, Schuur EaG, Natali SM *et al.* (2016) Increased wintertime CO2 loss as a result of sustained tundra warming. *Journal of Geophysical Research: Biogeosciences,* **121**, 249-265.

Welker JM, Fahnestock JT, Henry GHR, O'dea KW, Chimner RA (2004) CO2 exchange in three Canadian High Arctic ecosystems: response to long-term experimental warming. *Global Change Biology,* **10**, 1981-1995.

Weltzin JF, Pastor J, Harth C, Bridgham SD, Updegraff K, Chapin CT (2000) Response of bog and fen plant communities to warming and water-table manipulations. *Ecology,* **81**, 3464-3478.

Wertin TM, Mcguire MA, Teskey RO (2010) The influence of elevated temperature, elevated atmospheric CO2 concentration and water stress on net photosynthesis of loblolly pine (Pinus taeda L.) at northern, central and southern sites in its native range. *Global Change Biology,* **16**, 2089-2103.

Wertin TM, Mcguire MA, Van iersel M, Ruter JM, Teskey RO (2012) Effects of elevated temperature and [CO2] on photosynthesis, leaf respiration, and biomass accumulation of Pinus taeda seedlings at a cool and a warm site within the species’ current range. *Canadian Journal of Forest Research,* **42**, 943-957.

Wheeler JA, Gonzalez NM, Stinson KA (2017) Red hot maples: Acer rubrum first-year phenology and growth responses to soil warming. *Canadian Journal of Forest Research,* **47**, 159-165.

Wu Y, Zhang J, Deng Y, Wu J, Wang S, Tang Y, Cui X (2014) Effects of warming on root diameter, distribution, and longevity in an alpine meadow. *Plant Ecology,* **215**, 1057-1066.

Xia J, Niu S, Wan S (2009) Response of ecosystem carbon exchange to warming and nitrogen addition during two hydrologically contrasting growing seasons in a temperate steppe. *Global Change Biology,* **15**, 1544-1556.

Xiong J, Chu H, Sun H, Xue X, Peng F, Zhang H (2014) Divergent responses of soil fungi functional groups to short-term warming. *Microb Ecol,* **68**, 708-715.

Xiong Q, Pan K, Zhang L, Wang Y, Li W, He X, Luo H (2016) Warming and nitrogen deposition are interactive in shaping surface soil microbial communities near the alpine timberline zone on the eastern Qinghai–Tibet Plateau, southwestern China. *Applied Soil Ecology,* **101**, 72-83.

Xu CY, Salih A, Ghannoum O, Tissue DT (2012) Leaf structural characteristics are less important than leaf chemical properties in determining the response of leaf mass per area and photosynthesis of Eucalyptus saligna to industrial-age changes in [CO2] and temperature. *J Exp Bot,* **63**, 5829-5841.

Xu G, Jiang H, Zhang Y, Korpelainen H, Li C (2013) Effect of warming on extracted soil carbon pools of Abies faxoniana forest at two elevations. *Forest Ecology and Management,* **310**, 357-365.

Xu M, Peng F, You Q, Guo J, Tian X, Liu M, Xue X (2014) Effects of warming and clipping on plant and soil properties of an alpine meadow in the Qinghai-Tibetan Plateau, China. *Journal of Arid Land,* **7**, 189-204.

Xu Z-F, Hu R, Xiong P, Wan C, Cao G, Liu Q (2010) Initial soil responses to experimental warming in two contrasting forest ecosystems, Eastern Tibetan Plateau, China: Nutrient availabilities, microbial properties and enzyme activities. *Applied Soil Ecology,* **46**, 291-299.

Xu Z, Zhao C, Yin H, Liu Q (2015) Warming and forest management interactively affect the decomposition of subalpine forests on the eastern Tibetan Plateau: A four-year experiment. *Geoderma,* **239-240**, 223-228.

Yin H, Xiao J, Li Y, Chen Z, Cheng X, Zhao C, Liu Q (2013) Warming effects on root morphological and physiological traits: The potential consequences on soil C dynamics as altered root exudation. *Agricultural and Forest Meteorology,* **180**, 287-296.

Yin HJ, Liu Q, Lai T (2007) Warming effects on growth and physiology in the seedlings of the two conifers Picea asperata and Abies faxoniana under two contrasting light conditions. *Ecological Research,* **23**, 459-469.

Yoon ST, Hoogenboom G, Flitcroft I, Bannayan M (2009) Growth and development of cotton (Gossypium hirsutum L.) in response to CO2 enrichment under two different temperature regimes. *Environmental and Experimental Botany,* **67**, 178-187.

Yoshitake S, Tabei N, Mizuno Y, Yoshida H, Sekine Y, Tatsumura M, Koizumi H (2014) Soil microbial response to experimental warming in cool temperate semi-natural grassland in Japan. *Ecological Research,* **30**, 235-245.

Yu CQ, Shen ZX, Zhang XZ, Sun W, Fu G (2014) Response of soil C and N, dissolved organic C and N, and inorganic N to short-term experimental warming in an Alpine meadow on the Tibetan Plateau. *ScientificWorldJournal,* **2014**, 152576.

Zavaleta ES, Shaw MR, Chiariello NR, Mooney HA, Field CB (2003a) Additive effects of simulated climate changes, elevated CO2, and nitrogen deposition on grassland diversity. *Proceedings of the National Academy of Sciences of the United States of America,* **100**, 7650-7654.

Zavaleta ES, Shaw MR, Chiariello NR, Thomas BD, Cleland EE, Field CB, Mooney HA (2003b) Grassland responses to three years of elevated temperature, CO2, precipitation, and N deposition. *Ecological Monographs,* **73**, 585-604.

Zeppel MJ, Lewis JD, Chaszar B, Smith RA, Medlyn BE, Huxman TE, Tissue DT (2012) Nocturnal stomatal conductance responses to rising [CO2], temperature and drought. *New Phytol,* **193**, 929-938.

Zhang L, Zhu L, Yu M, Zhong M (2016a) Warming decreases photosynthates and yield of soybean [*Glycine max* (L.) Merrill] in the North China Plain. *The Crop Journal,* **4**, 139-146.

Zhang N, Liu W, Yang H *et al.* (2013) Soil microbial responses to warming and increased precipitation and their implications for ecosystem C cycling. *Oecologia,* **173**, 1125-1142.

Zhang T, Guo R, Gao S, Guo J, Sun W (2015a) Responses of plant community composition and biomass production to warming and nitrogen deposition in a temperate meadow ecosystem. *PLoS One,* **10**, e0123160.

Zhang W, Parker KM, Luo Y, Wan S, Wallace LL, Hu S (2005) Soil microbial responses to experimental warming and clipping in a tallgrass prairie. *Global Change Biology,* **11**, 266-277.

Zhang X, Johnston ER, Li L, Konstantinidis KT, Han X (2017) Experimental warming reveals positive feedbacks to climate change in the Eurasian Steppe. *ISME J,* **11**, 885-895.

Zhang Y, Gao Q, Dong S *et al.* (2015b) Effects of grazing and climate warming on plant diversity, productivity and living state in the alpine rangelands and cultivated grasslands of the Qinghai-Tibetan Plateau. *The Rangeland Journal,* **37**.

Zhang Z, Qiao M, Li D, Yin H, Liu Q (2016b) Do warming-induced changes in quantity and stoichiometry of root exudation promote soil N transformations via stimulation of soil nitrifiers, denitrifiers and ammonifiers? *European Journal of Soil Biology,* **74**, 60-68.

Zhao YH, Jia X, Wang WK, Liu T, Huang SP, Yang MY (2016) Growth under elevated air temperature alters secondary metabolites in Robinia pseudoacacia L. seedlings in Cd- and Pb-contaminated soils. *Sci Total Environ,* **565**, 586-594.

Zhao Z, Dong S, Jiang X *et al.* (2017) Effects of warming and nitrogen deposition on CH4, CO2 and N2O emissions in alpine grassland ecosystems of the Qinghai-Tibetan Plateau. *Sci Total Environ,* **592**, 565-572.

Zhong Q, Du Q, Gong J, Zhang C, Wang K (2013) Effects of in situ experimental air warming on the soil respiration in a coastal salt marsh reclaimed for agriculture. *Plant and Soil,* **371**, 487-502.

Zhong ZM, Shen ZX, Fu G (2016) Response of soil respiration to experimental warming in a highland barley of the Tibet. *Springerplus,* **5**, 137.

Zhou X, Chen C, Wang Y, Xu Z, Duan J, Hao Y, Smaill S (2013) Soil extractable carbon and nitrogen, microbial biomass and microbial metabolic activity in response to warming and increased precipitation in a semiarid Inner Mongolian grassland. *Geoderma,* **206**, 24-31.

Zhou X, Ge Z-M, KellomÄki S, Wang K-Y, Peltola H, Martikainen P (2011) Effects of elevated CO2 and temperature on leaf characteristics, photosynthesis and carbon storage in aboveground biomass of a boreal bioenergy crop (Phalaris arundinacea L.) under varying water regimes. *GCB Bioenergy,* **3**, 223-234.

Zhou X, Sherry RA, An Y, Wallace LL, Luo Y (2006) Main and interactive effects of warming, clipping, and doubled precipitation on soil CO2 efflux in a grassland ecosystem. *Global Biogeochemical Cycles,* **20**, n/a-n/a.

Zhou X, Wan S, Luo Y (2007) Source components and interannual variability of soil CO2 efflux under experimental warming and clipping in a grassland ecosystem. *Global Change Biology,* **13**, 761-775.

Zhu X, Luo C, Wang S *et al.* (2015) Effects of warming, grazing/cutting and nitrogen fertilization on greenhouse gas fluxes during growing seasons in an alpine meadow on the Tibetan Plateau. *Agricultural and Forest Meteorology,* **214-215**, 506-514.

Zong S, Jin Y, Xu J, Wu Z, He H, Du H, Wang L (2016) Nitrogen deposition but not climate warming promotes Deyeuxia angustifolia encroachment in alpine tundra of the Changbai Mountains, Northeast China. *Sci Total Environ,* **544**, 85-93.

**Text S3:** PRISMA diagram to show how we ended up with 322 papers.



**Text S4:** The Normal-test was used to test the frequency distribution of individual *RR* to warming.

The Normal-test was used to test the frequency distribution of individual *RR* to warming (Eq. 1, Systat Software Inc., CA, USA).

*y*=*α exp*$\left[-\frac{\left(x-μ\right)^{2}}{2σ^{2}}\right]$ (1)

where *x* is *RR* of a certain variable; *y* is the frequency (i.e., number of individual *RR*); *α* is a coefficient showing the expected number of *RR* values at x = μ; *μ* and σ are mean and variance of the frequency distributions of *RR*, respectively.

