

Supplemental materials for: How do climate change experiments actually change climate?

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April 14, 2017

Climate from Climate Change Experiments Database

We developed a new, publicly available database for our analyses: the Climate from Climate Change Experiments (C3E) database, which is available at KNB. These database of daily climate data allow us to explore, for the first time, the complex ways that climate is altered by active warming treatments, both directly and indirectly, across multiple studies. The data in this database were collected between 1991 and 2014 from North American and European climate change experiments (Table 1, Figure 1 in the main text).

We carried out a full literature review to identify potential active field warming experiments to include in the database. To find these studies, we followed the methods and search terms of (Wolkovich *et al.*, 2012) for their Synthesis of Timings Observed in iNcrease Experiments (STONE) database (also available on KNB). We searched the Web of Science (ISI) for Topic=(warm* OR temperature*) AND Topic=(plant* AND phenolog*) AND Topic=(experiment* OR manip*). We restricted dates to the time period after their database (i.e. January 2011 through March 2015). This yielded 277 new studies.

We wanted to focus on active warming studies only, so we removed all passive warming studies from this list. In addition, a secondary goal of this database was to test hypotheses about mechanisms for the mismatch in sensitivities between observational and experimental phenological studies. Because of this secondary goal, studies included in the database had to either 1) include more than one level of warming, or 2) manipulate both temperature and precipitation. (Some studies met both of these criteria.) These additional restrictions constrained the list to 11 new studies, as well as 6 of the 37 studies in the STONE database. We contacted authors to obtain daily (or sub-daily) climate data and the most accurate phenological data for these 17 sites, as well as one additional site that we knew about through personal connections (BACE). We received data from authors of 12 of these 18 studies or 67%. STONE received 16.7% of data directly.

Additional Analyses

References

Wolkovich, E. M. *et al.* Warming experiments underpredict plant phenological responses to climate change. *Nature* **485**, 494–497 (2012). PT: J; UT: WOS:000304344500041.

Tables

Table 1: Basic xtable

	study	location	warming_type	data_years	warming_c	precip_perc	soilt
1	exp01	Waltham, MA, USA	above-canopy (infrared)	2010-2014	1,2,7,4	150,50	2,10
2	exp02	Montpelier, France	above-canopy (infrared)	2002-2005	1.5,3	70	NA
3	exp03	Duke Forest, North Carolina, USA	above-canopy & soil warming	2009-2012	3,5	none	10
4	exp04	Harvard Forest, Massachusetts, USA	above-canopy & soil warming	2009-2012	3,5	none	10
5	exp05	Jasper Ridge Biological Reserve, CA, USA	above-canopy (infrared)	2000-2002	1	150	15
6	exp06	Rocky Mountain Biological Laboratory, CO, USA	above-canopy (infrared)	1995-1998	1	none	12,2
7	exp07	Harvard Forest, MA, USA	above-canopy (forced air)	2009-2010	1.5,2,2.5,3,3.5,4,4.5,5,5.5	none	2,6
8	exp08	Harvard Forest, MA, USA	soil warming	1993-1993	5	none	5
9	exp09	Stone Valley Forest, PA, USA	above-canopy (infrared)	2009-2010	2	120	3
10	exp10	Duke Forest, North Carolina, USA	above-canopy (forced air)	2010-2012	1.5,2,2.5,3,3.5,4,4.5,5,5.5	none	2,6
11	exp11	Rocky Mountain Biological Laboratory, CO, USA	above-canopy (infrared)	1991-1994	1	none	12
12	exp12	Kessler Farm Field Laboratory, OK, USA	above-canopy (infrared)	2003-2003	4	200	7.5,2