How to write good research papers

Jingfeng Xiao (肖劲锋)

Earth Systems Research Center, University of New Hampshire

USCCC Writing Workshop

Jiujiang, China, August 15, 2018

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

Ideas are like fruits

- Good ones & bad ones
- Low-hanging fruits & high-hanging fruits
- In season & out of season
- Juicy ones & juiceless ones

Have curiosity and passion

- Curiosity is the key to science
- Love what you do
- Find a reason to like it
- Force yourself to like it
- Switch to something else

Know the literature

- From new to old
- Classical and ongoing
- What has been done
- What has not been done
  - Pay attention to Discussion and Conclusions

Attend conferences

- Introduce your work
- Lots of information
- Latest work
- Next steps
- Borrow ideas
- Networking
- Exposure
- Attend AGU and/or ESA

Think more

- Do not always work
- Leave some time for thinking
- What projects I can propose
- What questions I can answer
- What papers I can write

Discuss with colleagues

- Advisors
- Collaborators
- Other group members
- Friends
- Two heads are better than one

Bottom-up vs top-down

- Bottom-up
  - Start with existing data (e.g., model simulations for the Tibet Plateau; two years of eddy covariance data)
  - Try to figure out what papers can be written
- Top-down
  - Start with science questions or hypotheses
  - Then think about how to proceed

SCIENTIFIC REPORTS

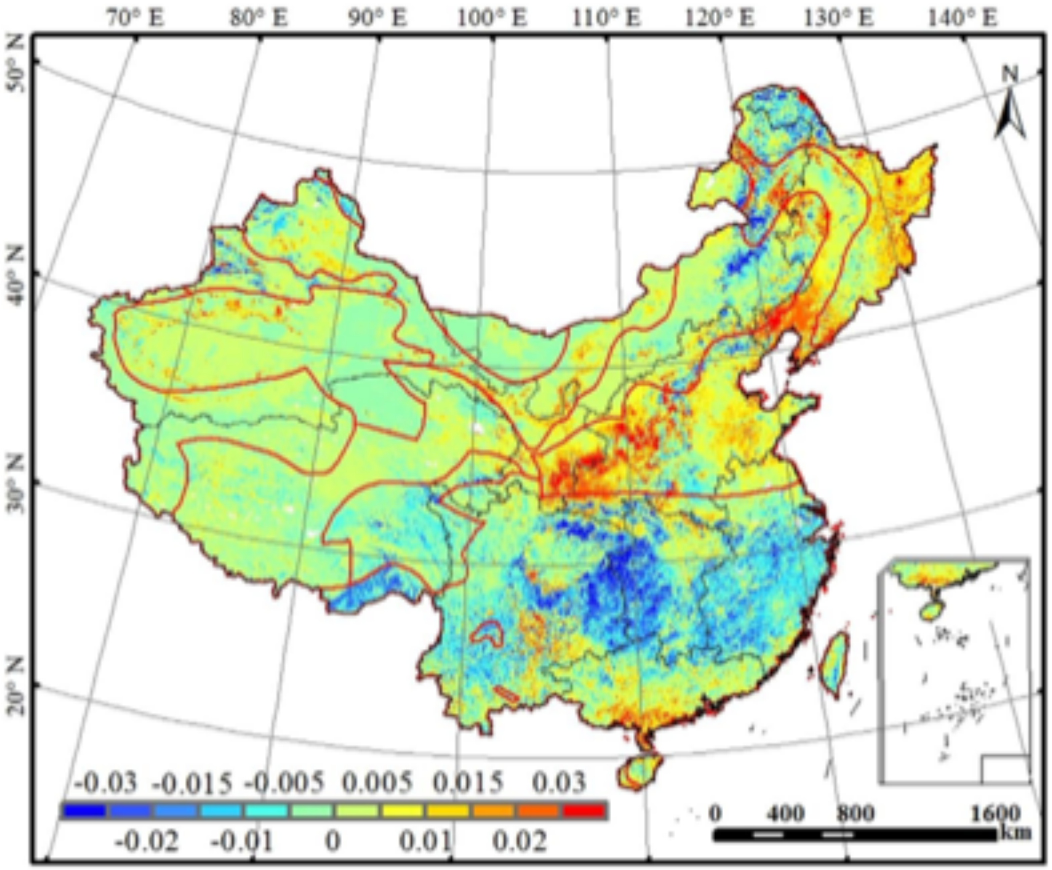
OPEN

Water use efficiency of China's terrestrial ecosystems and responses to drought

Received: 02 April 2015
Accepted: 05 August 2015
Published: 08 September 2015

Yibo Liu[1,2,3], Jingfeng Xiao[4,5], Weimin Ju[2,3], Yanlian Zhou[2,6], Shaoqiang Wang[7] & Xiaocui Wu[2,3]

Water use efficiency (WUE) measures the trade-off between carbon gain and water loss of terrestrial ecosystems, and better understanding its dynamics and controlling factors is essential for predicting ecosystem responses to climate change. We assessed the magnitude, spatial patterns, and trends of WUE of China's terrestrial ecosystems and its responses to drought using a process-based ecosystem model. During the period from 2000 to 2011, the national average annual WUE (net primary productivity (NPP)/evapotranspiration (ET)) of China was 0.79 g C kg^{-1} H_2O. Annual WUE decreased in the southern regions because of the decrease in NPP and the increase in ET and increased in most northern regions mainly because of the increase in NPP. Droughts usually increased annual WUE in Northeast China and central Inner Mongolia but decreased annual WUE in central China. "Turning-points" were observed for southern China where moderate and extreme droughts reduced annual WUE and severe drought slightly increased annual WUE. The cumulative lagged effect of drought on monthly WUE varied by region. Our findings have implications for ecosystem management and climate policy making. WUE is expected to continue to change under future climate change particularly as drought is projected to increase in both frequency and severity.



Liu et al. Scientific Reports, 2015

Figure 2. Trends of annual WUE (g C kg^{-1} H_2O yr^{-1}) for the terrestrial ecosystems across China during the period 2000-2011. This figure was produced using ArcGIS 10.0.

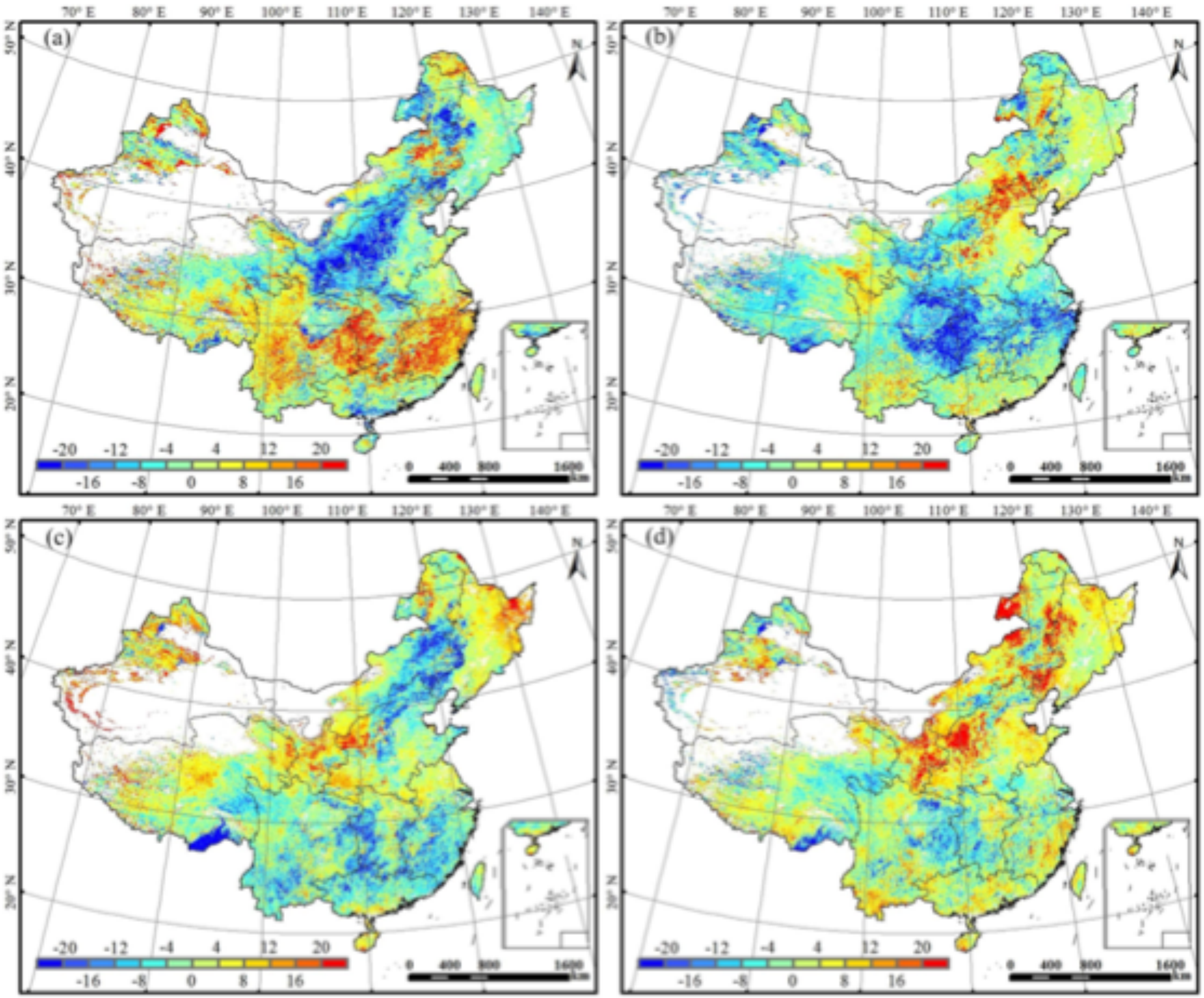


Figure 4. The spatial distributions of annual WUE anomalies (%) in 2001 (**a**), 2006 (**b**), 2009 (**c**) and 2011 (**d**) relative to the 12-year mean over the period 2000-2011 means, respectively. This figure was produced using ArcGIS 10.0.

Liu et al. Scientific Reports, 2015

AGU PUBLICATIONS

JGR

Journal of Geophysical Research: Biogeosciences

RESEARCH ARTICLE

10.1002/2017JG003949

Key Points:

- The trend in spring phenology on the Tibetan Plateau varied among the five NDVI data sets and between the two phenology retrieval methods
- There was no consistent evidence for advancing or delaying trends in spring phenology on the Tibetan Plateau
- The debate on the trends of spring phenology could be largely attributed to the use of different NDVI data sets and/or different methods

No Consistent Evidence for Advancing or Delaying Trends in Spring Phenology on the Tibetan Plateau

Xufeng Wang[1,2], Jingfeng Xiao[2], Xin Li[1,3], Guodong Cheng[1], Mingguo Ma[4], Tao Che[1], Liyun Dai[1], Shaoying Wang[5], and Jinkui Wu[6]

[1]Key Laboratory of Remote Sensing of Gansu Province, Heihe Remote Sensing Experimental Research Station, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou, China, [2]Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH, USA, [3]CAS Center for Excellence in Tibetan Plateau Earth Sciences, Chinese Academy of Sciences, Beijing, China, [4]School of Geographical Sciences, Southwest University, Chongqing, China, [5]Key Laboratory of Land Surface and Climate Change in Cold and Arid Regions, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou, China, [6]State Key Laboratory of Cryospheric Sciences, Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou, China

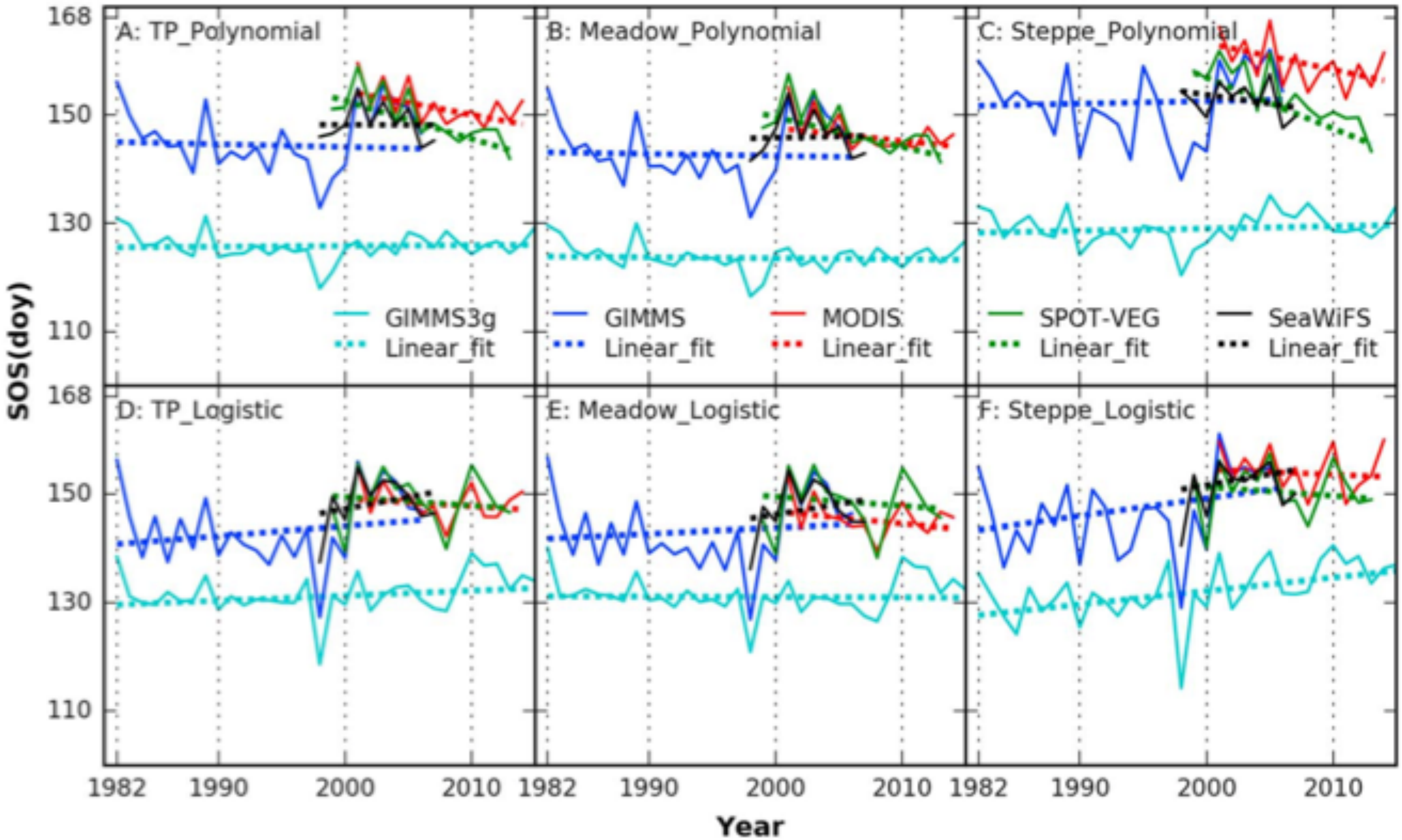


Figure 2. Start of growing season (SOS) of the Tibetan Plateau retrieved from the GIMMS3g, GIMMS, MODIS, SPOT-VEG, and SeaWiFS NDVI data sets. Dotted lines are the linear fitting lines based on the Theil-Sen method at confidence degree 0.95. The trend slopes and *P* values are provided in Table S1. TP: the entire Tibetan Plateau including both alpine meadow and steppe areas, Meadow: alpine meadow areas, Steppe: alpine steppe areas, Polynomial: threshold SOS method using polynomial function fitting, Logistic: inflection point SOS method using double logistic function fitting.

Wang et al., JGR, 2014

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

Curiosity & observation

Curiosity & observation

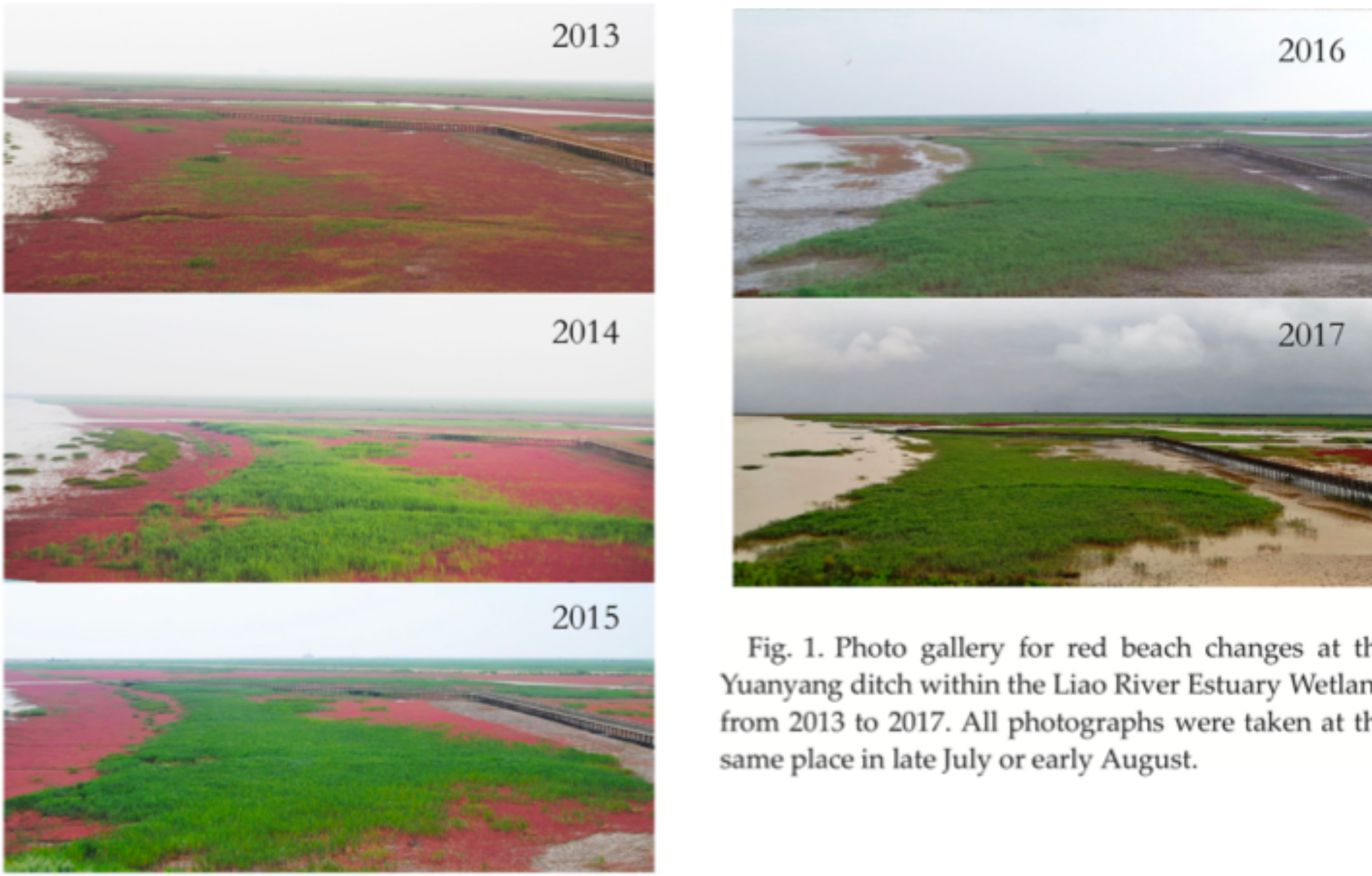


Fig. 1. Photo gallery for red beach changes at the Yuanyang ditch within the Liao River Estuary Wetland from 2013 to 2017. All photographs were taken at the same place in late July or early August.

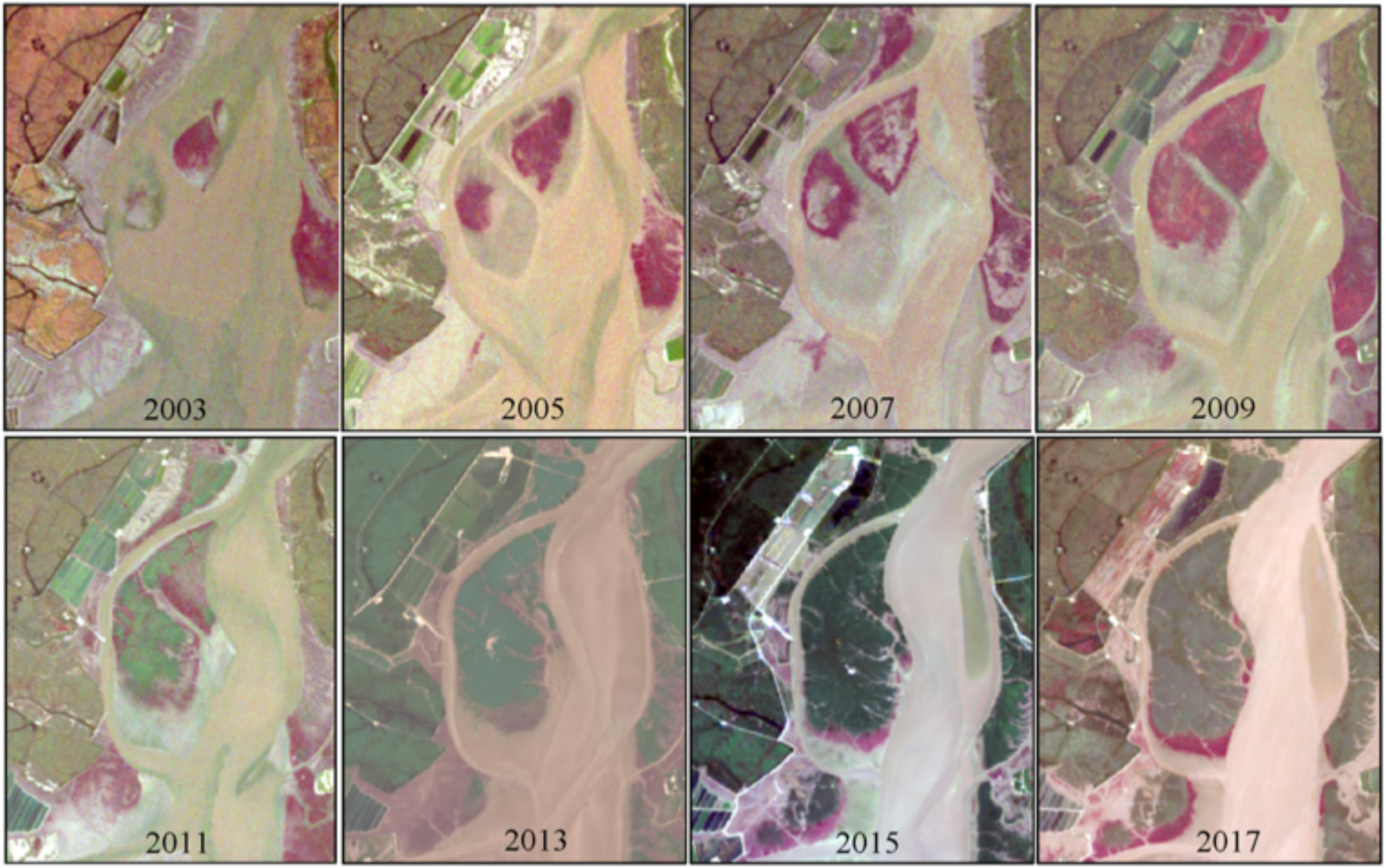


Fig. 3. Spatial distribution and temporal development of red beaches and the succession from seepweed to reed within the study area between 2003 and 2017. These Landsat images are shown in natural color with seepweed appearing in red (or pink) and reed in green.

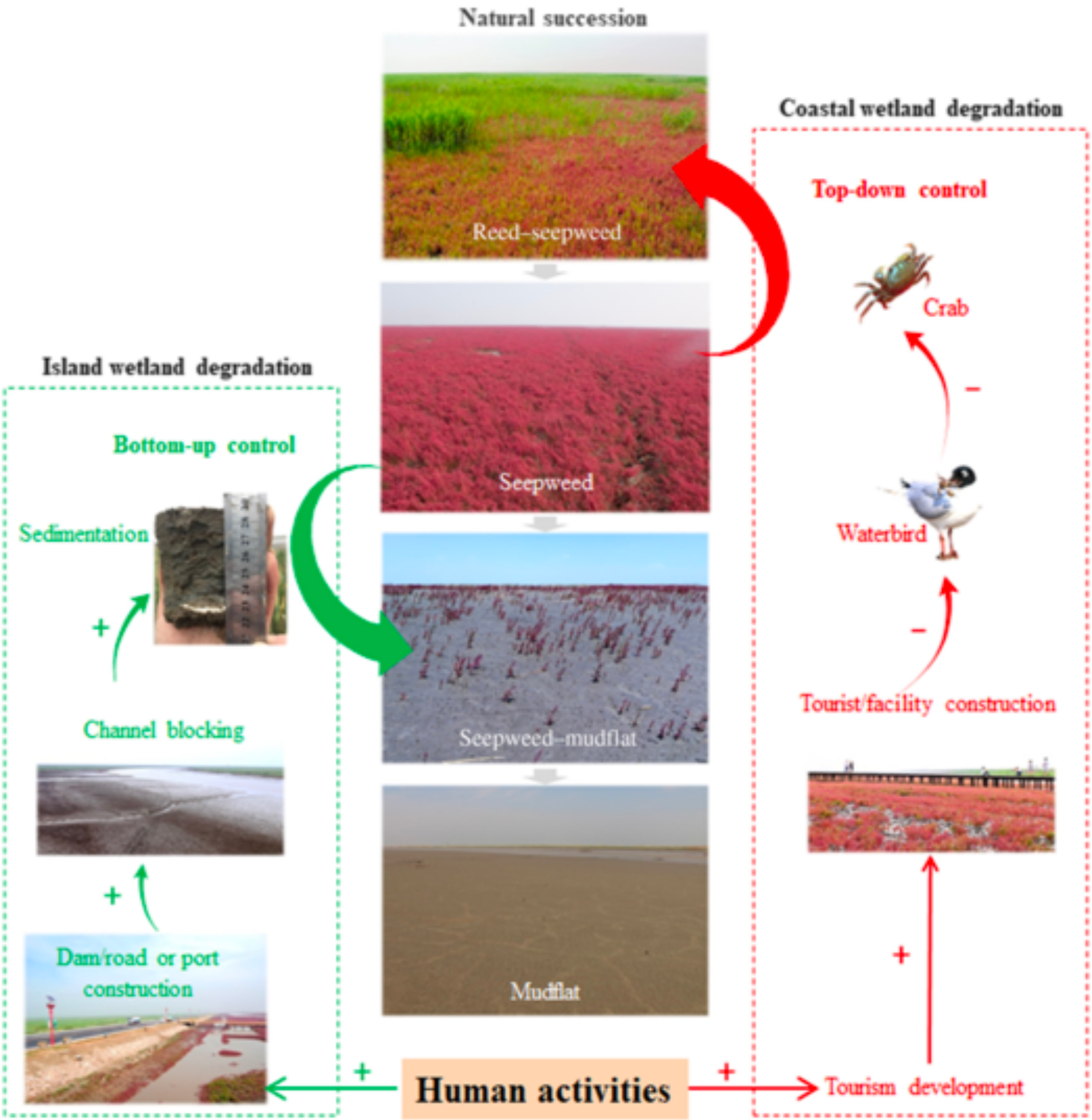


Fig. 12. Conceptual model of succession and degradation of red beaches in the Liao River Estuary Wetland based on the present research and assumptions.

esa ECOSPHERE

Human activities accelerated the degradation of saline seepweed red beaches by amplifying top-down and bottom-up forces

Weizhi Lu,[1,2] Jingfeng Xiao,[2,†] Wei Lei,[1] Jinqiu Du,[1] Zhengjie Li,[3] Pifu Cong,[1] Wenhao Hou,[1] Jialin Zhang,[1] Luzhen Chen,[4] Yihui Zhang,[4] and Guoxiang Liao[1]

[1]*Key Laboratory for Ecological Environment in Coastal Areas (SOA), National Marine Environmental Monitoring Center, Dalian 116023 China*
[2]*Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, New Hampshire 03824 USA*
[3]*CAS Key Laboratory of Forest Ecology and Management, Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang 110164 China*
[4]*Key Laboratory of the Ministry of Education for Coastal and Wetland Ecosystems, College of the Environment and Ecology, Xiamen University, Xiamen, Fujian 361102 China*

Citation: Lu, W., J. Xiao, W. Lei, J. Du, Z. Li, P. Cong, W. Hou, J. Zhang, L. Chen, Y. Zhang, and G. Liao. 2018. Human activities accelerated the degradation of saline seepweed red beaches by amplifying top-down and bottom-up forces. Ecosphere 9(7):e02352. 10.1002/ecs2.2352

Science question

IOP Publishing Environ. Res. Lett. 11 (2016) 094010 doi:10.1088/1748-9326/11/9/094010

Environmental Research Letters

LETTER

OPEN ACCESS

RECEIVED
5 April 2016

REVISED
20 July 2016

ACCEPTED FOR PUBLICATION
15 August 2016

PUBLISHED
7 September 2016

Recent trends in vegetation greenness in China significantly altered annual evapotranspiration and water yield

Yibo Liu[1,2], Jingfeng Xiao[2,3], Weimin Ju[4], Ke Xu[5], Yanlian Zhou[6] and Yuntai Zhao[7]

[1] Jiangsu Key Laboratory of Agricultural Meteorology, School of Applied Meteorology, Nanjing University of Information Science and Technology, Nanjing, 210044, People's Republic of China

[2] Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH 03824, USA

[3] International Center for Ecology, Meteorology, and Environment, School of Applied Meteorology, Nanjing University of Information Science and Technology, Nanjing, 210044, People's Republic of China

[4] International Institute for Earth System Sciences, Nanjing University, Nanjing, 210023, People's Republic of China

[5] Department of Atmospheric and Oceanic Sciences & Center for Climate Research, University of Wisconsin Madison, Madison, WI 53706, USA

[6] School of Geographic and Oceanographic Sciences, Nanjing University, Nanjing, 210023, People's Republic of China

[7] China Land Surveying and Planning Institute, Beijing, 10035, People's Republic of China

E-mail: j.xiao@unh.edu

Keywords: vegetation greenness, greening, browning, water yield, evapotranspiration, afforestation, leaf area index

Supplementary material for this article is available online

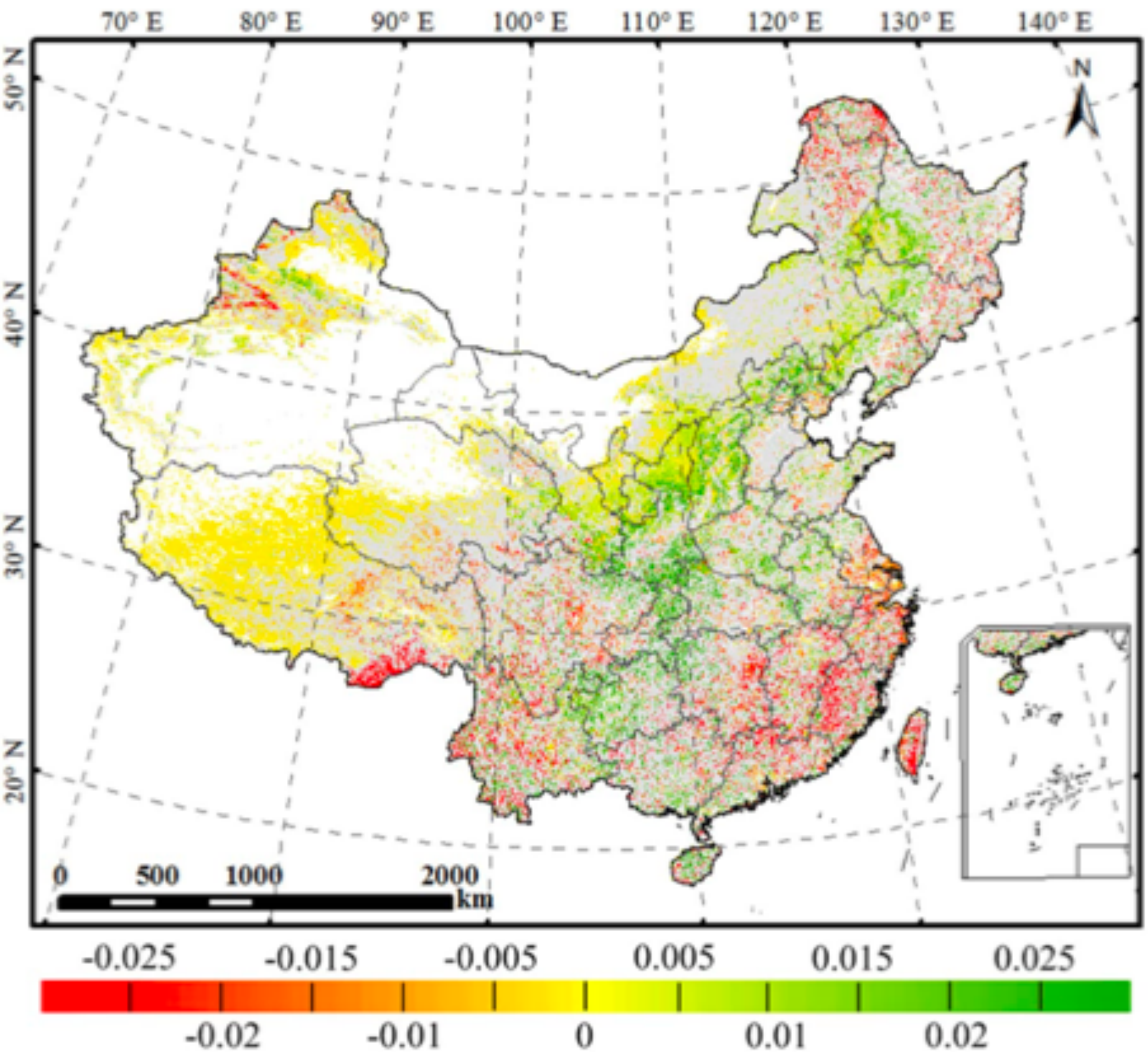


Figure 2. Trends of vegetation greenness as characterized by annual mean LAI for China's terrestrial ecosystems during the period 2000–2014. The units of the trends are $m^2\ m^{-2}\ yr^{-1}$. The white color indicates non-vegetated areas, and light gray indicates vegetated areas with insignificant trends in annual mean LAI ($p > 0.05$).

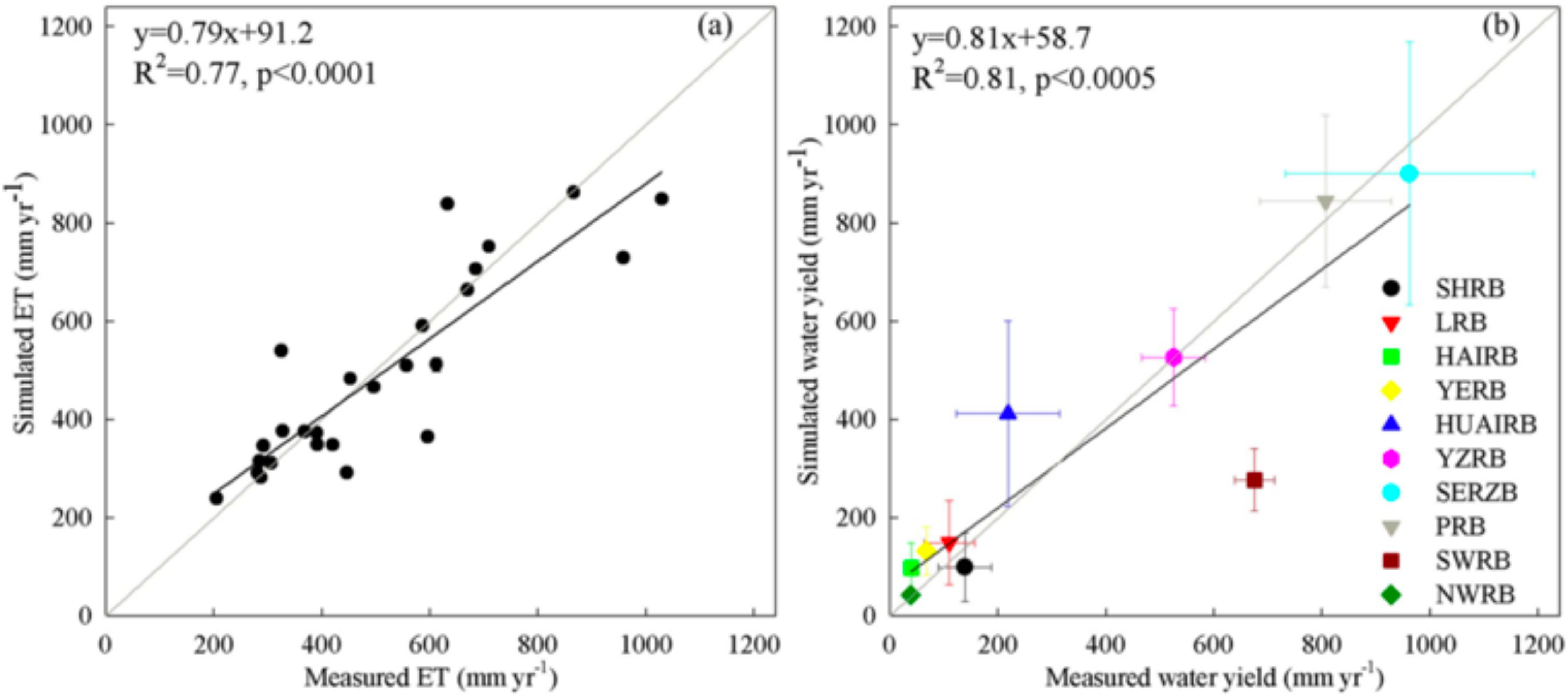


Figure 4. Evaluation of simulated annual ET and water yield: (a) simulated ET versus measured ET across the 26 EC sites; (b) simulated water yield versus measured water yield across the 10 river basins.

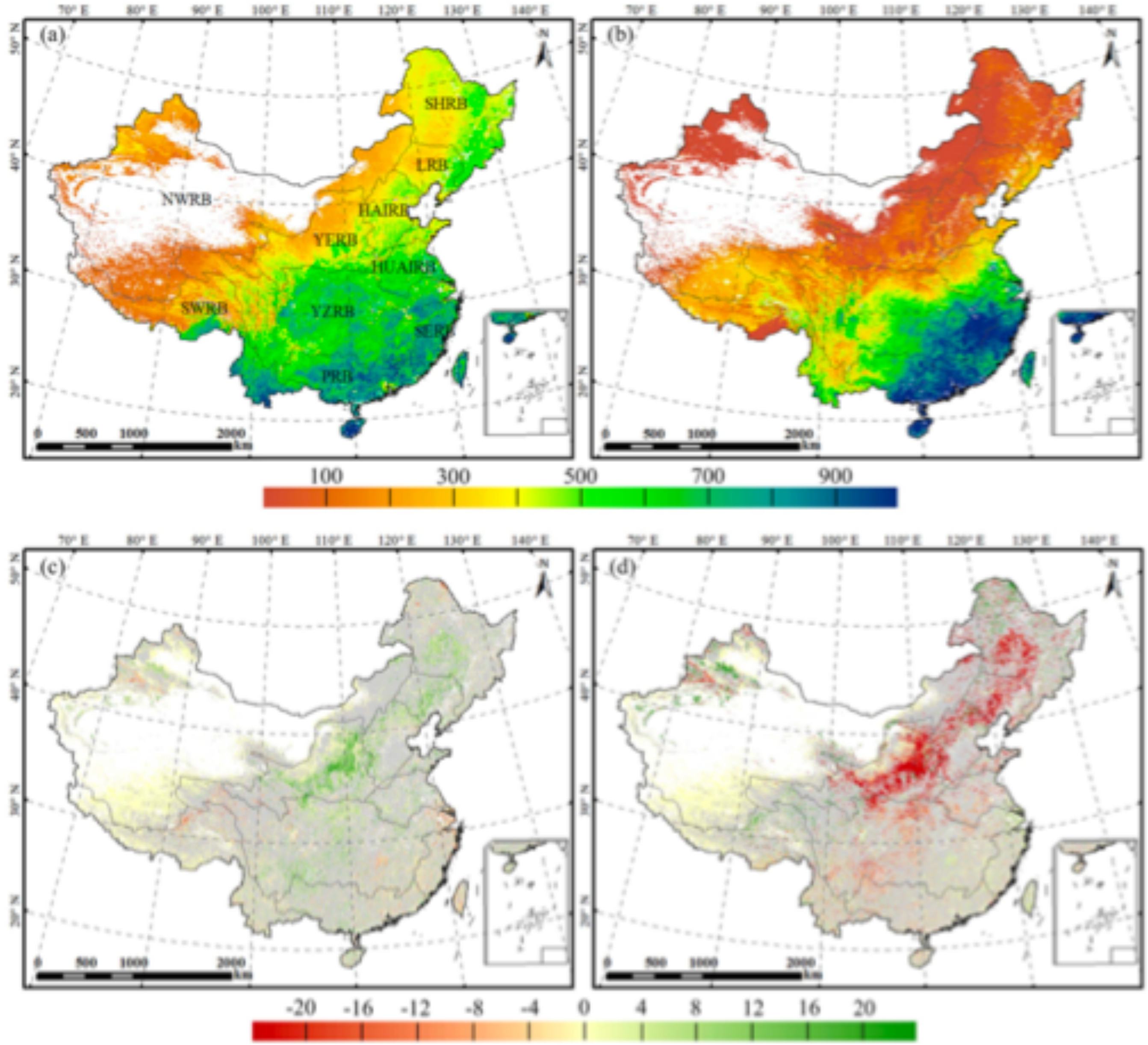


Figure 5. Magnitude and spatial distribution of mean annual ET and water yield in China over the period 2000–2014: (a) mean annual ET (mm yr^{-1}) and (b) mean annual water yield (mm yr^{-1}) simulated with original LAI; (c) the relative differences (%) in annual ET between the two model simulations (original–detrended); and (d) the relative differences (%) in water yield between the two model simulations (original–detrended).

Meta-analysis

Global Change Biology

Global Change Biology (2017) **23**, 1180–1198, doi: 10.1111/gcb.13424

Contrasting ecosystem CO_2 fluxes of inland and coastal wetlands: a meta-analysis of eddy covariance data

WEIZHI LU[1], JINGFENG XIAO[2], FANG LIU[3], YUE ZHANG[1], CHANG'AN LIU[1] and GUANGHUI LIN[3,4]

[1]*National Marine Environmental Monitoring Center, State Oceanic Administration, Dalian 116023, China,* [2]*Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH 03824, USA,* [3]*Ministry of Education Key Laboratory for Earth System Modeling, Center for Earth System Science, Tsinghua University, Beijing 100084, China,* [4]*Division of Ocean Science and Technology, Graduate School at Shenzhen, Tsinghua University, Shenzhen 518055, China*

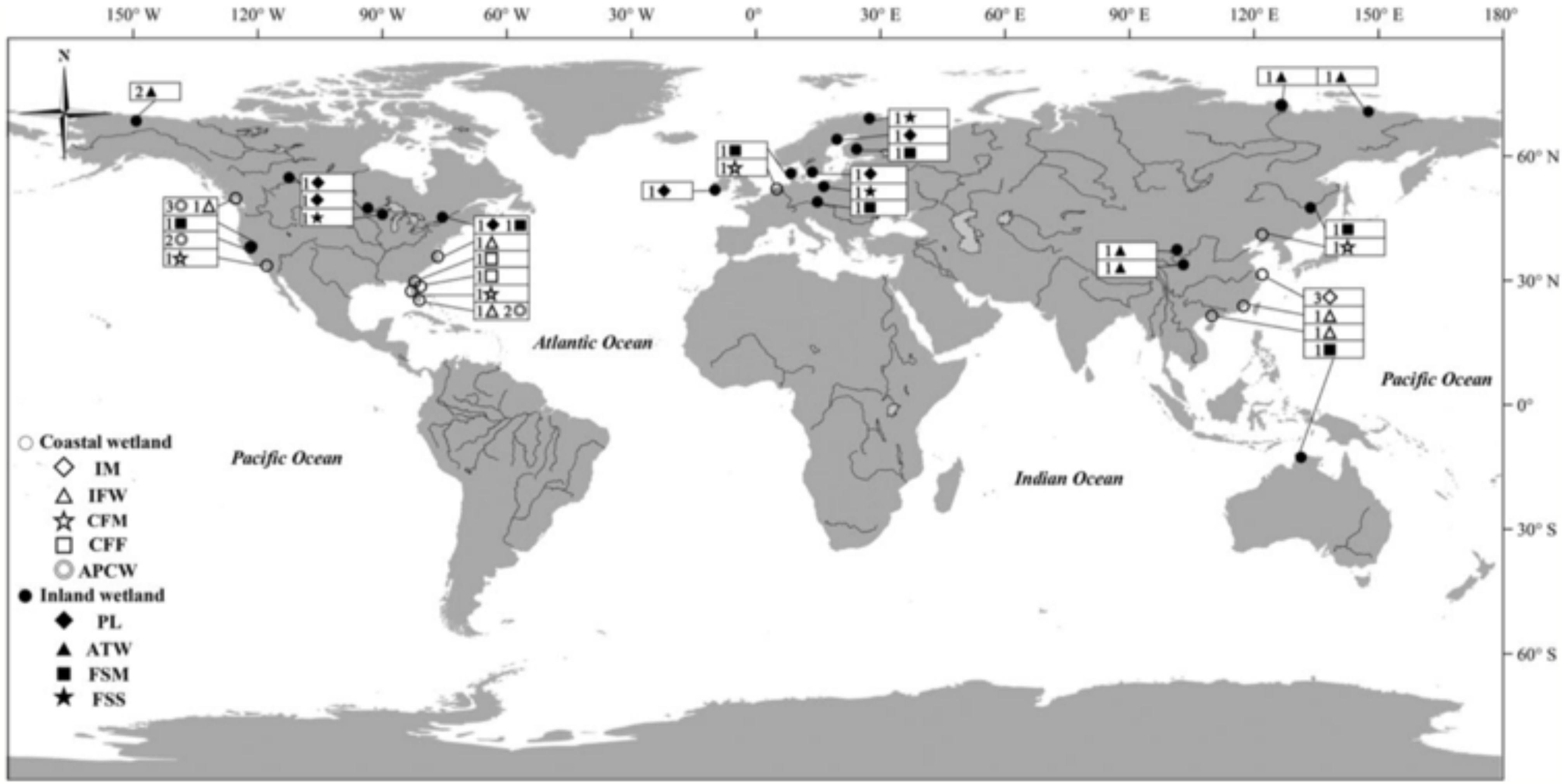


Fig. 1 Location and distribution of the wetland sites selected in this meta-analysis. The wetland sites are grouped into inland wetlands and coastal wetlands. The inland wetlands include peatland (PL), freshwater swamp marsh (FSM), freshwater shrub swamp (FSS), and alpine tundra wetlands (ATW). Coastal wetlands include intertidal forested wetlands (IFW), intertidal marshes (IM), coastal freshwater marshes (CFM), coastal freshwater forests (CFF), and anthropogenic perturbations coastal wetlands (APCW).

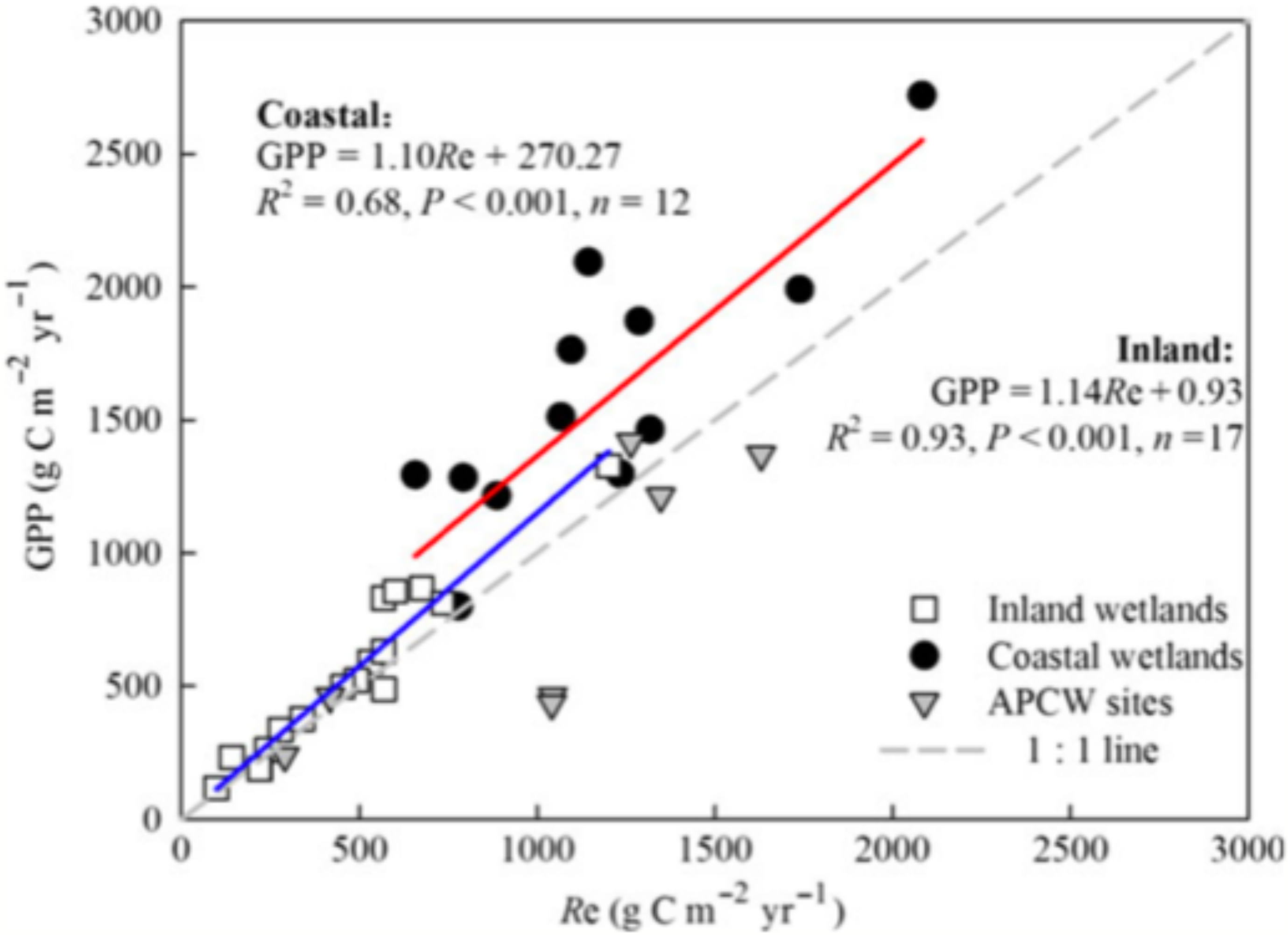


Fig. 9 Relationship between annual gross primary productivity (GPP) and annual ecosystem respiration (R_e) for the inland wetlands (blue line), the coastal wetlands (red line), and the coastal wetland sites with heavy anthropogenic perturbations.

Synthesis

Agricultural and Forest Meteorology 182–183 (2013) 76–90

Contents lists available at ScienceDirect

Agricultural and Forest Meteorology

journal homepage: www.elsevier.com/locate/agrformet

ELSEVIER

Carbon fluxes, evapotranspiration, and water use efficiency of terrestrial ecosystems in China

Jingfeng Xiao[a,*], Ge Sun[b], Jiquan Chen[c,d], Hui Chen[e], Shiping Chen[f], Gang Dong[g], Shenghua Gao[h], Haiqiang Guo[i], Jixun Guo[j], Shijie Han[k], Tomomichi Kato[l], Yuelin Li[m], Guanghui Lin[n], Weizhi Lu[e], Mingguo Ma[o], Steven McNulty[b], Changliang Shao[f], Xufeng Wang[o], Xiao Xie[i], Xudong Zhang[h], Zhiqiang Zhang[p], Bin Zhao[i], Guangsheng Zhou[f], Jie Zhou[p]

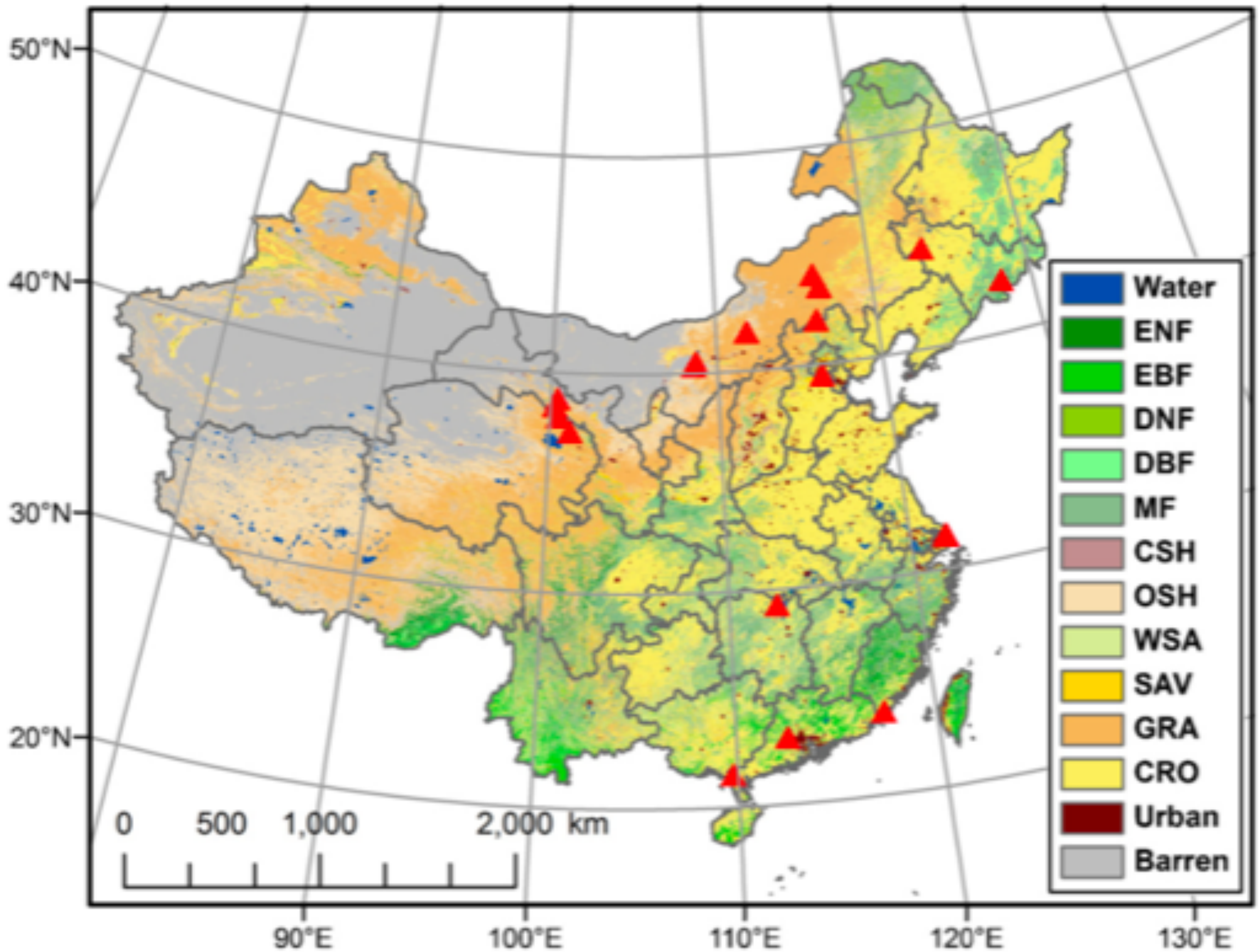


Fig. 1. Location and distribution of the eddy covariance (EC) flux sites used in this study. The base map is the 1 km land-cover map derived from the moderate resolution imaging spectroradiometer (MODIS) (Friedl et al., 2002). The land-cover types of the map are evergreen needleleaf forests (ENF), evergreen broadleaf forests (EBF), deciduous needleleaf forests (DNF), deciduous broadleaf forests (DBF), mixed forests (MF), closed shrublands (CSH), open shrublands (OSH), woody savannas (WSA), savannas (SAV), grasslands (GRA), croplands (CRO), urban, barren or sparsely vegetated (Barren), and water. The symbols represent the EC sites, and the site descriptions are provided in Tables 1 and 2.

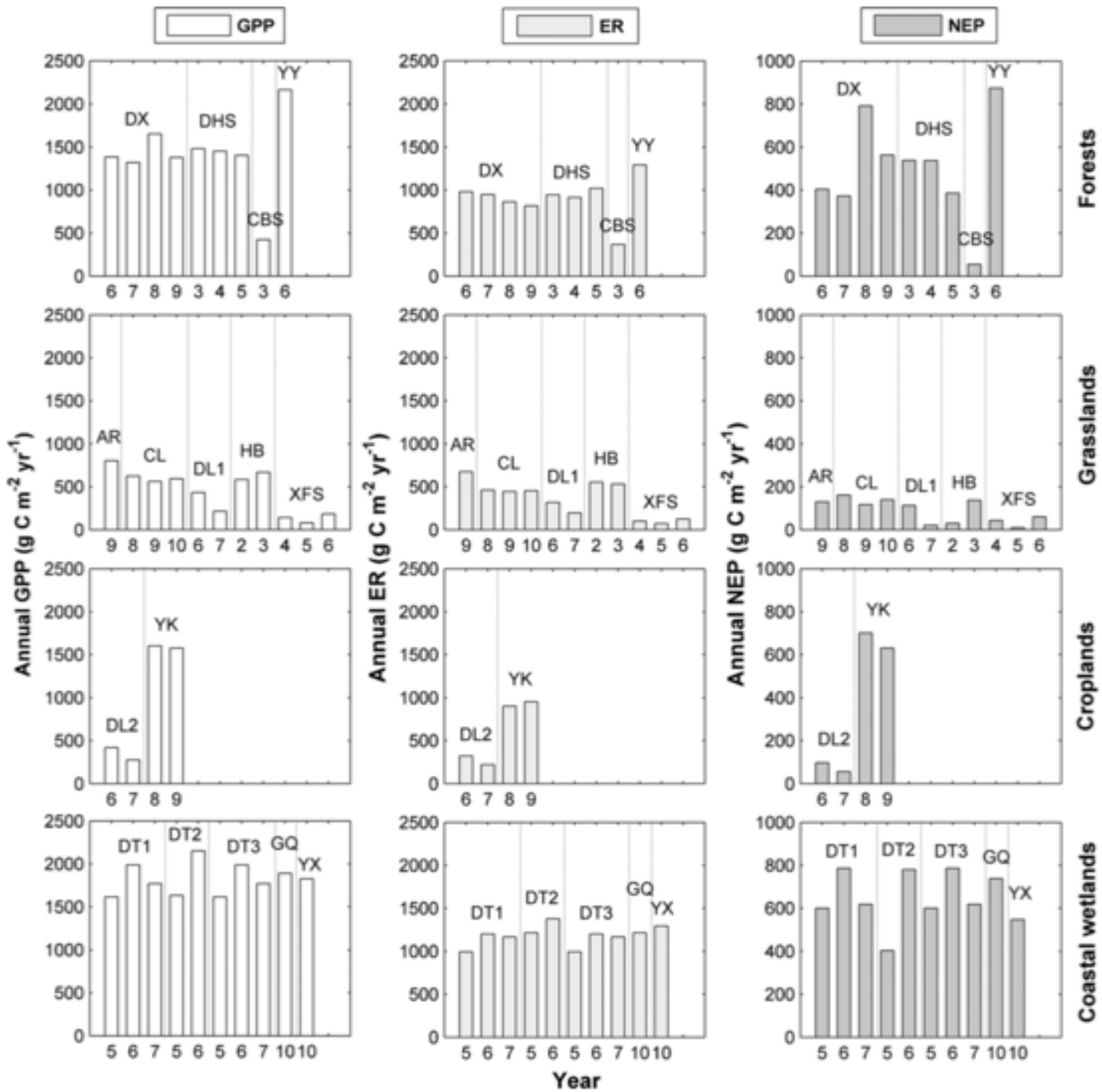


Fig. 2. Annual GPP, ER, and NEP for each eddy covariance site within each vegetation type: (a) forests; (b) grasslands; (c) croplands; (d) coastal wetlands.

JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 115, G00K02, doi:10.1029/2010JG001390, 2010

Ecosystem carbon dioxide fluxes after disturbance in forests of North America

B. D. Amiro,[1] A. G. Barr,[2] J. G. Barr,[3] T. A. Black,[4] R. Bracho,[5] M. Brown,[4] J. Chen,[6] K. L. Clark,[7] K. J. Davis,[8] A. R. Desai,[9] S. Dore,[10] V. Engel,[3] J. D. Fuentes,[8] A. H. Goldstein,[11] M. L. Goulden,[12] T. E. Kolb,[10] M. B. Lavigne,[13] B. E. Law,[14] H. A. Margolis,[15] T. Martin,[5] J. H. McCaughey,[16] L. Misson,[11,17] M. Montes-Helu,[10] A. Noormets,[18] J. T. Randerson,[12] G. Starr,[19] and J. Xiao[20]

Received 15 April 2010; revised 9 June 2010; accepted 18 June 2010; published 27 October 2010.

Table 1. Description of Sites[a]

Chronosequence	Location (Latitude, Longitude)	Vegetation Type[b]	Year of Most Recent Disturbance	Years Measured	Annual Mean Air Temperature (°C)	Annual Total Precipitation (mm)	Reference for Data	Site Name Used in Reference
			Fire Chronosequences					
Alaska	63.9N, 145.7W	ground vegetation	1999	1999, 2002	−1.9	300	*Randerson et al.* [2006]; *Welp et al.* [2006, 2007]	Bn3
	63.9N, 145.4W	bs, ta, willow	1987	2002–2004				Bn2
	63.9N, 145.7W	bs	1920	2002–2004				Bn1
Saskatchewan	53.9N, 106.1W	jp, bs, ta	1998	2001–2006	0.4	470	*Amiro et al.* [2006]; *Mkhabela et al.* [2009]	F98
	54.3N, 105.9W	jp, ta	1989	2002–2005				F89
	54.5N, 105.8W	jp	1977	2004–2006				F77
	53.9N, 104.7W	jp	1919	2000–2007			*Kljun et al.* [2006]	OJP
Manitoba	56.6N, 98.2W	ta, willow, bs	2003	2004–2005	−3.2	520	*Goulden et al.* [2006]; *McMillan et al.* [2008]	NSA2003
	56.6N, 98.2W	ta, willow, bs	1998	2003–2005				NSA1998
	55.9N, 99.0W	ta, willow, bs	1989	2003–2005				NSA1989
	55.8N, 98.4W	ta, willow, bs	1981	2002–2005				NSA1981
	55.8N, 98.4W	bs, jp, ta	1964	2002–2005				NSA1964
	55.8N, 98.5W	bs	1930	2002–2004				NSA1930
Arizona	35.1N, 111.8W	pp	1996	2006–2008	7.9	580	*Dore et al.* [2010]	Fwf
	35.1N, 111.8W	pp	1919	2006–2008			*Dore et al.* [2008, 2010]	Fuf
			Harvest Chronosequences					
Saskatchewan	53.9N, 104.6W	ground vegetation, jp	2002	2004–2005	0.4	470	*Kljun et al.* [2006]; *Mkhabela et al.* [2009]; *Zha et al.* [2009]	HJP02
	53.9N, 104.7W	jp	1994	2004–2005				HJP94
	53.9N, 104.6W	jp	1975	2004–2005				HJP75
	53.9N, 104.7W	jp	1919	2000–2007				OJP
Quebec	49.3N, 74.0W	ground vegetation, bs	2000 harvest, 2003 scarified	2002–2008	0	960	*Giasson et al.* [2006]; *Bergeron et al.* [2008]	HBS00
	49.8N, 74.6W	bs	1975	2008			H. A. Margolis, personal communication, 2009	HBS75
	49.7N, 74.3W	bs	1915	2004–2008			*Bergeron et al.* [2007, 2008]	EOBS
Vancouver Island	49.9N, 125.2W	df	2000	2001–2008	8.6	1450	*Humphreys et al.* [2006]; *Krishnan et al.* [2009]	HDF00
	49.5N, 124.8W	df	1988	2002–2008				HDF88
	49.4N, 125.3	df	1949	1998–2008				DF49
New Brunswick	46.5N, 67.1W	bf	2004	2005–2008	3.4	1190	M. B. Lavigne, personal communication, 2009	NL-CC
	46.5N, 67.1W	bf	1975, thinned in 1991 and 2005	2004–2008				NL-CT

Table 1. (continued)

Chronosequence	Location (Latitude, Longitude)	Vegetation Type[b]	Year of Most Recent Disturbance	Years Measured	Annual Mean Air Temperature (°C)	Annual Total Precipitation (mm)	Reference for Data	Site Name Used in Reference
Wisconsin	45.9N, 90.1W	ta, hardwoods	2001	2007	5.2	765	A. R. Desai, personal communication, 2009	Riley Creek
	45.8N, 90.1W	hardwoods	1930	2000–2006			*Cook et al.* [2004, 2008]	Willow Creek
	45.5N, 84.7W	hardwoods	1920	1999–2003			*Gough et al.* [2008]	UMBS
	46.6N, 91.1W	rp	1939	2002–2003			*Noormets et al.* [2007, 2009]	MRP
	46.6N, 91.1W	hardwoods	1999	2002				YHW
	46.6N, 91.1W	jp, rp	1995	2002				YRP
	46.6N, 91.1W	hardwoods	1992	2003				IHW
	46.6N, 91.1W	rp	1982	2003				IRP
	41.6N, 83.8W	oak	1947	2004–2005	9.2	840	*Noormets et al.* [2008]	TOL
Oregon	44.4N, 121.5W	pp	1984	2004–2005	7.6	460	*Law et al.* [2003]; *Schwarz et al.* [2004]; *Thomas et al.* [2009]	Me3
	44.4N, 121.6W	pp	1978	2001–2002	7.6	600		Me5
	44.5N, 121.6W	pp	1912	2002–2008	7.1	600		Me2
Florida	29.8N, 82.2W	sp	1972, 1998	1996–2007	20.6	1230	*Clark et al.* [2004]; *Binford et al.* [2006]	SP2
	29.8N, 82.2W	sp	1990	1999–2005				SP3
Arizona	35.4N, 111.8W	pp	2006 thinned	2006–2008	7.9	580	*Dore et al.* [2010]	FMF
California	38.9N, 120.6W	pp	1990, 2000 thinned	1999–2002	11.9	1290	*Misson et al.* [2005]	Blodgett
				Insect Chronosequences				
New Jersey Gypsy Moth	39.9N, 74.6W	oak, pine	1914, insects 2007	2005–2008	12.3	1155	*Clark et al.* [2010]	SLT
	39.8N, 74.4W	pine, oak	1995, insects 2007–2008	2005–2008				CED
British Columbia Mountain Pine Beetle	54.5N, 122.7W	lp	2003	2007–2008	2.3	655	*Brown et al.* [2010]	MPB03
	55.1N, 122.8W	lp	2006	2007–2008				MPB06
Wisconsin Forest Tent Caterpillar	45.8N, 90.1W	hardwoods	1930, insects 2001	2000–2006	5.2	765	*Cook et al.* [2008]	Willow Creek
				Hurricane				
Florida	25.4N, 81.1W	mangroves	1992, hurricane 2005	2004, 2007–2009	23.8	1390	*Barr et al.* [2010]	Shark River

[a]Only sites less than 100 years old were used in this analysis. Annual mean air temperature and total precipitation (rounded to nearest 5 mm) data are 30 year normals taken from the nearest meteorological station.
[b]Species are as follows: jp, *Pinus banksiana*; bs, *Picea mariana*; ta, *Populus tremuloides*; pp, *Pinus ponderosa*; df, *Pseudotsuga menzesii*; sp, *Pinus elliottii*; rp, *Pinus resinosa*; lp, *Pinus contorta*.

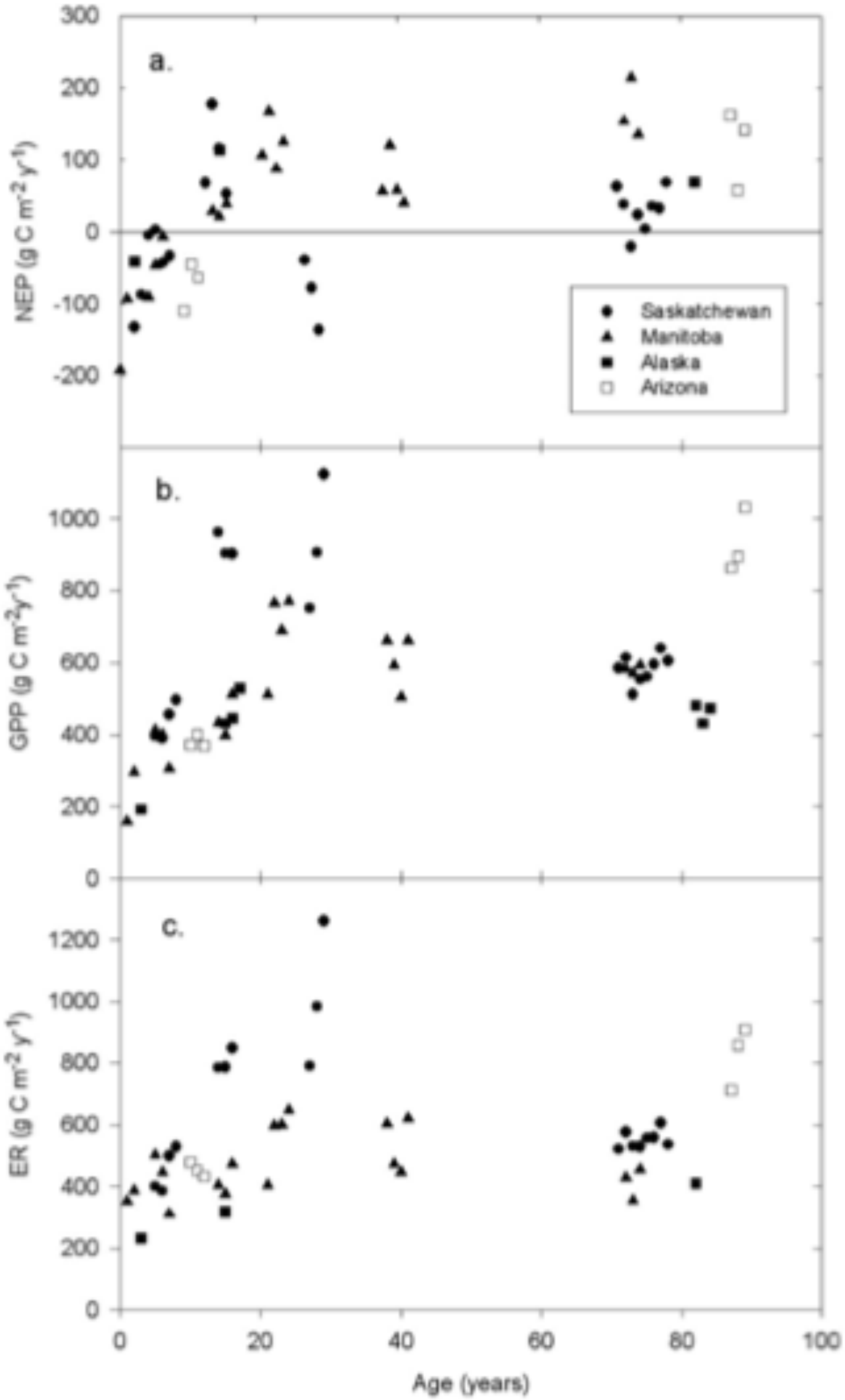


Figure 1. Annual (a) NEP, (b) GPP, and (c) ER for the fire chronosequences.

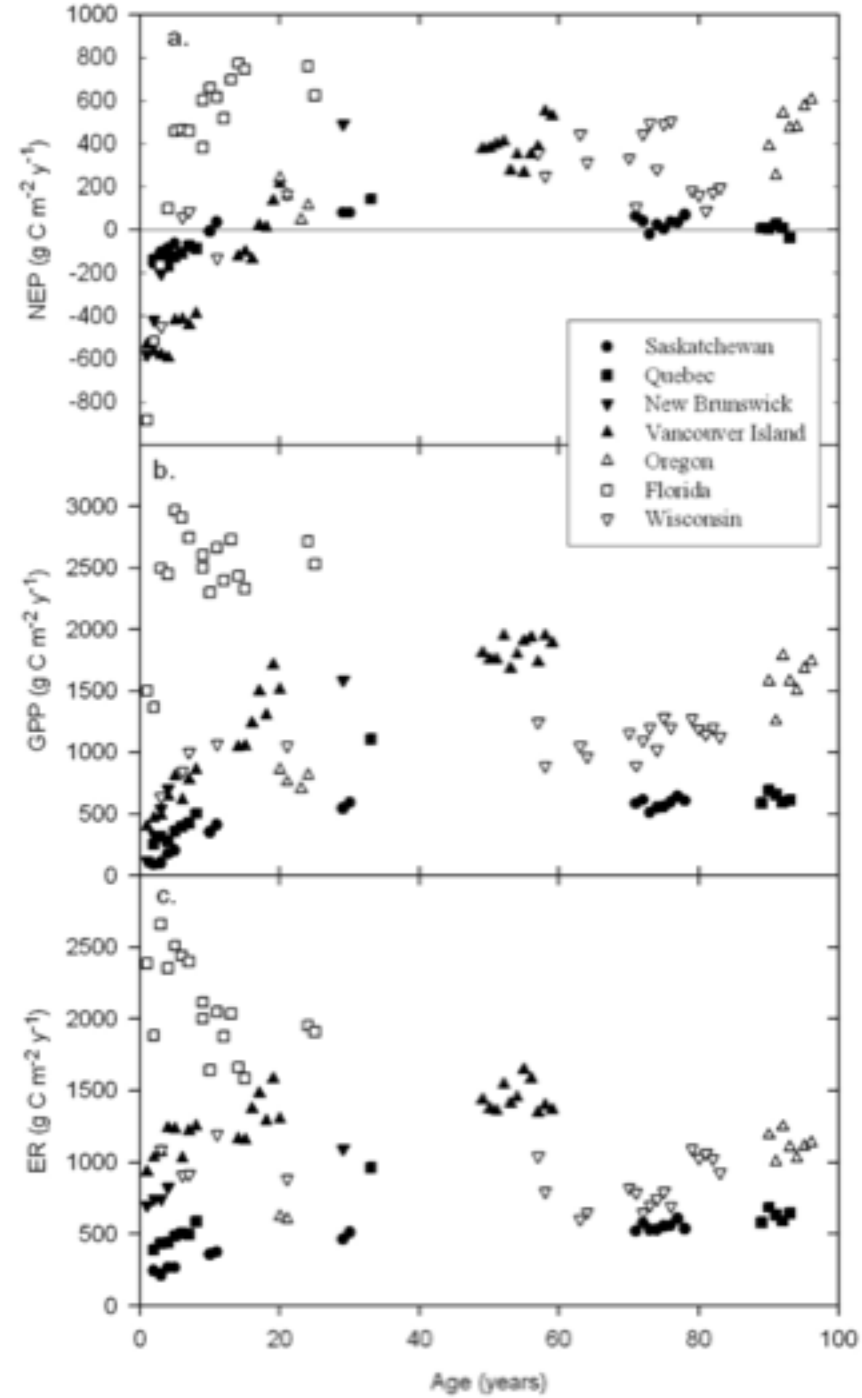


Figure 2. Annual (a) NEP, (b) GPP, and (c) ER for the harvest chronosequences.

Review

JOURNAL OF GEOPHYSICAL RESEARCH, VOL. 116, G00K08, doi:10.1029/2010JG001585, 2011

Simulating the impacts of disturbances on forest carbon cycling in North America: Processes, data, models, and challenges

Shuguang Liu,[1] Ben Bond-Lamberty,[2] Jeffrey A. Hicke,[3] Rodrigo Vargas,[4] Shuqing Zhao,[5] Jing Chen,[6] Steven L. Edburg,[3] Yueming Hu,[7] Jinxun Liu,[8] A. David McGuire,[9] Jingfeng Xiao,[10] Robert Keane,[11] Wenping Yuan,[12] Jianwu Tang,[13] Yiqi Luo,[14] Christopher Potter,[15] and Jennifer Oeding[8]

Received 20 October 2010; revised 5 August 2011; accepted 9 August 2011; published 8 November 2011.

Policy

AGU PUBLICATIONS

JGR

Journal of Geophysical Research: Biogeosciences

RESEARCH ARTICLE

10.1002/2014JG002820

Key Points:

- The Grain for Green Program increased forest cover of the Loess Plateau in China

Satellite evidence for significant biophysical consequences of the “Grain for Green” Program on the Loess Plateau in China

Jingfeng Xiao[1,2]

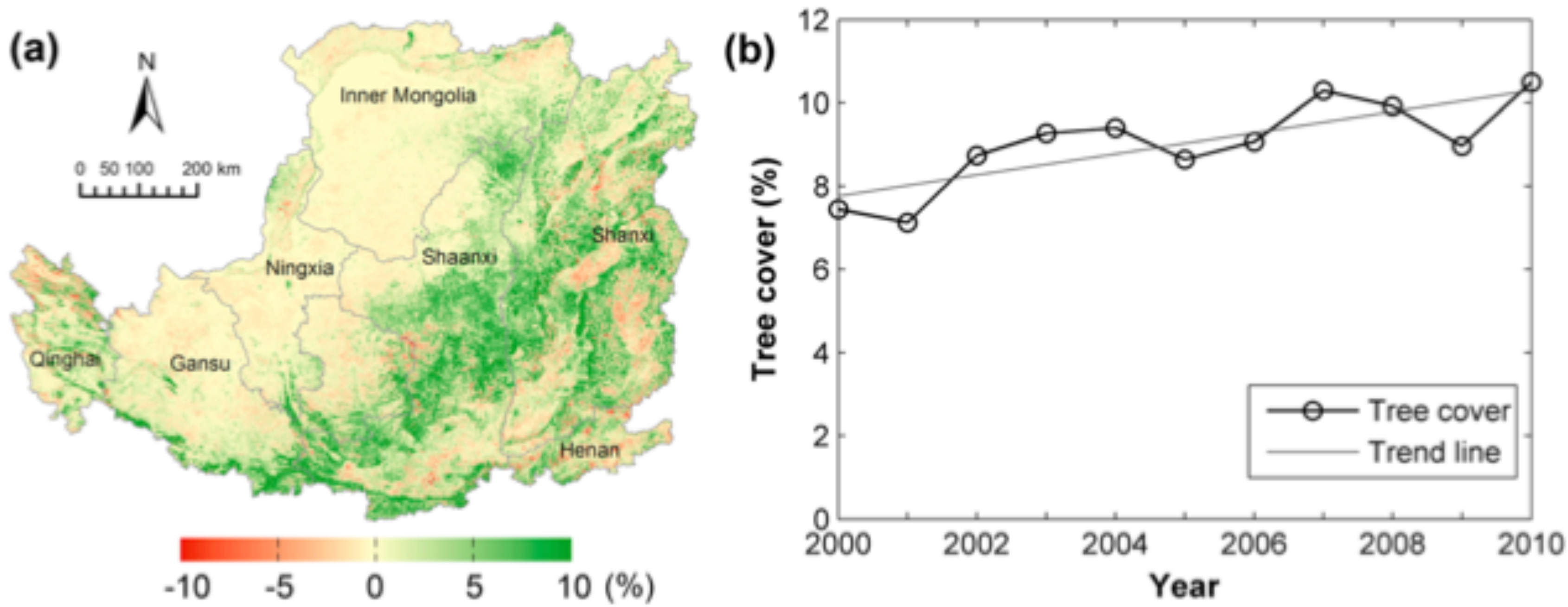


Figure 3. Trends of percent tree cover for the Loess Plateau over the period 2000–2010: (a) trends of percent tree cover on a per pixel basis and (b) trends of percent tree cover averaged across the plateau. The trends in Figure 3a are provided as increases in percent tree cover (%) over the 11 year period.

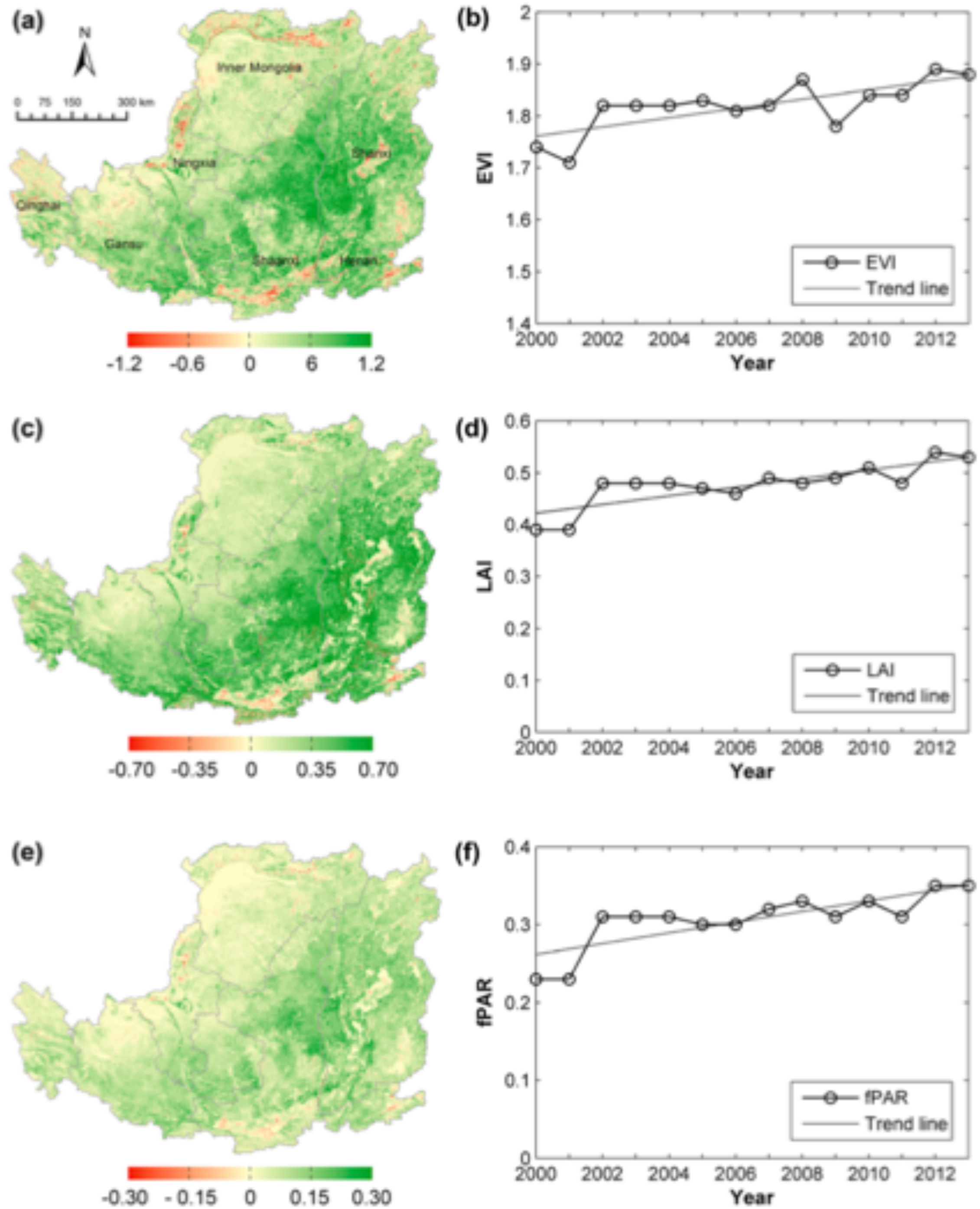


Figure 5. Trends of growing season integrated EVI, mean LAI, and mean fPAR of the Loess Plateau over the period 2000–2013: (a, c, and e) the trends of EVI, LAI, and fPAR on a per pixel basis; (b, d, and f) the trends of EVI, LAI, and fPAR averaged across the plateau. The trends in Figures 5a, 5c, and 5e are provided as increases in EVI, LAI, and fPAR over the 14 year period.

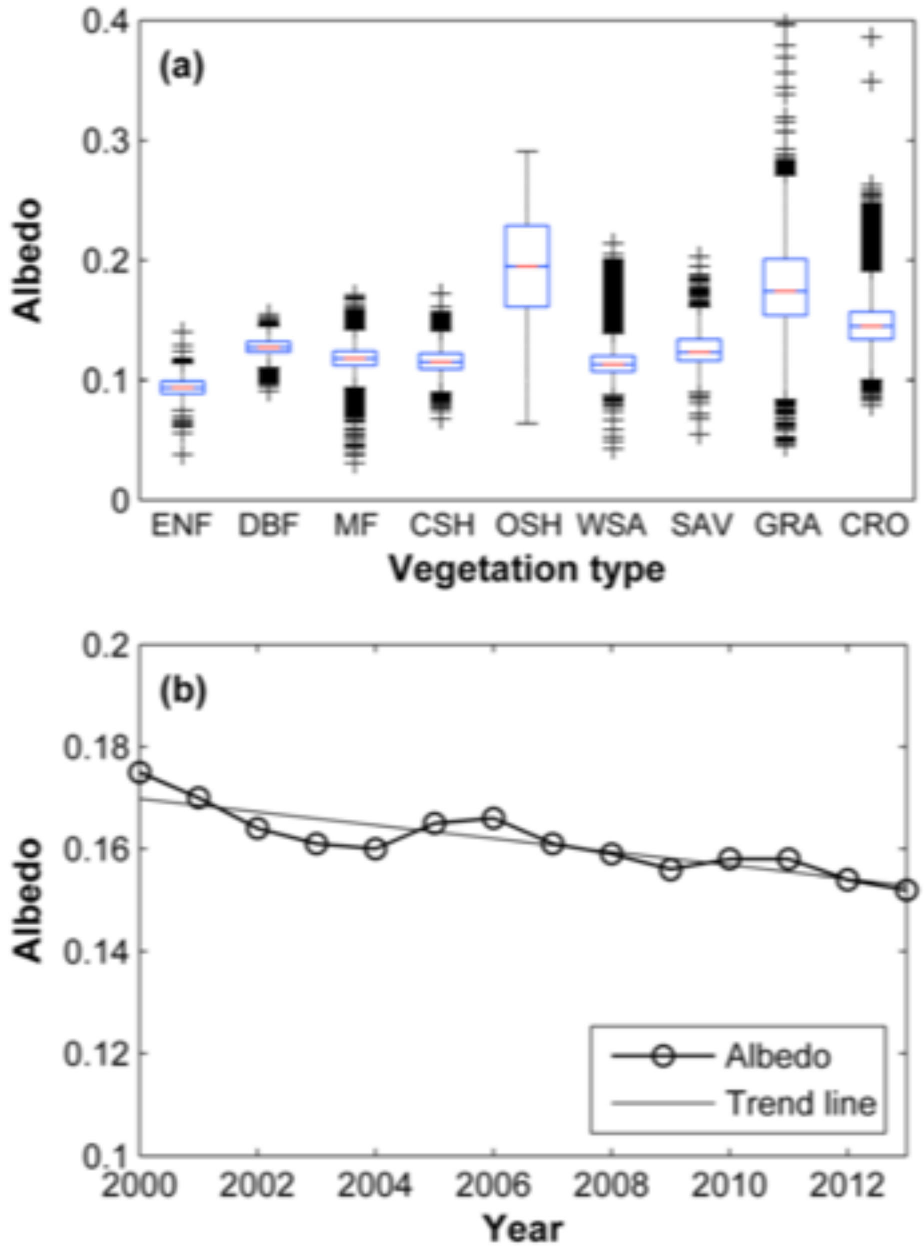


Figure 7. Albedo over the growing season of the Loess Plateau: (a) box plot of per pixel albedo in 2001 for each vegetation type; (b) the trend of the albedo averaged across the plateau from 2000 to 2013. The abbreviations for the vegetation types are spelled out in the caption of Figure 1.

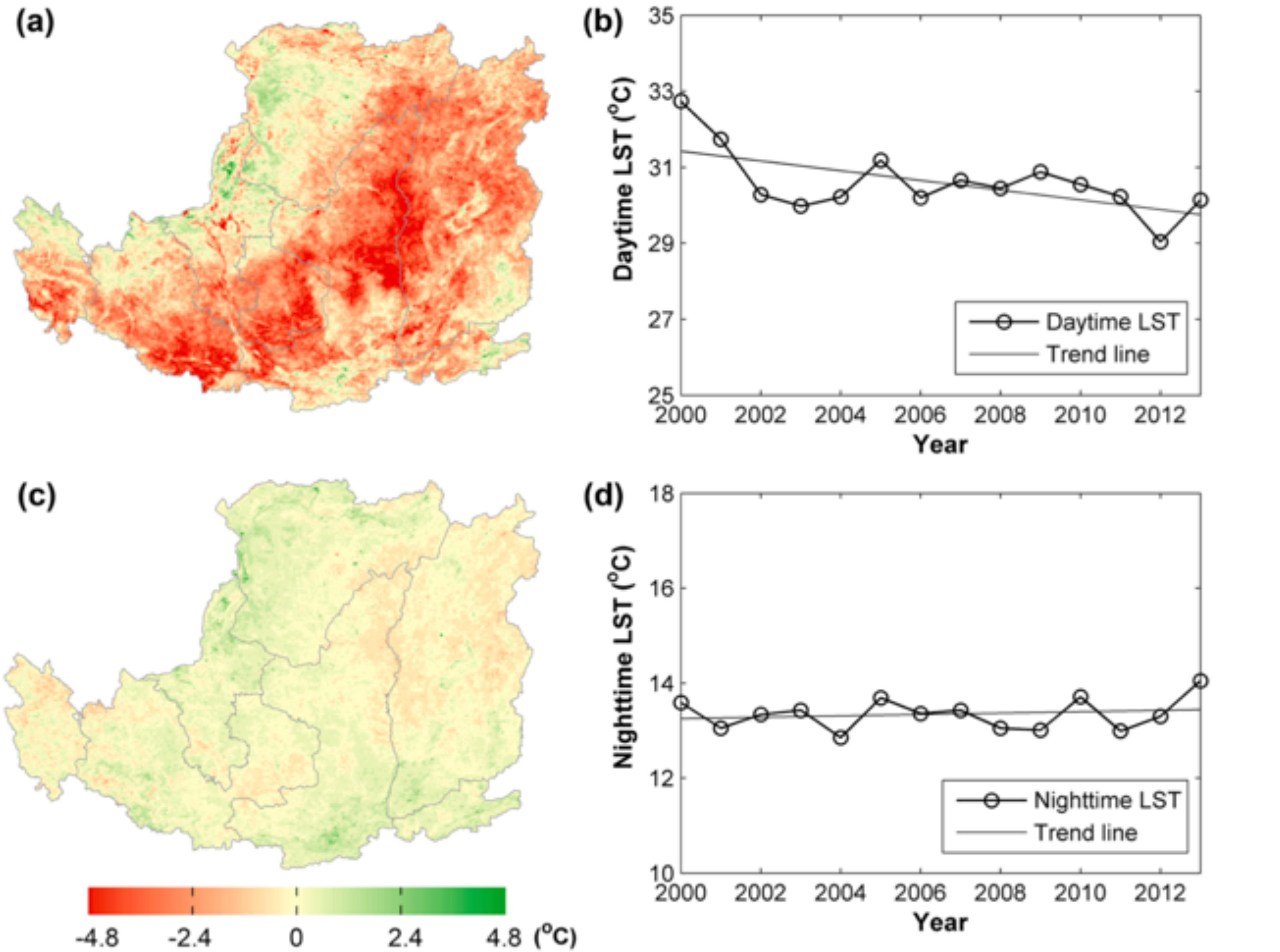


Figure 9. Trends of daytime and nighttime LST of the Loess Plateau over the period 2000–2013: (a) increases in daytime LST on a per pixel basis; (b) increase in average daytime LST of the plateau; (c) increases in nighttime LST on a per pixel basis; (d) increase in average nighttime LST of the plateau. The trends in Figures 9a and 9c are provided as increases in daytime and nighttime LST (°C) over the 14 year period.

Time-sensitive

OPEN ACCESS
IOP Publishing — Environmental Research Letters
Environ. Res. Lett. **7** (2012) 045706 (10pp) — doi:10.1088/1748-9326/7/4/045706

The 2010 spring drought reduced primary productivity in southwestern China

Li Zhang[1,2], Jingfeng Xiao[3], Jing Li[1], Kun Wang[2], Liping Lei[2] and Huadong Guo[2]

[1] State Key Laboratory of Earth Surface Processes and Resource Ecology, Beijing Normal University, Beijing 100875, People's Republic of China
[2] Key Laboratory of Digital Earth, Center for Earth Observation and Digital Earth, Chinese Academy of Sciences, Beijing 100094, People's Republic of China
[3] Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH 03824, USA

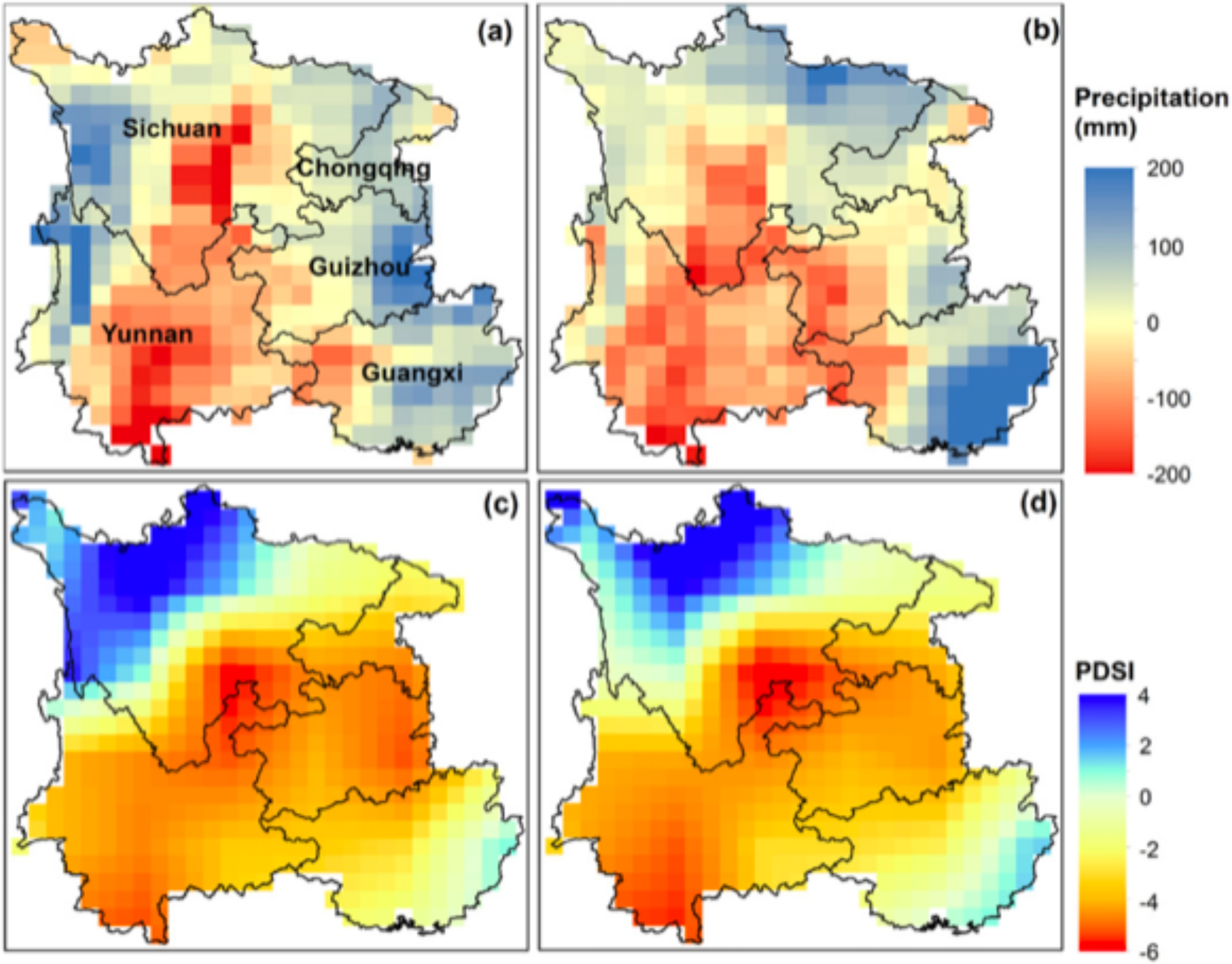


Figure 3. Spatial extent and severity of the 2010 spring drought in southwestern China. (a) Precipitation anomalies for spring (March–May) 2010 relative to the mean over the period 1980–2009, (b) precipitation anomalies for September 2009–May 2010 relative to the mean over the period 1980–2009, (c) mean monthly PDSI for spring (March–May) 2010, (d) mean monthly PDSI for September 2009–May 2010.

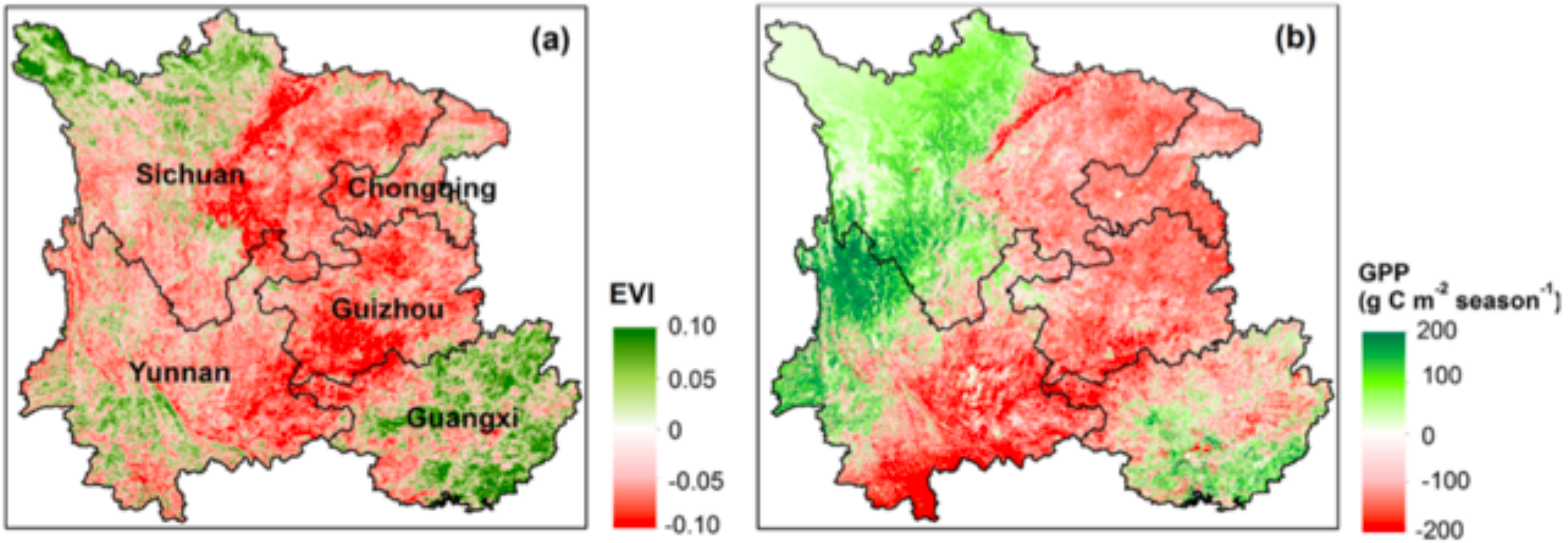


Figure 6. Regional anomalies of (a) EVI and (b) GPP during spring (March–May) 2010 relative to the means over the period 2000–2009.

… just a few example studies that I have been involved in

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

Know the novelty and limitations of your research

- Be familiar with the literature
  - Read many relevant papers (old and new)
  - Know what has been done and what has not been done
  - What is new with your research

Know the novelty and limitations of your research

- Attend conferences
  - A lot of information
  - Know what has been done and what has not been done
  - What is new
  - What are the limitations

Know the novelty and limitations of your research

- Discuss with colleagues
  - Help identify novelty and limitations with fresh eyes/mind
- Evaluate the novelty and significance of your research
  - Breakthrough?
  - Marginal?

Know the novelty and limitations of your research

- Identify the limitations
  - What are they?
  - Can they be solved now?
  - How can they be solved?
  - Leave them to the future?
  - Mention them in the manuscript?

IOP Publishing | *Environ. Res. Lett.* **11** (2016) 094010 | doi:10.1088/1748-9326/11/9/094010

Environmental Research Letters

CrossMark

OPEN ACCESS

RECEIVED
5 April 2016

REVISED
20 July 2016

ACCEPTED FOR PUBLICATION
15 August 2016

PUBLISHED
7 September 2016

LETTER

Recent trends in vegetation greenness in China significantly altered annual evapotranspiration and water yield

Yibo Liu[1,2], Jingfeng Xiao[2,3], Weimin Ju[4], Ke Xu[5], Yanlian Zhou[6] and Yuntai Zhao[7]

[1] Jiangsu Key Laboratory of Agricultural Meteorology, School of Applied Meteorology, Nanjing University of Information Science and Technology, Nanjing, 210044, People's Republic of China

[2] Earth Systems Research Center, Institute for the Study of Earth, Oceans, and Space, University of New Hampshire, Durham, NH 03824, USA

[3] International Center for Ecology, Meteorology, and Environment, School of Applied Meteorology, Nanjing University of Information Science and Technology, Nanjing, 210044, People's Republic of China

[4] International Institute for Earth System Sciences, Nanjing University, Nanjing, 210023, People's Republic of China

[5] Department of Atmospheric and Oceanic Sciences & Center for Climate Research, University of Wisconsin Madison, Madison, WI 53706, USA

[6] School of Geographic and Oceanographic Sciences, Nanjing University, Nanjing, 210023, People's Republic of China

[7] China Land Surveying and Planning Institute, Beijing, 10035, People's Republic of China

E-mail: j.xiao@unh.edu

Keywords: vegetation greenness, greening, browning, water yield, evapotranspiration, afforestation, leaf area index

Supplementary material for this article is available online

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

Conduct sound and thorough analysis and/or experiments

- Be sound
  - Use right data
  - Use newest data
  - Use right methods
  - Use state-of-the-art methods
  - Avoid mistakes

Conduct sound and thorough analysis and/or experiments

- Be thorough
  - Consider more treatments or scenarios
  - Collect relevant measurements (e.g., diffuse radiation, LAI, spectral measurements)
  - Simulate relevant variables (e.g., target is carbon flux, but simulate ET, biomass, and other variables as well)
  - Combine multiple datasets
  - Integrate different methods

Conduct sound and thorough analysis and/or experiments

- Pay attention to issues that reviewers might raise
  - Conduct those analyses just in case
  - Consider them in experiments
  - Include them in the manuscript
  - Retain some results for revision (or another paper)

Conduct sound and thorough analysis and/or experiments

- Vision (for future papers)
  - Conduct experiments for future papers
  - Conduct analyses for future papers
  - Kill two birds with one stone
  - What will be popular or important in the future
  - Value of long-term experiments or measurements

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

As the 1st author, you typically do the heavy lifting

Take advantage of your co-authors

- Early involvement
  - From the very beginning (e.g., initial ideas)
  - Not until full draft
  - Involve at least those who are expected to be co-authors
  - Engage other potential contributors

Take advantage of your co-authors

- Make full use of their inputs
  - Ideas
  - Analysis
  - Writing
  - Editing

Take advantage of your co-authors

- Push them
  - Request
  - Remind
  - Meet
  - Discuss
  - “Threaten”

Take advantage of your co-authors

- Remember they are co-authors
  - Requires contribution (ethics!)
  - Co-authors vs acknowledgement
  - Old times
  - Standard of co-authorship is changing
  - Co-author’s responsibility

Take advantage of your co-authors

- Early involvement
- Make full use of their inputs
- Push them
- Remember they are co-authors

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

What you need to know before you start to write

- Novelty (breakthrough or marginal)
- Focus, highlights (or key messages)
- Literature
- Limitations
- Set of figures/tables
- Audience and journal (e.g., C in urban areas)

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

How to actually write the paper

- Start with an outline
  - Tentative title
  - *Potential authors (have an author list?)*
  - Sections (e.g., Introduction, Data & Methods, Results, Discussion, Conclusions)
  - What paragraphs/sub-sections in each section
  - Discuss with coauthors and revise
  - Be comfortable with the outline

How to actually write the paper

- Then where to start?
  - Wherever you want to write
- Use English in the first place
  - Do not write Chinese first and then translate
- Engage coauthors in writing
  - Meet and discuss during the writing process
  - Ask coauthors write pieces of the manuscript

How to actually write the paper

- Seek higher-level comments on 1st draft and revise
- Ask for detailed comments on 2nd draft and revise
- *Repeat the "comment + revise" process as many times as needed*
  - *Sometimes 4-6 times prior to submission*

How to actually write the paper

- Pay attention to language
  - Language matters!
  - Learn from the literature
  - Ask coauthors to polish the writing
  - Learn from coauthors
  - Seek help from professional editors (?)

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

and

What is a “niche”?

- “most [ecologists] would agree that **niche** is a central concept of ecology, even though we do not know exactly what it means" (Real and Levin 1991)
- The status of an organism (or population) within its environment and community
- Ecological niche of an organism describes how that particular individual "fits" into its ecosystem

What is a "niche" for a researcher?

- The "niche" of a scientist describes how that particular individual "fits" into the research community
- Here, a "niche" also means a research direction that has great potential but is overlooked or rarely studied by scientists

Having your own niche

- Pros
  - Easier to identify science questions
  - Less competition from former advisors, group members, other scientists
  - More collaborative opportunities
  - Recognition from peers
- Cons
  - Takes time
  - More effort is needed
  - Can be less productive in the beginning

and

- Niche vs productivity
- Niche evolves
- Having high productivity is important for your career
- How high is high enough?
- How low is too low?
- Quality vs productivity

Outline

- How to come up with good ideas
- What types of papers to write
- Know the novelty and limitations of your research
- Conduct sound and thorough analysis or experiments
- Take advantage of your co-authors
- What you need to know before you start to write
- How to actually write the paper
- Balance between quality and quantity and between niche and productivity
- Ethics is important

Ethics

- No plagiarism
  - Not even a sentence
- Give proper credit
  - Citation, acknowledgement, co-authorship
- Be open and collaborative
  - Be willing to work together
- Do not offer co-authorship as a gift
  - Contribution, responsibility

Final advice - ① **Work hard!!!**

Final advice - ②

Balance work & life!!!