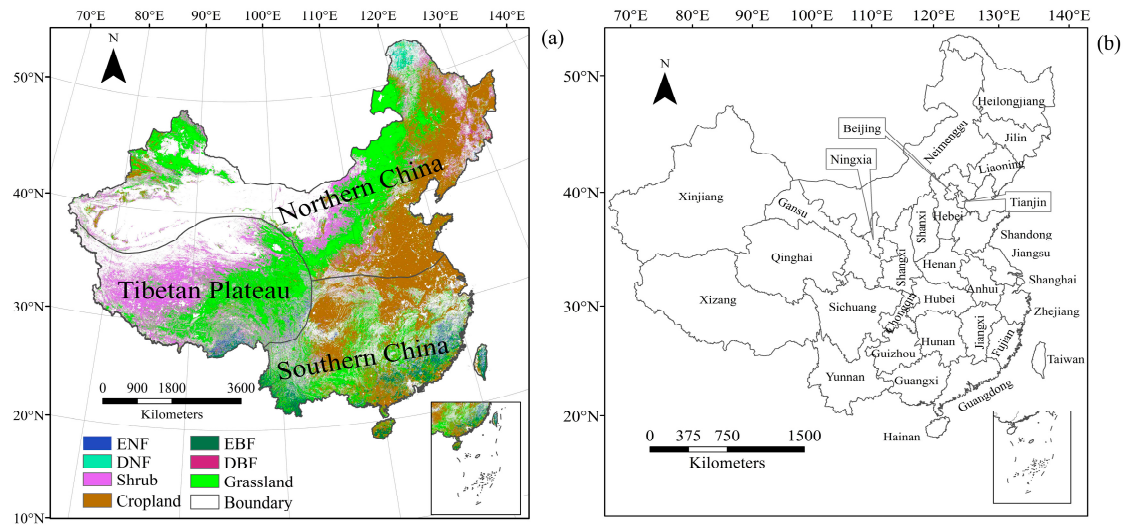
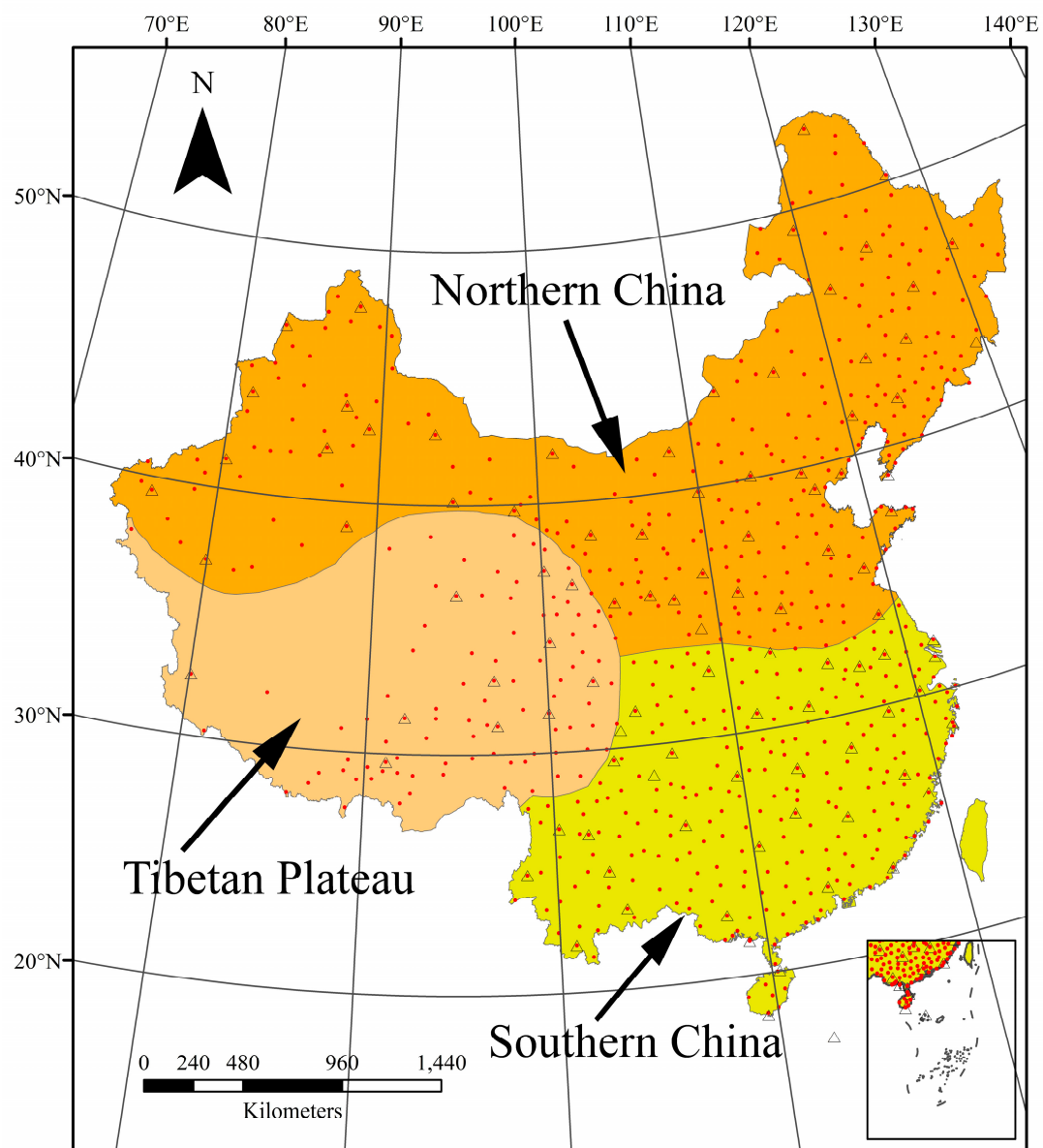


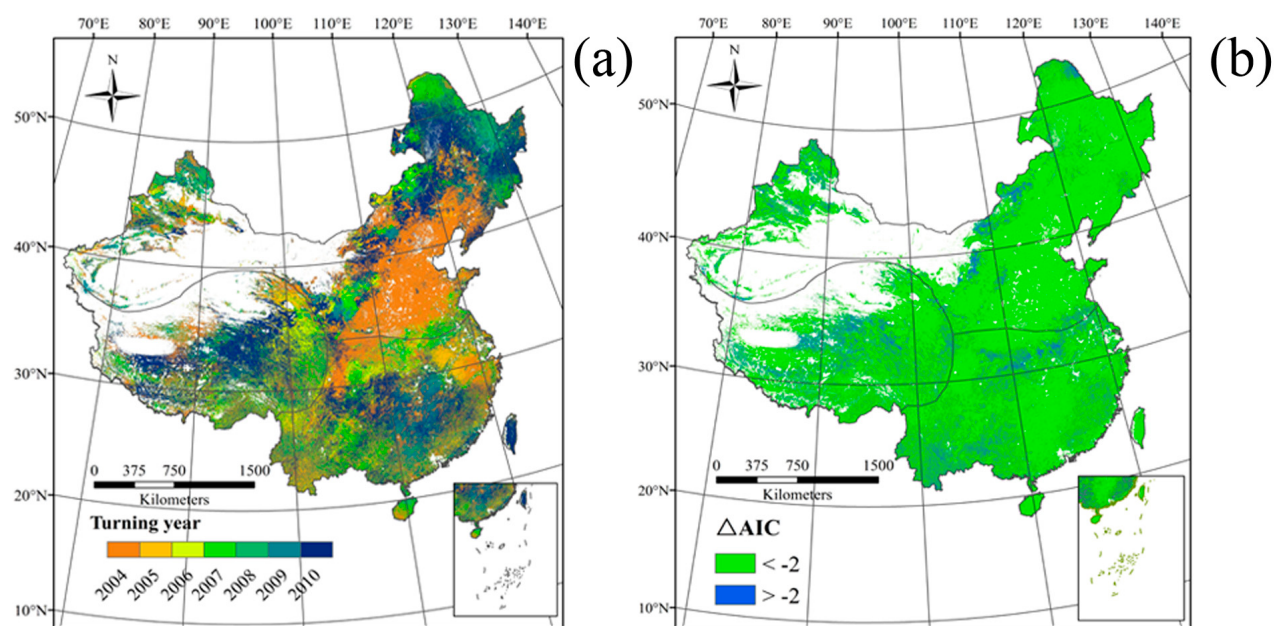
## Supplementary materials



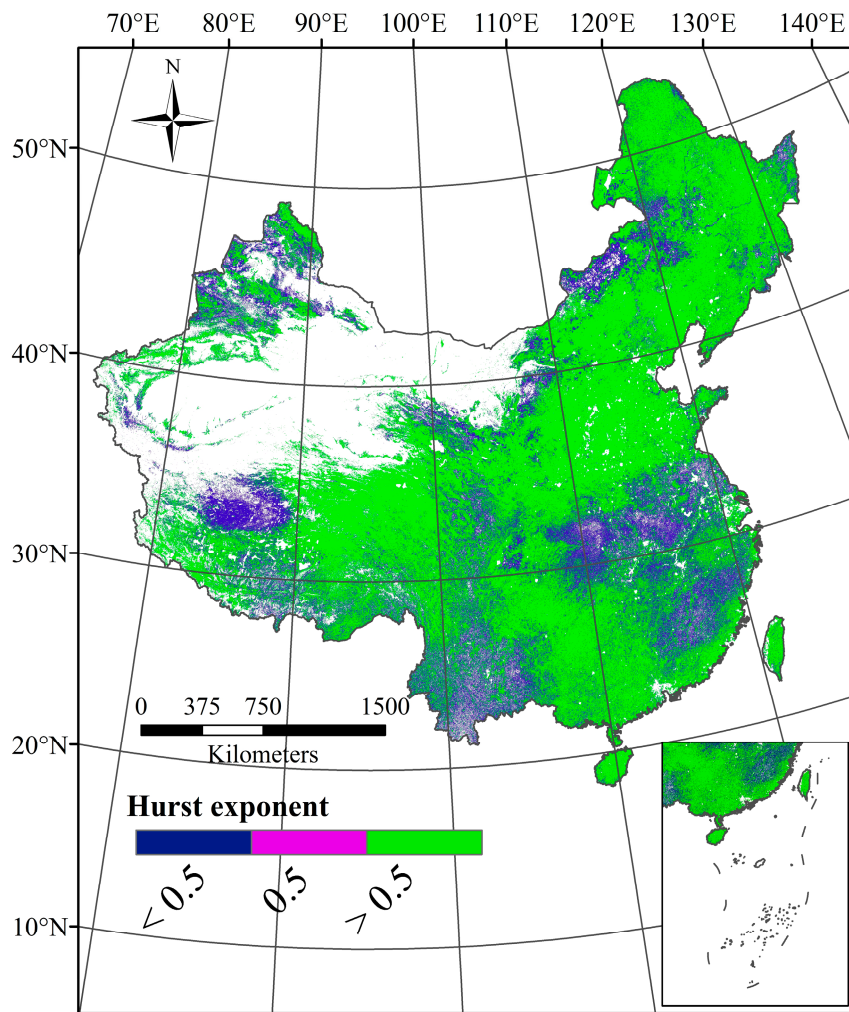
**Figure S1** Vegetation types (DNF, deciduous needle-leaf forest; ENF, evergreen needle-leaf forest; EBF, evergreen broadleaf forest; DBF, deciduous broadleaf forest) as well as three sub-region divisions (a), and provinces distribution (b) in China.



**Figure S2** Distribution of meteorological stations across China, red points represent stations for temperature and precipitation, and black triangles represent stations for solar radiation.



**Figure S3** Spatial distribution of Turing Point (TP) years (a) and corresponding  $\Delta AIC$  values (b) of the NPP in China for the period 2001–2014.



**Figure S4** Spatial distribution of the Hurst exponent in China from 2001 to 2014.

The observed NPP data were collected from ChinaFLUX directly and from literatures indirectly. The calculations were based on the eddy covariance method. The details such as locations for field NPP data could see Table S1 below.

**Table S1** Sites information of the field Net primary productivity (NPP) data used in this study

| Observation<br>site ID | Year      | Types of<br>vegetation | Latitude<br>(°) | Longitude<br>(°) | NPP<br>(gC m <sup>-2</sup> yr <sup>-1</sup> ) | Reference                               |
|------------------------|-----------|------------------------|-----------------|------------------|-----------------------------------------------|-----------------------------------------|
| 1                      | 2003-2008 | Forest                 | 23.17           | 112.53           | 395.95±106.76                                 | ChinaFLUX                               |
| 2                      | 2009-2010 | Forest                 | 24.53           | 101.02           | 976.15                                        | (Tan <i>et al.</i> , 2011)              |
| 3                      | 2003-2008 | Forest                 | 26.73           | 115.05           | 487.512±52.06                                 | ChinaFLUX                               |
| 4                      | 2008      | Forest                 | 26.83           | 109.75           | 313.4                                         | (Zhang, 2010)                           |
| 5                      | 2008-2009 | Cropland               | 28.51           | 115.98           | 391.36                                        | (Wang <i>et al.</i> , 2011)             |
| 6                      | 2006-2007 | Forest                 | 29.53           | 112.86           | 515.65                                        | (Han, 2008)                             |
| 7                      | 2006-2007 | Forest                 | 30.47           | 116.99           | 506.1                                         | (Han, 2008)                             |
| 8                      | 2010      | Forest                 | 33.35           | 113.91           | 343.4                                         | (Geng, 2011)                            |
| 9                      | 2006-2007 | Forest                 | 35.02           | 112.47           | 497.25                                        | (Tong <i>et al.</i> , 2010)             |
| 10                     | 2007-2008 | Cropland               | 36.65           | 116.05           | 559                                           | (Lei & Yang, 2010)                      |
| 11                     | 2003-2008 | Cropland               | 36.83           | 116.57           | 365.96±123.77                                 | ChinaFLUX                               |
| 12                     | 2008      | Cropland               | 37.83           | 114.67           | 202                                           | (Chen, 2011)                            |
| 13                     | 2009      | Grassland              | 37.87           | 102.85           | 241.8                                         | (Guo <i>et al.</i> , 2010)              |
| 14                     | 2006      | Forest                 | 39.53           | 116.25           | 462                                           | (Zha, 2007)                             |
| 15                     | 2006      | Grassland              | 40.38           | 108.55           | 49.17                                         | FLUXNET                                 |
| 16                     | 2006      | Cropland               | 41.15           | 121.92           | 301.62                                        | (Zhou <i>et al.</i> , 2010)             |
| 17                     | 2006      | Cropland               | 41.15           | 121.20           | 333.56                                        | (Zhou <i>et al.</i> , 2010)             |
| 18                     | 2003-2008 | Forest                 | 42.40           | 128.10           | 302.33±38.37                                  | ChinaFLUX                               |
| 19                     | 2006      | Grassland              | 43.55           | 116.67           | 65.1                                          | (Chen <i>et al.</i> , 2009),<br>FLUXNET |
| 20                     | 2007-2008 | Grassland              | 44.58           | 123.50           | 112.35                                        | (Dong <i>et al.</i> , 2011)             |
| 21                     | 2004      | Forest                 | 45.33           | 127.67           | 146                                           | (Wang <i>et al.</i> , 2008a)            |
| 22                     | 2004      | Forest                 | 45.42           | 127.67           | 204                                           | (Wang, 2008b)                           |
| 23                     | 2006      | Cropland               | 47.58           | 133.52           | 262                                           | (Song, 2007)                            |
| 24                     | 2007-2008 | Forest                 | 48.10           | 129.23           | 199                                           | (Wang <i>et al.</i> , 2010)             |
| 24                     | 2008      | Forest                 | 48.12           | 129.25           | 212.32                                        | (Yu & Liu, 2011)                        |
| 26                     | 2010      | Forest                 | 51.78           | 123.02           | 242.35                                        | ChinaFLUX                               |

Note: Each row represents one site, and yearly averaged value for more than one year in the NPP column. The error

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interval means the standard deviation of carbon fluxes in the same climate zone. Limited to the observation number, some climate zones with lower than 3 observations does not have the error interval.

## Reference

- Chen S, Chen J, Lin G *et al.* (2009) Energy balance and partition in Inner Mongolia steppe ecosystems with different land use types. *Agricultural and Forest Meteorology*, **149**, 1800-1809
- Chen F (2011) Modeling the change of terrestrial ecosystem carbon budget over recent 30 years in China. Unpublished Master Hebei Normal University, Shijiazhuang, P.R.China (in Chinese with English abstract), 59 pp..
- Dong G, Guo J, Chen J, Sun G, Gao S, Hu L, Wang Y (2011) Effects of spring drought on carbon sequestration, evapotranspiration and water use efficiency in the songnen meadow steppe in northeast China. *Ecohydrology*, **4**, 211-224.
- Guo W, Li S, Zhang X (2010) Research on variation and controlling mechanism of vineyard's CO<sub>2</sub> flux in arid northwestern China. pp 175-187, Kunming, P.R.China(in Chinese with English abstract), Yunnan University Press.
- Geng S (2011) Study on the carbon flux observation over poplar plantation ecosystem of XiPing city in Henan Province of China. Unpublished Master Beijing Forestry University, Beijing, P.R.China (in Chinese with English abstract), 91 pp.
- Han S (2008) Productivity estimation of the poplar plantations on the beaches in middle and low reaches of Yangtze river using eddy covariance measurement. Unpublished Master Chinese Academy of Forestry, Beijing, P.R. China (in Chinese with English abstract), 75 pp.
- Lei H, Yang D (2010) Seasonal and interannual variations in carbon dioxide exchange over a cropland in the North China Plain. *Global Change Biology*, **16**, 2944-2957.
- Song T (2007) Long term carbon dioxide flux measurements in Sanjiang Plain, Northeastern China. Unpublished Doctor Nanjing University of Information Science and Technology, Nanjing, P.R.China (in Chinese with English abstract), 187 pp.
- Tan ZH, Zhang YP, Schaefer D, Yu GR, Liang N, Song QH (2011) An old-growth subtropical Asian evergreen forest as a large carbon sink. *Atmospheric Environment*, **45**, 1548-1554.
- Tong X, Zhang J, Meng P, Huang H, Guo L, Yin C, Gao J (2010) Characteristics of net carbon exchange over a mixed plantation in a hilly area of the north China. *Scientia Silvae Sinicae (in Chinese with English abstract)*, **46**, 37-43.
- Wang HM, Saigusa N, Zu YG, Wang WJ, Yamamoto S, Kondo H (2008a) Carbon fluxes and their response to environmental variables in a Dahurian larch forest ecosystem in northeast China.
- Wang XC (2008b) Temporal variations and environmental control of carbon dioxide exchange of a natural secondary forest in Northeastern China. Unpublished Master Northeast Forestry University, Haerbin, P.R.China(in Chinese with English abstract), 72 pp.
- Wang Y, Zhou GS, Jia BR, Li S, Wang SH (2010) Comparisons of carbon flux and its controls between broad-leaved Korean pine forest and Dahurian larch forest in northeast China. *Acta Ecologica Sinica (in Chinese with English abstract)*, **30**, 4376-4388.
- Wang SM, Hu JC, Wu GX *et al.* (2011) Characteristic analysis of CO<sub>2</sub> fluxes from a rice paddy ecosystem in a subtropical region (In Chinese). *Acta Scientiae Circumstantiae(in Chinese with English abstract)*, **31**, 217-224.
- Yu CL, Liu D (2011) Analysis on CO<sub>2</sub> flux during growth season of natural broadleaved mixed forest in Xiaoxinganling Mountains. *Chinese Journal of Agrometeorology (in Chinese with English*

*abstract*), **32**, 525-529.

- Zha TG (2007) Carbon balance of a poplar plantation ecosystem in Daxing, Beijing. Unpublished Doctor Beijing Forestry University, Beijing, P.R.China (in Chinese with English abstract), 168 pp.
- Zhang LP (2010) Characteristics of CO<sub>2</sub> flux in a Chinese Fir Plantations Ecosystem in Huitong County, Hunan Province. Unpublished Master Central South University of Forestry and Technology, Changsha, P.R.China(in Chinese with English abstract), 61 pp.
- Zhou GS, Wang Y, Zhou L (2010) Seasonal dynamics of carbon budget in typical Maize and paddy ecosystem in the delta of Liao River, China. pp 265-271, Beijing, P. R. China (In Chinese), China Agriculture Press.