

Auxiliary Material for Paper 2007gb002939

This supplementary material contains: (1) Observation data sets used in parameters estimation; (2) Sources of auxiliary data; (3) Optimal parameter searching process.

In this study, 12 observed data sets were used for the parameters estimation, which included three NPP data sets (i.e., NPP in leaves, stems, and roots), five biomass data sets (i.e., one for biomass of leaves, one for stems, and three for roots in three soil layers), one litter data set (i.e., fine litter mass), and three SOC data sets in the three soil layers. There are a total of 7660 observed data points, which contain 7 data points in fine litter, 468 data points in NPP, 316 data points in biomass, and 6869 data points in SOC. Spatial distribution of these data points illustrates in Figure S1. While the sources of observation data list in Table S1.

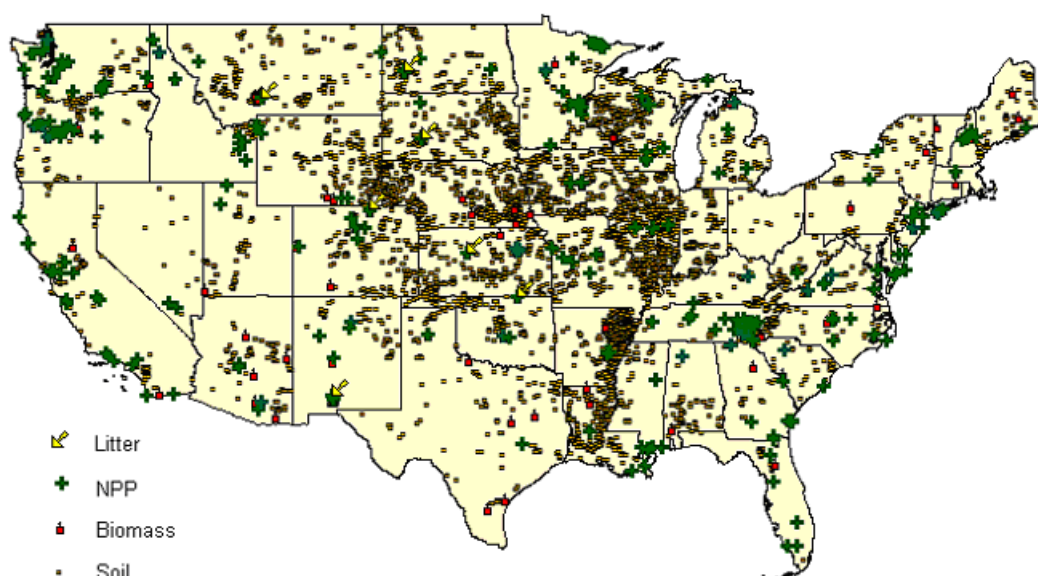


Figure S1. Spatial distribution of observed data points used in the parameters estimation

Table S1. Sources of the observation data sets

1. Batjes N.H. (2002), A homogenized soil profile data set for global and regional environmental research (WISE, version 1.1) [Available on-line via http://www.isric.org], Report 2002/01. International Soil Reference and Information Centre, Wageningen.
2. Buell, G.R., H.W. Markewich, R. Kulisek, S. Pollard, and T.T. Cook (2004), Site-Specific Soil-Carbon (S3C) Database for Mineral Soils of the Mississippi River Basin, U.S. Geological Survey.
3. Cannell, M.G.R. (1982), World forest biomass and primary production data, 391 pp., Academic Press, London.
4. DeAngelis, D.L., R.H. Gardner, and H.H. Shugart (1997), NPP Multi-Biome: Global IBP Woodlands Data, 1955-1975, Data set, Available on-line [http://www.daac.ornl.gov]

from ORNL Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.
5. Esser, G. (1998) NPP Multi-Biome: Global Osnabruck Data, 1937-1981, Data set, Available on-line [http://www.daac.ornl.gov] from ORNL Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.
6. Kicklighter, D.W. (1999), NPP Multi-Biome: TEM Calibration Data, 1992. Data set. Available on-line [http://www.daac.ornl.gov] from ORNL Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.
7. Knapp, A.K., and M.D. Smith (2001) Variation among biomes in temporal dynamics of aboveground primary production. <i>Science</i> , 291: 481-484.
8. Olson, R.J., J.M.O. Scurlock, S.D. Prince, D.L. Zheng, and K.R. Johnson (2001),NPP Multi-Biome: Global Primary Production Data Initiative Products. Data set. Available on-line [http://www.daac.ornl.gov] from the ORNL Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.
9. Schenk, H.J., and R.B. Jackson (2003), Global Distribution of Root Profiles in Terrestrial Ecosystems. Data set. Available on-line [http://www.daac.ornl.gov] from ORNL Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.
10. Scurlock, J.M.O., K.R. Johnson, and R.J. Olson (2003), NPP Grassland: NPP Estimates from Biomass Dynamics for 31 Sites, 1948-1994. Data set. Available on-line [http://www.daac.ornl.gov] from ORNL Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.
11. Seastedt, T.R., and C.L. Turner (1994), Root Biomass Data (FIFE) Data set. Available on-line [http://www.daac.ornl.gov] from ORNL Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.
12. Soil Survey Staff (2004), National Soil Survey Characterization Data, Soil Survey Laboratory, National Soil Survey Center, USDA-NRCS - Lincoln, NE. USA.
13. Turner, C.L. (1994) Plant Biomass/Production/Consump[tion]. (FIFE). Data set. Available on-line [http://www.daac.ornl.gov] from ORNL Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.
14. USDA National Soil Survey Center. Soil Survey Laboratory, 100 Centennial Mall N., Rm. 152, MS 41, Lincoln, NE. USA.

Sources of auxiliary data used in this study are the continental subsets of AVHRR-NDVI, annual solar radiation, monthly precipitation and temperature, soil texture, and 1-km spatial resolution land cover data. The detail information on these sources of auxiliary data lists in Table S2.

Table S2. Auxiliary datasets used in this study

Data	Source
NDVI	http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/FTP_SITE/readmes/pal.html
Solar_radiation	http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/FTP_SITE/INT_DIS/readmes/larcsrb.html
Precipitation	http://www.ocs.orst.edu/prism

Temperature	http://www.ocs.orst.edu/prism
Soil_texture	http://www.ncgc.nrcs.usda.gov/branch/ssb/products/statsgo/index.html
Land_cover	http://glcf.umiacs.umd.edu/data/landcover/data.shtml

The optimal parameters searching process illustrates in Figure S2, which shows the trails of cost function values.

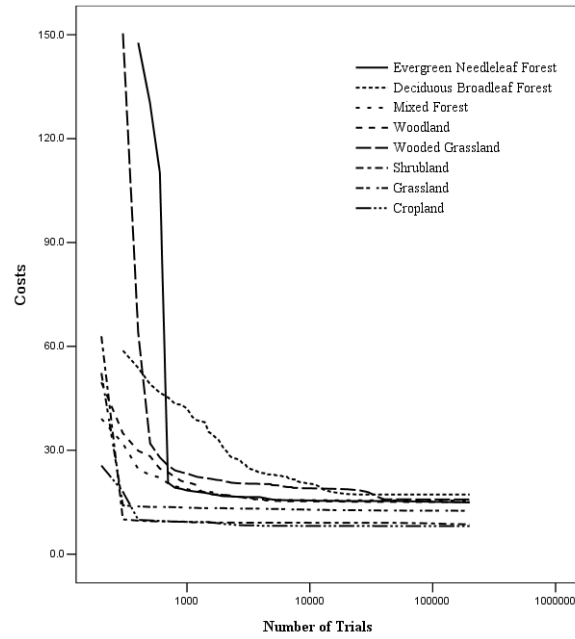


Figure S3. Trails of cost function values in the process of parameters optimization