A Big Earth Data Platform for Three Poles

**Flux observation dataset over a winter wheat-summer maize rotation cropland in the North China Plain - Weishan (Gaoying) flux site of Tsinghua University (2005-2006)**

1、Description

This dataset contains the fluxes and meteorological data of Weishan (Gaoying) flux site of Tsinghua University from May 17, 2005 to September 26, 2006. The site (116.0542° E, 36.6487° N, 30 m above sea level) was built on March 18, 2005 and is located in Xiaozhuang Town, Chiping District, Liaocheng City, Shandong Province. It belongs to Weishan Irrigation District along the lower Yellow River. The local climate is characterized as temperate monsoons, with an average annual temperature of 13.8 ℃, an average annual precipitation of 553mm, most of which occurs between June and October, and an average annual potential evaporation of 1950mm. The soil type is silt loam. For the soil of the top 5 cm, the average saturated soil water content, field capacity and wilting point in volumetric values are 0.43, 0.33 and 0.10 m3m-3, respectively. The height of the flux tower is 10m, and the area within about 1 km radius around the flux tower is largely homogeneous winter wheat-summer maize rotation cropland. The winter wheat is generally sown in mid-October and harvested in early June of the following year, while the summer maize is usually planted directly into the stubbles of wheat at the same location immediately after the harvest of wheat and is harvested in late September to early October. See the file named “Supplementary data\_WeishanGaoying20052006.xlsx” for specific sowing, harvesting and irrigation dates.
The surface flux data is measured by the eddy covariance system, which is composed of a three-dimensional sonic anemometer (CSAT3, Campbell Scientific, Inc., Logan, UT, USA) and an open-path infrared gas analyzer (IRGA) (LI-7500, LI-COR, Inc., Lincoln, NE, USA) with an installation height of 3.7m. The 30-minute net ecosystem carbon exchange (NEE), latent heat flux (LE) and sensible heat flux (H) data were obtained after the raw 10Hz data were processed by Eddypro software. The preprocessing steps included despiking, double coordinate rotation, 30-min block averaging, time lag compensation, spectral corrections, the Webb-Pearman-Leuning (WPL) density correction, a quality check using the “0-1-2 system”. Then the 30-min data were screened as follows: (1) remove bad quality fluxes with quality flag 2; (2) limit H and LE to - 200 ~ 500 W m-2 and - 200 ~ 800 W m-2, respectively; (3) the data during the precipitation events were excluded. Then, REddyproc software is used to filter the data under low turbulence mixing conditions (i.e. filter the flux data according to the friction wind speed u\*), fill the gaps in the time series, and then the NEE was divided into ecosystem respiration (Reco) and gross primary production (GPP) by the nighttime partitioning method.
The published dataset includes: year, month, day, time, atmospheric pressure (P), infrared surface temperature (Tsurf), wind speed (Ws), wind direction (Wd), air temperature (Tair) and relative humidity (rH) at 2m, downward short wave radiation (Rsd), upward short wave radiation (Rsu), downward long wave radiation (Rld), upward long wave radiation (Rlu), Net radiation (Rn), incident photosynthetically active radiation (PAR\_dn), reflected photosynthetically active radiation (PAR\_up), precipitation (precip), groundwater level (GW), 5cm/10cm/20cm/40cm/80cm/160cm soil water content (soil\_VW\_ 5cm / 10cm / 20cm / 40cm / 80cm / 160cm) and soil temperature (soil\_T\_5cm / 10cm / 20cm / 40cm / 80cm / 160cm), soil heat flux at 5cm depth (soil\_ G) , raw data of net ecosystem carbon exchange (NEE\_raw), raw data of latent heat flux (LE\_raw), raw data of sensible heat flux (H\_raw), net ecosystem carbon exchange after gap filling (NEE\_ f) , latent heat flux after gap filling (LE\_f), sensible heat flux after gap filling (H\_f), ecosystem respiration imputation (Reco\_f), gross primary productivity (GPP\_f). The data are stored in .xlsx format at 30-minute intervals. Null values in the dataset are represented by NA.
Please refer to Lei and Yang (2010a, 2010b) for detailed information of this site and the observation instruments.

2、Keywords

Theme：Radiation,Winds,Solar radiation,Meteorological data,Hydrology,Eddy covariance system,Carbon-water fluxes,wind speed
Discipline：Atmosphere,Terrestrial Surface
Places：winter wheat-summer maize rotation cropland, Weishan Irrigation District, North China Plain
Time：30-min interval,

3、Data details

1.Scale：None

2.Projection：

3.Filesize：7.1MB

4.Data format：None

4、Space scope

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| --- | --- | --- |
| - | north：36.6487 | - |
| west：116.0542 | - | east：116.0542 |
| - | south：36.6487 | - |

5、Time frame:2005-05-16 16:00:00+00:00--2006-09-26 16:00:00+00:00

6、Reference method

References to data:

LEI Huimin. Flux observation dataset over a winter wheat-summer maize rotation cropland in the North China Plain - Weishan (Gaoying) flux site of Tsinghua University (2005-2006). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2716642021

References to articles:

Lei, H.M., & Yang, D.W. (2010a). Interannual and seasonal variability in evapotranspiration and energy partitioning over an irrigated cropland in the North China Plain. Agricultural and Forest Meteorology, 150(4), 581-589.

Lei, H.M., & Yang, D.W. (2010b). Seasonal and interannual variations in carbon dioxide exchange over a cropland in the North China Plain. Global Change Biology, 16(11), 2944-2957.

7、Supporting project information

The National Natural Science Foundation

8、Data resource provider

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