A Big Earth Data Platform for Three Poles

**A long term hourly eddy covariance dataset of consistently processed CO2 and H2O Fluxes from the Tibetan Alpine Steppe at Nam Co (2005 - 2019)**

1、Description

The data set contains nearly 15 years of eddy covariance data from an alpine steppe ecosystem on the central Tibetan Plateau.The data was processed following standardized quality control methods to allow for comparability between the different years of our record and with other data sets. To ensure meaningful estimates of ecosystem atmosphere exchange, careful application of the following correction procedures and analyses was necessary: (1) Due to the remote location, continuous maintenance of the eddy covariance (EC) system was not always possible, so that cleaning and calibration of the sensors was performed irregularly. Furthermore, the high proportion of bare soil and high wind speeds led to accumulation of dirt in the measurement path of the infrared gas analyzer (IRGA). The installation of the sensor in such a challenging environment resulted in a considerable drift in CO2 and H2O gas density measurements. If not accounted for, this concentration bias may distort the estimation of the carbon uptake. We applied a modified drift correction procedure following Fratini et al. (2014) which, instead of a linear interpolation between calibration dates, uses the CO2 concentration measurements from the Mt. Waliguan atmospheric observatory as reference time series. (2) We applied rigorous quality filtering of the calculated fluxes to retain only fluxes which represent actual physical processes. (3) During the long measurement period, there were several buildings constructed in the near vicinity of the EC system. We investigated the influence of these obstacles on the turbulent flow regime to identify fluxes with uncertain land cover contribution and exclude them from subsequent computations. (4) We calculated the de-facto standard correction for instrument surface heating during cold conditions (hereafter called sensor self heating correction) following Burba et al. (2008) and a revision of the original method following Frank and Massman (2020). (5)Subsequently, we applied the traditional and widely used gap filling procedure following Reichstein et al. (2005) to provide a more complete overview of the annual net ecosystem CO2 exchange.(6) We estimated the flux uncertainty by calculating the random flux error (RE) following Finkelstein and Sims (2001) and by using the standard deviation of the fluxes used for gap filling(NEE\_fsd) as a measure for spatial and temporal variation.

2、Keywords

Theme：Latent heat flux,Radiation,Carbon dioxide flux,Sensible heat flux  
Discipline：Atmosphere  
Places：Nam Co, Tibetan Plateau  
Time：time series

3、Data details

1.Scale：None

2.Projection：

3.Filesize：250.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：30.772766 | - |
| west：90.963043 | - | east：90.963043 |
| - | south：30.772766 | - |

5、Time frame:2005-12-09 08:00:00+00:00--2019-09-12 08:00:00+00:00

6、Reference method

References to data:

Felix Nieberding, Yuyang Wang\*, MA Weiqiang\*, Torsten Sachs, MA Yaoming, Gerardo Fratini, Magnus Ole Asmussen, Cristian Wille. A long term half-hourly eddy covariance dataset of consistently processed CO2 and H2O Fluxes from the Tibetan Alpine Steppe at Nam Co (2005 - 2019). A Big Earth Data Platform for Three Poles, doi:10.11888/Meteoro.tpdc.2703332020

References to articles:

Ma, Y.M., Kang, S.C., Zhu, L.P., Xu, B.Q., Tian, L.D., & Yao, T.D. (2008). Tibetan Observation and Research Platform- Atmosphere–land interaction over a heterogeneous landscape, Bulletin of the American Meteorological Society. 89, 1487–1492. doi:10.1175/2008BAMS2545.1.  
  
Ma, Y.M., Ma, W.Q., Zhong, L., Hu, Z., Li, M., Zhu, Z., et al. (2017). Monitoring and Modeling the Tibetan Plateau’s climate system and its impact on East Asia, Scientific Reports, 7, 44574, doi:10.1038/srep44574.  
  
Nieberding, F., Wille, C., Fratini, G., Asmussen, M. O., Wang, Y., Ma, Y., & Sachs, T. (2020). A long-term (2005–2019) eddy covariance data set of CO2 and H2O fluxes from the Tibetan alpine steppe. Earth System Science Data. 12. 2705-2724. 10.5194/essd-12-2705-2020.

7、Supporting project information

Pan-Third Pole Environment Study for a Green Silk Road-A CAS Strategic Priority A Program  
Second Tibetan Plateau Scientific Expedition Program

8、Data resource provider

name: MA Weiqiang\*  
unit: Institute of Tibetan Plateau Research, Chinese Academy of Sciences  
email: wqma@itpcas.ac.cn  
  
name: MA Yaoming  
unit: Institute of Tibetan Plateau Research, Chinese Academy of Sciences  
email: ymma@itpcas.ac.cn  
  
name: Felix Nieberding  
unit:   
email: felix.nieberding@posteo.de  
  
name: Cristian Wille  
unit:   
email: christian.wille@gfz-potsdam.de  
  
name: Gerardo Fratini  
unit:   
email: gerardo.fratini@licor.com  
  
name: Magnus Ole Asmussen  
unit:   
email: m.asmussen@tu-braunschweig.de  
  
name: Torsten Sachs  
unit:   
email: torsten.sachs@gfz-potsdam.de  
  
name: Yuyang Wang\*  
unit:   
email: wangyuyang@itpcas.ac.cn