Atmos. Chem. Phys. Discuss., 14, C6232–C6234, 2014
www.atmos-chem-phys-discuss.net/14/C6232/2014/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Development of a 10 year (2001–2010) 0.1 dataset of land-surface energy balance for mainland China" *by* X. Chen et al.

Anonymous Referee #2

Received and published: 27 August 2014

Generally, this MS utilized multi-source data and a modified surface energy balance model to simulate the temporal and spatial patterns of surface energy fluxes at national scale (China). Compare to the previous related studies, a higher resolution data set of energy fluxes was produced and well validated with ground flux measurement. With such dataset, 10 years variations of radiation and turbulent heat fluxes in China were evaluated.

Obviously, this study provided a useful dataset and gave some interesting results on the spatial-temporal patterns of land surface energy balance in China, especially in Tibetan Plateau. However, there are still some explanations and modifications are needed,

1. In Introduction section, if the authors can make a more clearly introduction on the reasons for constructing such a high spatial resolution and long term dataset at national scale? And what are the progresses about this topic in China and world?

2. In model description, although the structure and equations were detail introduced with many references, it is still not clearly that how the model was developed based on those references in this MS.

3. Only the EC data with more than 70% available in a month was acceptable in flux validation. However, it is popular that the most nighttime EC data usually was questionable and filtered out under weak turbulent condition, which resulted in large gaps in EC data. So 70% available data probably main come from daytime. If it will affect the monthly flux validation, for example, sensible heat flux?

4. If possible, please add a figure to show the validation of LWD, because it was assumed to be important and there still existed room for improvement, although linear-fitting slope and correlation coefficient attained 0.9 and 0.98, respectively.

5. Why only the validation from Yucheng and SC flux site were introduced in detail, the results were similar for other 9 sites?

6. In trend analysis, it is interesting for the distinct variations in Tibetan Plateau, for example, in Fig 9 and 10. Meanwhile, it is also noticeable that the radiation and turbulent energy fluxes decreased in both northeastern and north China. Related explanations will be helpful for the understanding of the spatial variations of radiation and fluxes in China as a whole picture.

7. The organization of discussion is not well, and lots of discussion has already appeared in Introduction and Results section.

Technical corrections:

1. In Introduction section, some descriptions about the estimation method and input data were also included in this section, for example, “For this reason we chose a more

ACPD
14, C6232–C6234, 2014

physically-based method –turbulent flux parameterization – to produce the dataset" on p14475, line 17, and "To derive the surface energy balance terms for the Chinese landmass, we used high resolution reanalysis data,. . ." on p14476, line 16. It will be more appropriate to move such description into the Methods section.

2. Canopy height is important for the estimation of land surface heat flux. From eq. 8, it was just the linear function of NDVI, and even canopy fraction (fc) from eq. 9. Although the author indicated the reference, if some HC validations at flux sites can be provided?

3. The color and letters in Fig.1 is confusing, please improve it.

4. From Table 3, it seems that no forest flux site was included for model validation.

5. As for the sensible heat flux and latent heat flux, different names were used in this MS, for example, Heat flux, Surface fluxes, Heat and water fluxes, Land surface fluxes, Land surface-energy fluxes, Turbulent flux, Turbulent heat fluxes, Turbulent heat, etc., please check and uniform it.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 14471, 2014.