**Atmospheric
Chemistry
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Discussions**

Interactive comment on "Characterization of wind power resource in the United States" by U. B. Gunturu and C. A. Schlosser

Anonymous Referee #2

Received and published: 4 April 2012

General Comments

It is a very interesting paper that reconstructs wind power resource in the continental and offshore regions of United States based on MERRA hourly data from 1979 to 2009. Novel aspects include characterize wind resource not only through its abundance and availability but also through its persistence and intermittence. The later has not yet been fully presented in previous wind resource studies over United States. It has application originality. However, there are a few specific concerns need to be addressed before accepted.

Specific Comments

[1] Definitions for CoV and IQR are missing in the main text, which are needed for

general readers with insufficient backgrounds in statistic.

[2] On P. 7312, Line 20-L21, the similarity theory in boundary layer is used to interpret wind speed at 80m, 100m, and 120m, which is a function of near surface friction velocity, surface heat flux, and surface aerodynamically roughness (P. 7314, L11-L13). This method is based on the assumption that the interoperated wind level is within atmospheric boundary layer, which is typical true for daytime PBL, however it may not be true at nocturnal stable boundary layer when its PBL height sometimes shallow than 80-120m. In the later case, winds near the surface is decoupled from winds aloft at wind turbine height (80m to 120m); therefore turbine winds should not be interpreted as boundary layer winds related to surface heat flux and surface roughness. As a consequence, nighttime wind speeds at various vertical levels may not be well estimated in this paper, which leads to potential problems in estimating WPD variance and intermittent properties in some regions over United States.

[3] P7308, L4-7 about shape factor:

Original: "The shape factor of the Weibull distribution has a great impact on the fit of wind speeds because as shape factor increases, the tail of the Weibull distribution decreases. Thus, the extreme wind speeds decrease and the distribution transforms towards a normal one. "

As shape factor increases, the tail is shorter, which may not lead to decrease of extreme wind speeds, because there is no direct relationship between absolute wind speed and the shape factor. It is suggested to rewrite the sentence to emphasis only the shift of distribution toward a normal one when the tail is shorter.

[4] P7323, L22-25

Original: "Further, it also erroneously characterizes the mountainous regions as high wind resource locations. Thus, wind speed is not a suitable measure for the wind resource. If WPD is used, it is more comprehensive as it covers the variation of air

density"

The wind resource is not limited to wind power resource but also to extreme wind assessment, surface dust and aerosol transport, surface flux estimation, et al. Wind speed is a suitable measure for the wind resource, but air density variation is also important for accurately estimate wind power resource particularly in non-mountain regions.

Technical Corrections

[1] Color schemes for Figure 8, 12b, 12c, 13b, 13c, 15b, 15c,16b, 16c are suggested to be improved for better figure quality;

[2] Study periods are missing in all figure captions.

Please also note the supplement to this comment: http://www.atmos-chem-phys-discuss.net/12/C1278/2012/acpd-12-C1278-2012-supplement.pdf

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 7305, 2012.

C1280