

## ***Interactive comment on “Estimation of surface energy fluxes under complex terrain of Mt. Qomolangma over the Tibetan Plateau” by X. Chen et al.***

**Anonymous Referee #2**

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This paper presents a modified version of the well known model SEBS. Two new features are presented: 1- a new kB-1 formulation for bare soil surfaces, which corrects a well documented overestimations of kB-1 by the original Brutsaert formulation (this aspect is, in the paper, secondary); 2- a method to account for topographical effects on radiation exchange. The new model algorithm is well documented and could be useful for applications in other mountainous regions. Both improvements are welcome, since in mountainous regions, bare soils are frequent and topographical effects prevent from using an average regional aerodynamical resistance and therefore methods based on the triangle method etc. Unfortunately, the paper does not provide the comparison with

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performance values obtained at the same EC tower location with the original kB-1s formulation, nor does it build on enough data (one EC tower on what seems to be flat terrain) to evaluate the topographical module in a satisfying way. Some qualitative checking on several key elements (glacier for instance) allows to verify the realism of the new model. If the EC tower footprint at the 8 dates includes slanting terrain, please provide information on the slopes and azimuth angles of the pixels included in the footprint, as well as the performance of the original TSEB model that ignores topographical effects. Moreover, the climate forcing is spatialised from a single meteorological tower, which is not surprising in such a remote environment, and one could ask if alternative, even indirect, information could help solve the regionalisation issue for the climate forcing (regional climate model outputs, integrated moisture and temperature profile from atmospheric sounder etc, I'm not a specialist in the matter). In my view, the authors should concentrate on the improvement of the bare soil KB-1 evaluation rather than on the topographical module, by providing statistics of the original Zu (2002) model performances, and publish TESEBS in a journal such as Env. Modelling Software, or, alternate solution, provide a more comprehensive (even qualitative) assessment of the model performance in slanting terrain, the actual evaluation at regional scale being insufficient according to me.

Detailed comments:

P10426L23: "Time series.... local scale": isn't it the core of the paper ? why isn't it shown here ?

P10416L9: "transport" > "exchange"; L10: reference/background info for Angstrom-Prescott model ?

P10425L16: is z set to the boundary layer height in Eq. 12 ?

P10426L6: I don't get why the terrain is "complex": the tower is located on a flat bare soil (fig 1) which covers many Landsat pixels; moreover, with a height of 3.5 meter, the footprint covers at most several (1-10 maybe ?) landsat pixels. Couldn't you use other

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albedo products ? (ASTER ?)

Figures 3 and 4: units are missing

Figure 5: geographical info. (scale) is missing.

Figure 6 caption: cross is not a line.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 10411, 2012.

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