



Interactive comment on “Evaluation of an extreme-condition-inverse calibration remote sensing model for mapping energy balance fluxes in arid riparian areas” by S.-H. Hong et al.

S.-H. Hong et al.

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Dear editor,

Co-authors and I have responded comments from reviewers and prepared revised manuscript. Here are attached 3 files as follow;

1. Response_to_Reviewers_Hong.pdf
2. Final_Draft_Hong_Track Change.pdf
3. Final_Draft_Hong.pdf

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Interactive Discussion

Discussion Paper



Please let me know if there is any question.

Best regards, Sung-ho Hong

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 13479, 2014.

HESSD

11, C6831–C6835, 2015

Interactive
Comment

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Interactive Discussion

Discussion Paper

C6832



Response to Reviewers' Comments

Referees' responses are in black; authors' responses are in blue.

Response to Anonymous Referee #1

Summary: The authors present an application of SEBAL to semi-arid riparian regions in the US West. The study design is appropriate to the problem and the presentation of methods and results is clear throughout. I am not a SEBAL user, but my impression is that this paper will present a useful case study and a number of useful application tips for users of that system. Since SEBAL is a widely used model and semi-arid riparian zones are of particular interest for ET analysis I believe that publication of this paper in HESS is justified.

[Answer:](#) Thank you.

That said, I admit that I find the paper disappointing in some respects, as indicated in my major comments below. My overall impression is that the paper as it is currently written provides a technical resource for SEBAL users, but that the authors have missed the opportunity to put their analysis into the broader context of semi-arid riparian hydrology, or at least the broader context of available ET methods and datasets in these regions.

Major comments:

1. I find it odd that so many ET methods and products are listed in the introduction, yet the paper only presents internal analyses. It would be very interesting to know how the calibrated SEBAL estimates from this study compare to available ET estimates from MODIS (MOD16 and/or the UW product for CONUS), ALEXI, NLDAS, or other available datasets. Indeed, I had really hoped that in reading the paper I would learn whether calibrated SEBAL performs substantially better than other methods or publicly available products in these regions.

[Answer:](#) We fully agree that it would be interesting to know how the calibrated SEBAL estimates compare to those by operational ET products such as MOD16, ALEXI, NLDAS or other ones. However, the goal of this paper is "to conduct a thorough evaluation of the performance of SEBAL in arid riparian areas." Other international research groups have evaluated SEBAL for irrigated areas, forested catchments, cropped soil and desert surfaces. There are many scientists that believe SEBAL is designed for irrigation systems, hence it is an excellent idea to synthesize the multi-year research work in semi-arid riparian regions. The latter is an ecosystem requiring more global attention in water accounting frameworks of river basins. Comparison between SEBAL and METRIC at the one hand with other remote sensing based ET models at the other hand has been done before (TSEB, DISALEXI, IWMI Turkey experiment, Caren Jarman South Africa). References to that could be provided Co-author Hendrickx is involved with a statewide assessment of ET in New Mexico and evaluation of the MOD16, ALEXI and SSBop operational ET products. The study started last fall and publication of its results will take a while to complete.

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**EVALUATION OF AN EXTREME-CONDITION-INVERSE CALIBRATION
REMOTE SENSING MODEL FOR MAPPING ENERGY BALANCE FLUXES IN
ARID RIPARIAN AREAS**

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⁶Southwest Watershed Research Center, USDA-ARS, Tucson, AZ; ⁷Inyo County, Water
Department, Independence, CA.

ABSTRACT

Accurate information on the distribution of the surface energy balance components in
arid riparian areas is needed for sustainable management of water resources as well as for
developing a better understanding of water and heat exchange processes between the land
surface and atmosphere. Since the spatial and temporal distributions of these fluxes over large
areas are difficult to determine from ground measurements, their prediction from remote sensing
data is very attractive due to its large areal coverage and a high repetition rate. In this study the
Surface Energy Balance Algorithm for Land (SEBAL) was used as a remote-sensing platform to
estimate energy balance components in the arid riparian areas of the Middle Rio Grande Basin
(New Mexico and San Pedro Basin (Arizona), and areas of rhacatophytic shrubs and grasses in
the Owens Valley (California). We compared instantaneous and daily fluxes from SEBAL
derived from Landsat TM images to surface-based measurements from eddy covariance flux
towers. This study presents evidence that inversion-calibrated surface energy balance models

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Fig. 2.

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Accurate information on the distribution of the surface energy balance components in arid riparian areas is needed for sustainable management of water resources as well as for developing a better understanding of water and heat exchange processes between the land surface and atmosphere. Since the spatial and temporal distributions of these fluxes over large areas are difficult to determine from ground measurements, their prediction from remote sensing data is very attractive due to its large areal coverage and a high repetition rate. In this study the Surface Energy Balance Algorithm for Land (SEBAL) was used as a remote-sensing platform to estimate energy balance components in the arid riparian areas of the Middle Rio Grande Basin (New Mexico) and San Pedro Basin (Arizona), and areas of phreatophytic shrubs and grasses in the Owens Valley (California). We compared instantaneous and daily fluxes from SEBAL derived from Landsat TM images to surface-based measurements from eddy covariance flux towers. This study presents evidence that inversion-calibrated surface energy balance models

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