

Interactive comment on “Water-balance and groundwater-flow estimation for an arid environment: San Diego region, California” by L. E. Flint et al.

Anonymous Referee #2

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This paper concerns the use of water balance and groundwater analysis to estimate recharge in the San Diego region. I enjoyed reading the paper and believe it should be published with modification.

It has been common knowledge in hydrology that estimates of groundwater recharge based on precipitation, runoff and actual ET (AET) are uncertain to the point of infeasibility because of uncertainty in AET that is far greater than the recharge. In other words, estimation of recharge through water balance calculations has been mostly impractical because the thus far irreducible uncertainty in AET is much greater than magnitude of

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the recharge term. The main exception is in the case of agricultural crops, for which decades of monitoring and research have helped adequately constrain the AET term. From the title and conclusions of this paper, one might construe that the above-stated problem has been partially or substantially solved. Unfortunately, this problem persists and is as nasty as ever, and I believe the authors should include more direct discussion of this shortcoming.

In concept, the recharge uncertainty problem can be better constrained through the combined approach of integrated hydrologic analysis that includes a bona fide, calibrated groundwater model. The authors have taken a small step in that direction, but the groundwater model appears highly preliminary, has questionable boundary conditions, and is apparently not calibrated. Moreover, the recharge forcing in the groundwater model was apparently taken from the water balance model, removing the possibility of using the groundwater model to constrain the water balance calculations.

I made many specific edits and comments directly on the PDF file, and I am attaching these to my review. Many of my comments are very significant and should lead to some substantial modifications by the authors. [Note that the comment on p. 17 stating “The coastal plain seds K (h2) is higher. . .” should read “The coastal plain seds K (h2) is lower. . .”]

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/9/C2191/2012/hessd-9-C2191-2012-supplement.pdf>

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