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Hydrology and Earth System Sciences Discussions

Interactive comment on "Calibration of a crop model to irrigated water use using a genetic algorithm" *by* T. Bulatewicz et al.

Anonymous Referee #3

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This paper employs interdisciplinary methods to calibrate the EPIC model in a typical irrigation area for crop yield andwater use simulation. The authors have done massive work on data preparation, calibration scheme design, and parameter robustness analysis. Several questions and comments are listed below.

1) As emphasized in the title of this paper, this paper applies genetic algorithms to calibrate EPIC. But in the text of this paper, I did not see any review of previous calibration work that has used evolutionary algorithms to calibrate EPIC or similar crop models (EPIC, APEX, SWAT, and ALMANAC) that are developed at Texas A&M University and USDA ARS at temple. Please go to https://www.card.iastate.edu/swat_articles/, and summarize previous work. There are many evolutionary algorithms available. What is

the major reason that inspires the authors to use Genetic Algorithms (GA)?

2) The basic settings of EPIC needs to be addressed in section 2. For example, what are the PET and soil erosion methods used in this paper.

3) In Table 1, the authors list the parameters that have been selected for calibration. There is no Curve number, Soil erodibility factor, Nitrogen uptake, and other parameters that control and water and nutrients movement. The authors may need to justify their selection.

4) From lines 10-25 on page 2372, the authors said that there are a total of 779 wells in the county, and they discarded 23 wells. For the 11-years period, there should be (779-23)*11 = 8316 well-year combination. But in line 22 on the same page, they said they used 4931 well-year combination. Some explanation should be added to address this difference.

5) From section 4, I think that the parameters (10 parameters listed in Table 1) are spatially aggregated but not spatially distributed. Is this correct? The authors need to clearly state this in section 4.

6) A discussion on how to transfer the results obtained in this study to stake holders and decision maker may strengthen this paper.

I suggest publishing this paper after the authors addressing the above comments.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 2367, 2009.