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Hydrology and Earth System Sciences
Discussions
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Interactive comment on "Linking economic and social factors to peak flows in an agricultural watershed using socio-hydrologic modeling" *by* David Dziubanski et al.

Anonymous Referee #2

Received and published: 19 November 2019

This paper presents a social-hydrological model on the links between farmers' land use decisions and flood consequences at a basin scale, which is a novel effort in this field. The research question, methods and data are well introduced, and the results are valuable. I recommend to consider this paper for publish after minor revisions.

A few detailed comments are listed here, which are hopefully helpful for improvement of the paper.

Page 4, line 87-90, the authors listed literature of ABM on water issues, but the references are quite old from the years of 2003-2011 and only one from 2017. In addition, there is a lack of reference about ABM in flood studies. I suppose it would be valuable if

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Discussion paper

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Page 4-5, line 94-102, there are already many research about land use changes impacts on stream flow, what's the new value added by the present study?

Line 137, it would be more accurate to say "a group of farmer agents and city agents". Is there only one city agent?

ABM proceed with monthly time steps. Hydrological model proceeds with hourly time step. How are they integrated?

Section 2.4.2, Line 255-257, why is it assumed that most farmers rent lands for crop production? Do they rent yearly, or how long usually is their land rent contract? I am not sure, but I assume many farmers own lands in the US.

Nice to see the many historical data in Figure 3. Are these data used as input in the ABM, and how?

Equation 1, yield is the Arithmetic function of year, precipitation and temperature. I may not understand this correctly. How could you add year, precipitation and temperature together? They don't even have the same unit. How would you explain the equation, e.g. 2200 MT/ha=2005 year + 160mm +35âĎČ?

Section 2,7,1, taking conservation option means farmers have to plant native prairie

strips. Did the authors consider the costs of planting the prairie strips? How much is it less than planting crops?

How did you quantify the many “ðİŻ£C”s in equation 2? There is only one introduction of calculating ðİŻ£ðİŘűðİŚİrofit:ðİŚŃ (equation 4).

The major finding of the study indicates that peak discharge is most sensitive to changes in crop prices. As we know generally crop price is a market effect and is not controllable by the farmer and city agents in the basin scale. Thus three questions: 1, would you say that crop price in the US or in the globe influences water discharge (flood) in the Squaw Creek basin? 2, Does it mean that local efforts in the basin have little effects regarding flood control? 3, what would you suggest for decision making of flood management in the Squaw Creek basin, based on your research findings?

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Fig. 1.