Geoscientific

Model Development

Discussions

GMDD

Interactive

comment

Interactive comment on "LUCI-EntEx v1.0: A GIS-based algorithm to determine stream entry and exit points at boundaries of any given shape" *by* Bethanna Jackson et al.

Anonymous Referee #1

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General comments

This paper described an algorithm to identify the entry/exit points at boundaries with any given shape. The LUCI-EntEx v1.0 and LUCI v0.9 were developed to automate the process for preprocessing the DEM, identify the stream entry/exit points, and determine the terrestrial entry/exit procedure at boundaries. The use cases for both farm and catchment scales were implemented to validate the GIS tools.

The major contribution of this work is the proposed algorithm to identify the stream entry/exit points at boundaries and the code implementation, which is a novel idea and not available in many of the existing GIS tools. The automation of the DEM preprocess-

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[Discussion paper]

ing and identification of the terrestrial entry/exit procedure with existing tools/algorithm also contribute a bit to simplify the work for data preprocessing and analysis. This paper presented the workflows and algorithm in a logical and clear way. The findings that the different contributing areas (buffer or upstream contributing area) in a farm scale will lead to different results are also informative. Detailed comments for this paper are listed below.

Detailed comments

1. pg 2 line 15: The paper only cited Arc Hydro (Maidment 2002) as GIS tools for catchment delineation. It would be better to provide a bit more description as a brief literature review of various GIS tools and algorithms for catchment delineation. This will help people especially for those who are not familiar with the GIS tools for catchment delineation to get a better sense how your work fit into a bigger context and the contribution of your work.

2. pg 5 fig 1: For the step "Burned DEM" -> "Calculate flow direction", this should be "hydDEM" ->"Calculate flow direction". The flow direction is calculated using the DEM of which the sinks are filled.

3. pg 7 line 2-3: Please provide a bit more information to explain how the "not determined points" are handled. Are they discarded directly?

4. pg 7 line 11: "is the located" should be "is located".

5. pg 9 fig 4: At the bottom of the figure, the flowchart has a bit overlap for the part "Is starting point inside study area mask" (the left one) and its option "N".

6. pg 15 line 24: What is NZSoS? Please spell its full name and put the abbreviation in parentheses.

7. pg 16 fig 10: Please add a scale bar and a legend in the map. It is also suggested to change the way to show the locations of the 4 study areas. In this map, the farm areas are big green points (hexagon) and the catchments are showing the actual shapes. It

is a bit misleading for readers to think the big green points for the farms are the actual shapes at the first glance of the map.

8. pg 18 fig 12 (a): I suppose both LUCI-EntEx v1.0 and LUCI v0.9 are using the same processed DEM data with the same small buffer area. In fig 11 (a), the caption is "buffer(beige)", will this be the same for the fig 12 (a) caption? Instead of "buffer (not shown)", it may be buffer (beige).

9. pg 19 line 13: In fig 14(b), it is number 15 not 14.

10. pg 20 fig 14 (a): This is the similar issue as fig 12 (a). The caption "buffer (not shown)" may need correction.

11. pg 21 table 1: Remove "\" in the caption for " study area \ and the upstream...".

12. pg 22 line 5: Missing a period "." before the sentence " The Preprocess DEM tool...".

13. pg 26 fig 18: Please add caption info for plot (a) and (b) separately after the general description of the figure.

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