

Dear Editor,

Thank you for considering the manuscript "Calibration of a Density-based Model of Urban Morphogenesis" for possible publication in PLOS ONE. The suggestions and comments will undoubtedly be of great value to the paper. The paper was updated accordingly.

First, the following general changes were done:

- A supplementary analysis was developed as a supplementary material, namely the sensitivity of indicators computed on real data to windows size. This gives stronger confidence in the results obtained.
- Several details or more precise explanations were added.
- The protocol of the study was archived on protocols.io as advised by the editor and the corresponding doi was added in the paper.
- A screening for spelling errors and English mistakes was done.
- The typo on the value of the entropy was corrected.
- Long paragraphs were split to ease readability.

I provide you now the point-by-point response to referees' reports.

Concerning the comments specific to the first referee:

1. Concerning the understanding of the interaction between aggregation and diffusion and its correspondance to emerging forms, I recalled that only a reference to the full behavior which is given in Supplementary material can unveil properties of a specific regime. The configuration detailed in main text is one example.
2. There was indeed a typo in the spatial range corresponding to the scale of the model, which is 50-100km. In comparison, the microscopic scale would be under 10km and the macroscopic scale at 500-1000km. This useful remark was added.
3. An explanation for the choice of parameters boundaries was added.
4. Concerning the caption in Figure 2 with high values of population for rural areas, a paragraph was added to recall that the interpretations are done on renormalized densities and that the total populations has less influence than the ratio between population and growth rate.
5. All equations were numbered.
6. The bibliography was screened and updated to meet the standards.

The comments of the second referee were addressed before in the common general section above.

Concerning the third referee's comments, the following precise points were treated:

1. Some literature was added, including the relevant suggestions that were made.
2. A flowchart describing the main step of the study was added.
3. A part was added in the discussion to discuss main findings, the position regarding existing literature, and possible practical applications of using this model at a continental scale.
4. The sensitivity analysis of the model is indirectly done both in the assessment of sensitivity to stochasticity, and in the exploration of model behavior which covers the full parameter space. The corresponding section was renamed accordingly.

Yours faithfully,

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