

Dear Editor,

I want to thank the two reviewers for their thorough evaluation and discussion of the paper. The manuscript was revised in a way that I believe addresses most of the comments.

The principal issue raised by both reviewers was a lack of problem statement, connection with literature and related work, statement of contributions and paper organizations. A thorough rewriting of the paper was carried to tackle this issue. The introduction was significantly reorganized and extended to state that (i) not many studies focus on controlling correlation structure in synthetic data; (ii) such spatial synthetic correlated data for socio-spatial systems, with constraints at a macroscopic scale, have never been investigated. The paper aims thus at answering this gap. It was therefore reorganized to focus mainly on this type of system, while the illustration on financial data was put as a second example to show the genericity of the method. Abstract and discussion were also rewritten significantly following these ideas.

Below are point-by-point response to referees comments.

First referee:

1. *Mathematical equations are not referred in the paper. Please refer them properly and if you have proposed an equation then explicitly mention it*
→ The main equations which are not intermediate stages in a computation were referred to in the corresponding part of the text
2. *equations are not labeled. Please label all the equations.*
→ All equations were numbered.
3. *x,y labels of most of the figures are not readable, please increase their font size.*
→ The figures were all redone for readability.
4. *Related work of a paper is very important which is missing in your work. Please add closely related paper from literature and mention that how your work is different from them.*
→ As the introduction and discussion were thoroughly rewritten, more literature was added.
5. *Problem statement is not defined properly. Please write the problem statement of your paper, define problem and highlight the solutions you have proposed to solve it by referring some closely related work.*
→
6. *Contributions of your paper are also ambiguous, I will suggest you to highlight your key contributions in the introduction section.*
→ Introduction was rewritten and now includes an explicit statement of paper's contributions.
7. *Use same convention when refereeing to figures i.e. either fig. 4 or figure 4.*
→ Refereeing to figures was unified as "Fig.N" throughout the paper.
8. *What does red and black plots represent in Fig. 1? Moreover, it is hard to differentiate between purple and black plots. I will suggest you to either increase the marker size of purple plot or use some other color instead of black and add plots legends also. Same is the case with rest of the figures. Figures' text is very tiny and it is not possible to read and understand anything from them.*
→ In Fig.1, the black plot corresponds to the raw time-series of log-prices, while purple and red curves show smoothed components (at 10min and 30min frequencies respectively). These are an example of basis components used to regenerate synthetic data from the signal. The legend was made more clear and the figure was reworked. Generally, all figures were improved for readability.
9. *Paper is written in poor English. Please refer to following examples: (...) Please read the paper carefully and proofread it for possible grammatical and typographical errors.*

→ Paper was carefully checked for English mistakes.

10. *Comparison with existing schemes is very important to prove the validity of proposed work. Please provide quantitative comparison with existing work.*

→ As there is to the best of our knowledge no directly comparable work in the literature, a numerical/quantitative benchmark of methods is not possible. We however added a minimal benchmark by constructing a null model for the geographical system, simulating it and estimating the null correlations it produces. This confirms the significance of correlations generated by the method, as they differ from this null model.

Second referee:

1. *It is really difficult to understand Abstract of this paper.*

→ The abstract was fully rewritten.

2. *As it is mentioned that Generation of hybrid synthetic data resembling real data to some criteria is an issue in most disciplines. . . , Instead of focusing on other domains, you need to explain this within the domain in which you are are working. And then you jumped straight to the methodology followed in the paper. Please rewrite the abstract and clearly state problem statement, proposed solution, methodology, and results.*

→ The paper was reorganized and rewritten to answer this issues.

3. *The paper has grammatical mistakes and improper use of commas etc.*

→ The paper was reworked for language and grammatical mistakes.

4. *The paragraphs has complex sentences.*

→ Language was simplified in many parts.

5. *At page 2 and in 3rd paragraph, the organization of paper is not described.*

→ Paper organization was described at the end of the introduction.

6. *The conclusion section also has weak content. Please rewrite it by mentioning problem statement, proposed solution, what you have done, and what you achieved i.e results. And finally limitations of your work and open problems.*

→ Discussion and conclusion was also reworked extensively to match the more precise positioning of the paper developed in introduction.

7. *It will be good, if you rewrite and restructure the paper, as simple language and grammatical mistakes can suppress the quality of work and efforts.*

→ The paper was thoroughly reworked for clarity and readability.