

Replies to the comments and suggestions

Dear editor and C. Huang:

Thank you for your letter and for the reviewers' comments concerning our manuscript entitled "Recognition of spatial framework for water quality and its relation with land use/cover types from a new perspective: A case study of Jinghe Oasis in Xinjiang, China". Those comments are all valuable and very helpful for revising and improving our paper, as well as important guiding sense to our researches. The authors have studied comments carefully and have made correction which we hope meet with approval. Revised portions are marked in red in the paper and authors have tried our best to revise the manuscript based on their suggestions. The point-by-point responses to each of the comments are presented as follows.

1. "Spatial framework" in the title and in the content sounds a little bit weird, maybe replaced with spatial pattern or spatial distribution?

Reply: Thanks to Revivers for encouraging Authors to revise the manuscript. Thanks to Reviewers for their suggestions in improving the manuscript. Authors have taken reviewers' comments and suggestions seriously. The title is revised, "Spatial framework" change into "spatial pattern". Modified parts have been marked in red in the revised paper.

2. Line 132, repeated sentence.

Reply: Line 132, repeated sentence has deleted by the authors.

3. Fig. 3, it seems there is only one sample in cluster 3? How much significance would the results of this cluster have? Should this cluster be deleted and keep only 5 clusters?

Reply: Only one sample of cluster 3 cannot be deleted, because the results are automatic output by SOM clustering. The results show the water quality sample is special of water quality. For significance of the cluster results, the SOM technique is a powerful tool to group the similar input patterns from a multidimensional input space into a much lower dimensional space, usually two dimensions; SOM can be used for clustering, classification, estimation, prediction, and data mining (Yan et al., 2016; Park et al., 2014), the spatial distribution of water quality is classified by SOM technique. In the present study, the main objectives of this study were analysis the relationship between water quality parameters and land use/cover types in different stages. The water samples are divided into six categories, which references the results of previous studies and consider of the status

of water quality (Park et al., 2014; Ren et al., 2017).

Reference

Yan, A., Zou, Z., & Li, R. 2016. Descriptive characteristics of surface water quality in hong kong by a self-organising map. *International Journal of Environmental Research & Public Health*, 13(1):115.

Park, Y. S., Kwon, Y. S., Hwang, S. J., & Park, S. 2014. Characterizing effects of landscape and morphometric factors on water quality of reservoirs using a self-organizing map. *Environmental Modelling & Software*, 55(5):214-221.

Ren Y, Zhang F, Wang J, Zhang Y, Yang ST. 2017. Spatio-temporal characteristics and source identification of surface water pollutants in Lake Ebinur Watershed, Xinjiang. *Journal of Lake Sciences*, 2017, 29(5):1143-1157.

4. Table 1, it seems there is no difference between cluster 1 and cluster 2? Then, what makes them two clusters?

Reply: Thanks to Reviewers for their suggestions in improving the manuscript. Table 1 shows the results of water quality combined with Chinese Environmental Quality Standard for Surface Water (GB 3838-2002), clusters 1 to 6 shows different water quality standard. Clusters 1 and 2 have identical water quality classification level, and their COD and TN contents are higher than the standard values. The result of this classification is not a fixed value, but an interval value. the SOM technique is a powerful tool to group the similar input patterns from a multidimensional, usually two dimensions; SOM can be used for clustering, classification, estimation, prediction, and data mining (Yan et al., 2016; Park et al., 2014), the methods can mining more detailed spatial distribution patterns, there is difference between cluster 1 and cluster 2 in more detailed spatial distribution patterns.

Reference

Yan, A., Zou, Z., & Li, R. 2016. Descriptive characteristics of surface water quality in hong kong by a self-organising map. *International Journal of Environmental Research & Public Health*, 13(1):115.

Park, Y. S., Kwon, Y. S., Hwang, S. J., & Park, S. 2014. Characterizing effects of landscape and morphometric factors on water quality of reservoirs using a self-organizing map. *Environmental Modelling & Software*, 55(5):214-221.

5. Table 2, it would be better to add lines to separate each clusters.

Reply: Thanks to Reviewers for their suggestions in improving the manuscript. According to Reviewers for their suggestions, lines are added in the Table 2. Modified parts have been marked in red in the revised paper. Please see the article.

6. Line 239, “combined with” should be “according to”.

Reply: Thanks to Reviewers for their suggestions in improving the manuscript. “Combined with” changed into

“according to”. Modified parts have been marked in red in the revised paper. Please see the article on page 6, lines to 239 in revised manuscript with obviously marked.

7. Line 245-246, how was the accuracy derived for land cover maps in Figure 6?

Reply: The accuracy classification for land cover maps in Figure 6 is required by Land cover transition matrix.

Confusion matrix is added by the authors, Please see the article, as follows:

Table 2 The calculation of a confusion matrix by a maximum likelihood supervised classification

| | LULC | Water body | Saline land | Farmland | Forest grassland | Other land | Total | User's accuracy (%) |
|---------|-------------------------|------------|-------------|----------|------------------|------------|------------------|---------------------|
| May | Water body | 144 | 0 | 0 | 0 | 0 | 144 | 100 |
| | Saline land | 0 | 77 | 0 | 0 | 16 | 93 | 82.79 |
| | Farmland | 0 | 36 | 101 | 0 | 0 | 137 | 73.72 |
| | Forest-Grass land | 0 | 36 | 0 | 101 | 0 | 137 | 73.72 |
| | Other land types | 1 | 0 | 0 | 0 | 87 | 88 | 98.96 |
| | Total | 145 | 149 | 101 | 101 | 103 | Overall=89.9750% | |
| | Producer's accuracy (%) | 99.31 | 51.67 | 100 | 100 | 84.46 | Kappa=0.8681 | |
| October | Water body | 144 | 0 | 0 | 0 | 0 | 144 | 100 |
| | Saline land | 0 | 57 | 0 | 0 | 26 | 83 | 86.67 |
| | Farmland | 0 | 16 | 101 | 0 | 0 | 117 | 86.32 |
| | Forest-Grass land | 4 | 16 | 0 | 101 | 0 | 117 | 86.32 |
| | Other land types | 0 | 0 | 0 | 0 | 77 | 77 | 100 |
| | Total | 148 | 89 | 101 | 101 | 103 | Overall=86.2848% | |
| | Producer's accuracy (%) | 97.29 | 64 | 100 | 100 | 74.75 | Kappa=0.8184 | |

In addition, authors have revised the figures and tables as well as words expression in the entire manuscript, please see the text.

Authors tried our best to improve the manuscript and made some changes in the manuscript. Authors appreciate for Editors/Reviewers' warm work earnestly, and hope that the correction will meet with approval.

Once again, thank you very much for your comments and suggestions.

All in all, if you have any questions about our paper, please contact with me as follow address:

E-mail:zhangfei3s@163.com

Thanks very much.

Best wishes and warmly regards for you.

Sincerely yours Fei ZHANG

11th, Jan., 2017