

Interactive comment on “Water table fluctuation and its effects on vegetation in a semiarid environment” by L. Duan et al.

L. Duan et al.

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COMMENT: The paper investigates spatial and temporal patterns of depth to water table and its relationship with climate, landuse, topography and remotely sensed NDVI for a 10 km² area within the Horqin Sandy Land (northern China). This study achieves some interesting field work and has potential practical relevance as the Horqin Sandy land is subject to desertification. However, data analysis needs to be substantially improved.

Response: Thanks!

GENERAL COMMENTS:

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1. As the practical question of this study seems to be to understand desertification processes and its interplay with landuse, climate, topography and water tables, it may be more relevant to explain patterns of remotely sensed NDVI (as a proxy for vegetation cover) rather than water tables. Water table is probably one important factor controlling desertification processes, in particular in shallow water table areas.

Response: Because this area has an average annual precipitation of 389 mm or less, groundwater controls vegetation coverage. As a result, the water table variation or fluctuation is comparable with the spatial pattern of vegetation. The reason for us to analyze water table fluctuation is that we have observed data on water table, which are more site-specific and can more accurately capture the pattern. On the other hand, the pattern is likely to be smoothed out by the coarse resolution of the NDVI data. Nevertheless, we will generate and include a NDVI map to address this comment when making revision.

2. The multivariate and geostatistical analysis tools presented are not well documented. Furthermore, there may be other methods, particularly for the multivariate analysis, that fit the problem at hand better. For example, as different types of variables (categorical and continuous) were used and the independent variables were correlated (water tables and rainfall and PET), Classification and Regression Trees (e.g. Selle et al., 2010) is probably a better choice than multiple linear regression.

References: Selle, B., Thayalakumaran, T., Morris, M. (2010): Understanding salt mobilization from an irrigated catchment in south-eastern Australia, *Hydrological Processes*, 24: 3307–3321.

Response: We will expand the subsection of “2.5 Analysis method” to address this comment when making revision.

SPECIFIC COMMENTS: P3274, L23: Is groundwater fresh or saline?

Response: The groundwater is fresh. We will clarify this when making revision.

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