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The preliminary investigation on grassland secondary desertification caused by a dry lake bed — take a Er-shute Lake in Dong Wu Danner as an example

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Introduction Rivers and lakes play very important roles in a grassland eco-system. Many of them are inland rivers and lakes, and the drying and shrinking of a lake can directly influence the eco-system. In this paper, we analyzed the ecological impact of a dry lake to gain insight into the process of grassland secondary desertification.

Materials and methods The A Er-xiaote Lake (37°32'N, 105°02'E) is located in Men Dou Communalize which belongs to Dong Wu-zhumuqing Banner in Xi Lin-guole Alliance. The lake is an inland lake typical to semi-arid grasslands. Four areas (the central area of lake (A), lake margin (B), secondary desertification areas (C), the original vegetation area (D)) were measured. The adjacent areas were artificially separated into zones along a transect from the center of the lake to the northwest. Soil samples were collected at three experimental points in every zone. Each sample was divided into three layers (0-10 cm, 10-20 cm, 20-30cm) and brought to the laboratory for analysis.

Results Through analyzing sediment (soil) particle size, we found that the content of particle (particle size > 0.05 mm), increased at first and then decreased from the lake center to the outside, which was in contrast to the distribution of the smaller particles (particle size < 0.001 mm). The analysis showed the horizontal distributions of conductivity, salinity, and pH was significantly correlated with conductivity and salinity. The pH declined from the lake center to outside, and it increased with depth in the secondary desertification areas and the border of lake. Sulfate was the main water-soluble salts contained in sediment. SO_4^{2-} , Cl^- , Na^+ , K^+ , Mg^{2+} , Ca^{2+} concentrations declined from the lake center to the outside, with a low peak in the secondary desertification areas. The concentrations of other ions were not significantly affected.

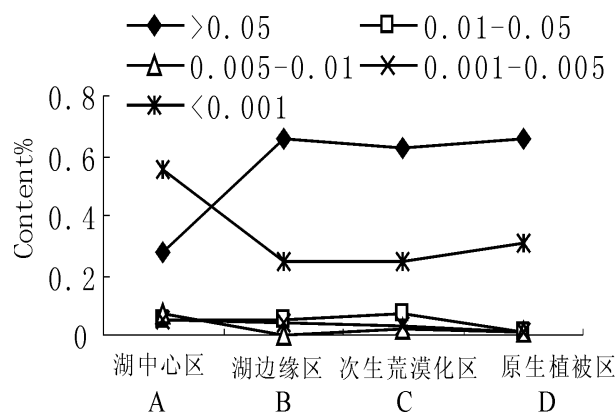


Figure 1 horizontal distribution of mechanical composition.

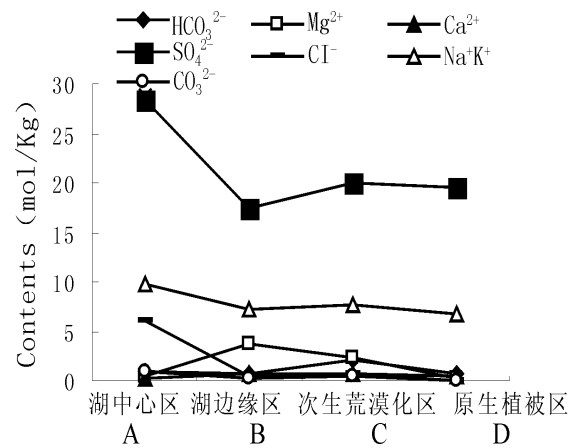


Figure 2 horizontal distribution of eight ions.

Conclusions (1) An abundance of sand materials on the lake bed could create sandstorms and bury vegetation and increase desertification on some areas. (2) With the action of small winds, alkali dust devils could form. The alkali leached into the soil with rainwater could be the cause of salinization-alkalization. (3) With the level of wind erosion increasing, the fine sand was blown off and the coarse sand remained on the lake bed, and this could affect the pattern of desertification and change terrain, such as lake bed drop and lake shape. Grassland secondary desertification was accelerated.

Reference

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