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The relationship between the spatial pattern of lakeside wetlands and water quality utilizing UAV hyperspectral remote sensing

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Introduction

Lakeside wetlands establish a connection between land and lakes, yet studies researching links between landscape pattern of lakeside wetland and lake water quality are lacking. Understanding landscape pattern of lakeside wetland is required for the landscape composition and configuration with reference to their various indicators: Patch Density(PD), Landscape Shape Index(LSI), Aggregation Index(AI),etc.. Better knowledge of effects of landscape pattern on lake water quality should lead to the development of management strategies and policies to prevent further environmental degradation of polluted lake region.

Research Questions

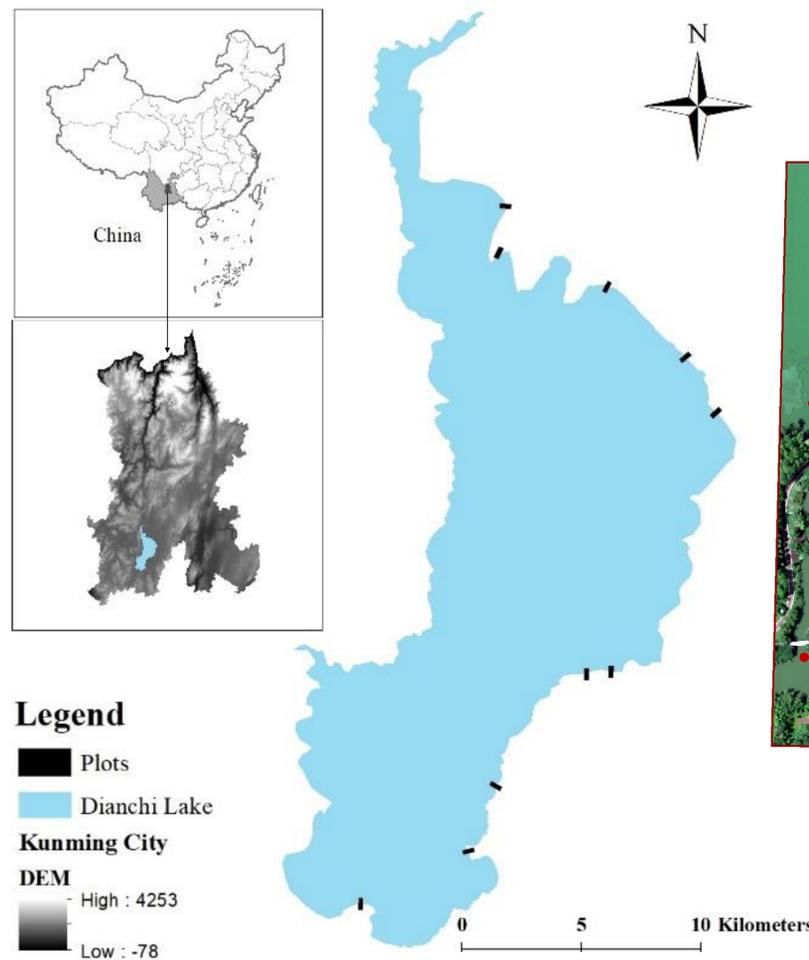
- Are there differences in the water quality of Dianchi Lake at different locations?
- Are there differences in the composition and configuration of different lakeside wetland landscapes in Dianchi Lake?
- What is the relationship between the water quality of Dianchi Lake at different locations and the lakeside wetlands?

Research content

- Difference analysis of water quality metrics in different study sites
- Classification of research sites
- Landscape composition and configuration analysis of different study sites
- Inversion of water quality metrics of lakes in the study area
- Correlation analysis between landscape pattern and lake water quality in the study area

Field Data and Imagery

A field survey was conducted along the south bank of Dianchi Lake, China. 100 water samples in lakes and wetlands were collected from August 30th to September 7th, 2021 at 10 study sites concurrently with drone hyperspectral image collection. Unmanned Aerial Vehicle (UAV) visible light image was collected by DJI PHANTOM. UAV hyperspectral image was collected by DJI M600 equipped with Resonon Pika L integrated lens.



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Material & Methods

- Used ClverChem Auto Discrete Analyzers and PHYTO-PAM to measure water quality metrics, including temperature(T), dissolved oxygen (DO), electrical conductance (EC), total nitrogen (TN), total phosphorus(TP),NH3-N,pH and chlorophyll a
- Image data and image classification
- Calculating landscape metrics with Fragstats
- Establishing the link between water quality metrics and landscape pattern of lakeside wetland by Pearson correlation coefficient

Data Display

