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Estimation of the Water Supply in the Lake Ecosystem of China

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Introduction

Wetlands are increasingly being prioritised for preservation because they provide a unique habitat for a diverse range of plant and animal species, some of which are threatened or endangered. Changes in water regimes are threatening many of the world's wetlands, with typically negative effects for their biota and the supply of ecosystem services important to many people. This presents the problem of not only protecting but also managing water supplies dedicated to wetland care for maximum wetland life. As a result, wetland health is commonly recognised as a consequence of not only wetness, but also water quality, timing, and depths.

As a result, estimating the real evapotranspiration (ETa) of wetland areas is beneficial. ETa determinations that are more precise could lead to better informed judgments about wetlands protection, development, and management. Evaporation is a significant part of a wetland's water budget, but it's been difficult to correctly assess. As a result, numerous methods for estimating evaporation have been devised by some researchers. Meteorological or climatological methods rely on point data, which makes it difficult to estimate ET over broad areas.

Although the water balance approach can estimate evapotranspiration on a basin scale, it only works over a lengthy period of time, usually a year, and cannot be used in short-term investigations. In order to address these issues, remote sensing methods are employed to estimate ETa on a pixel-by-pixel scale over a broad area, resulting in ETa estimated values on a pixel-by-pixel scale. The majority of these methods are based on the energy balancing principle, with net radiation as the primary driving parameter, resulting in a breakthrough in high-resolution ET acquisition.

About the study

The Surface Energy Balance Algorithm for Land is a spatial ETa estimation approach based on energy balance and a satellite remote sensing methodology that divides sensible and latent heat of vaporisation fluxes. The SEBAL method for estimating ET has been validated in a number of locations throughout the world, including Spain, Italy, Turkey, Pakistan, India, Sri Lanka, Egypt, Niger, China, and the United States.

Many studies in these nations have proven the SEBAL procedure's resilience by comparing experimental results to observed fluxes. Furthermore, the approach has been used in a number of studies to measure evapotranspiration rates using various satellite sensors or a combination of high spatial and temporal resolution, such as Landsat7 ETM+/ASTER with NOAA AVHRR/MODIS. SEBAL's capacity to effectively estimate daily evapotranspiration with little or no ground-based weather data has been proved in a variety of applications.

The goal of this work is to use the SEBAL model to evaluate the geographical variation of ETa in the Nansi Lake Wetland, which is significant for flood storage, climatic management, water conservation and purification, and the preservation of biological diversity in China. Landsat7 ETM+ remote sensing pictures, which give quantitative data on ETa with high spatial resolution for wetland management, were used to estimate daily ETa in the research area [1-5].

Conclusion

Evaporation is an important component of a wetland's water budget, but it's been difficult to precisely assess evapotranspiration. Using a remote sensing technique and the Surface Energy Balance Algorithm for Land model, this paper established a scheme to measure real evapotranspiration across a range of land uses in Nansi Lake Wetland, China. Using DEM and meteorological data, SEBAL was used to calculate pixel-scaled ETa.

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