

Comparing Water index methods for automated water classification using Landsat 8 Imagery based on Google Earth Engine Platform: A case Study in Yunnan Province

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Introduction

Water is an important part of the ecological environment and plays an important role in human survival and social and economic development. With the acceleration of urbanization, urban water resources are decreasing, especially in developing countries. Therefore, accurate extraction and automatic identification of water bodies are of great significance and urgent requirements for urban planning. This study evaluates the accuracy of 10 water index classification methods in 30 m resolution OLI images of Yunnan Province. The classification is implemented on Google Earth Engine (GEE) cloud computing platform by using pixel-based supervised random forest (RF) machine learning algorithm (MLA).

Method

Over the past decade, scholars at home and abroad have carried out a lot of research on automatic surface water extraction algorithms based on remote sensing. At present, common surface water extraction algorithms include single-band threshold, multi-band spectral relationship and water body index. In this paper, water body index method is used to extract the surface water body of Yunnan plateau. Ten kinds of water body indexes, such as MNDWI, NDWI, EWI and MBWI, are used to compare them. Then, 300-400 test samples are randomly selected by using Google satellite images on GEE platform in the experimental area, and the classification confusion matrix is calculated for accuracy analysis, the process is shown in Figure 1.

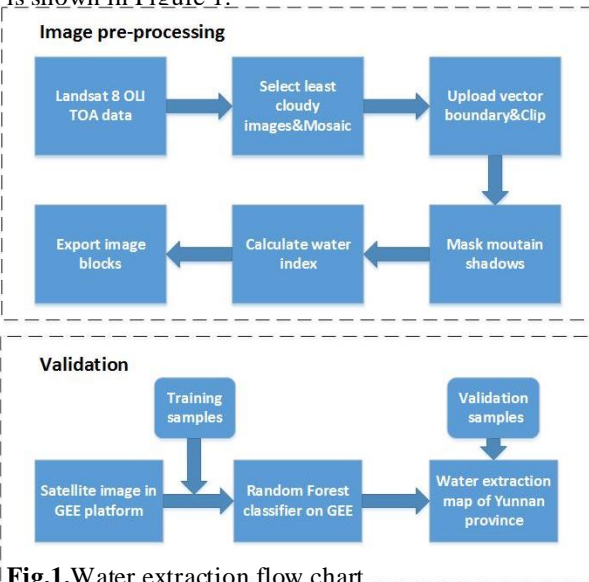


Fig.1. Water extraction flow chart

Result

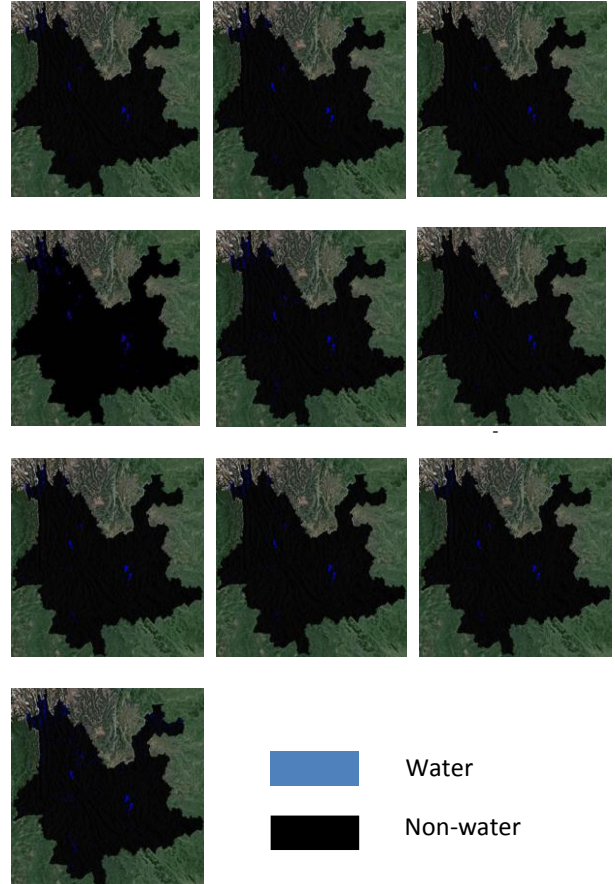


Fig.2. Result charts of each water body index based on GEE

Conclusion

Ten different water body indices were selected to extract the surface water bodies of Yunnan plateau. Through precision analysis, the experimental results show that:

- NDWife, NDWixu and AWEInsh on the surface of the plateau have good suppression effect on mountain shadow.
- MNDWI, AWEIsh, NEW, TCW and NWI can not eliminate the influence of cloud layer and mountain shadow on the extraction of plateau surface water bodies.
- There are some leakage phenomena of EWI and MBWI.