Wetland Detection Using Digital Elevation Model and Remote Sensing in Jimunai Desert, China

Ting Jiang, Yanjun Zhang, Liping Zhang, Cuiling Xian, and Peirong Lin
State Key Laboratory of Water Resources and Hydropower Engineering Science,Wuhan University, China
(tingjiangfh@163.com)

Wetlands play a vital role in the environment, especially in some desert, which has most vulnerable ecosystem. A method is introduced to identify wetlands in the desert with the aim to protect them better in this study. It takes advantage of the depressions calculated by the eight flow direction matrix (D8) approach, a conventional approach to derive drainage networks and catchment boundaries, and makes the most of the Normalized Difference Vegetation Index (NDVI) computed from remote sensing images. It was hypothesized that those depressions calculated by the D8 approach are potential wetlands. To test this hypothesis, the proposed method was used to derive wetlands automatically by combining DEM and NDVI.

Potential surface depressions are derived by mathematic algorithms from D8 approach and verified using Normalized Difference Vegetation Index (NDVI). The depressions can be identified as wetlands. Determining the sub-watershed of each wetland using the D8 approach and considering the correlation between the two of characteristic of a wetland and its sub-watershed. Besides, arranging those wetlands in the descending or ascending order of danger, helping the local government understand and manage wetlands more efficiently, with the presumption that more watershed area a wetland or depression has, safer it is. The proposed method has been tested at Jimunai Desert in Jimunai County, Xinjiang province, China. The result shows wetlands features can be isolated effectively and its performance appears to be consistent with the wetlands data collected by government well.