

Vegetation response of High Andean Wetlands and surrounding land covers to precipitation in semi-arid mountain region of southern Peru

Abstract

High mountain parts of the south Peruvian Andes contain a unique type of wetland biotope. This High Andean Wetlands (HAW) are surrounded by high mountain grasslands and deserts in semi arid or arid climate conditions between 4000 and 5000 m a.s.l.. Therefore, vegetation in this regions greatly depends on precipitation which changes annually and also interannually influenced by e.g. El-Niño-Southern-Oscillation (ENSO). The main focus of the study lies in characterisation of vegetation response of HAW compared to the surrounding land cover and their dependencies on precipitation. HAW are recognized as valuable and endangered wetlands, and are protected by national and international organisations. The first part of the study contains a land cover classification for separating HAW from the surrounding land cover using remote sensing data (LANDSAT TM/ETM+) and applying a mixed approach of unsupervised and knowledge-based classification methods. Secondly, precipitation data from Tropical Rainfall Measurement Mission (TRMM) was applied to cross correlate vegetation-index data from Moderate Resolution Imaging Spectroradiometer (MODIS). Up to 70 percent ($r^2=0.70$) of the variation of precipitation explains variations in vegetation dynamics on HAW and surrounding land cover within the study region. Since precipitation patterns could be influenced by the ENSO phenomenon vegetation-index data (NDVI) was compared with Southern Oscillation Index (SOI) data to discuss the impact of ENSO phenomenon on vegetation dynamic of HAW.