Abstract

Characterising hydroperiod and vegetation for flood-pulsed wetlands is a critical first step towards understanding their ecology. In large, data-poor wetlands such as Botswana's Okavango Delta, quantifying hydrology and ecology presents great logistic and financial challenges, yet relationships between hydrology and floodplain ecology are essential inputs to management. This paper describes an approach to improving ecological understanding by seeking relationships between archival remote sensing data and floodplain vegetation data. We produced a high spatial resolution (30 × 30 m) time series of annual flood frequency from Landsat 5TM imagery for the period 1989–2009. A second, lower spatial resolution (250 × 250 m) series of monthly flood extent was developed from a band 1 (0.62–0.67 μm) threshold of MODIS (MOD09Q1) imagery for the period 2000–2012. Vegetation composition and abundance was sampled in 30 floodplain sites, using a modified Braun-Blanquet approach. Interpreted flood extent from MODIS was 92 % accurate compared to the Landsat interpretation, and 89 % accurate when assessed against field data. Three major classes of floodplain vegetation were identified from ordination and cluster analysis: Occasionally flooded savanna, Seasonally flooded grassland, and Seasonally flooded sedgeland. Relationships identified between hydroperiod and vegetation communities were tested against five validation sites, in four of which indicator species occurrence was predicted with ≥60 % accuracy. The methods used are simple, objective, repeatable and inexpensive. Relating floodplain vegetation to hydrological history provides a means of predicting shifts in species composition and abundance for given changes in hydrology.