

The fluvial dynamics of the Maunachira Channel system, northeastern Okavango Swamps, Botswana

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Abstract

This study was undertaken to investigate the role and function of secondary channels (those that arise within the swamps and carry no externally derived bedload sediment) in the Okavango Delta, and focused on the Maunachira Channel of the north-eastern swamps. Three reaches were identified: an erosive upper reach; a depositional middle reach; and a stable lower reach where no sediment movement is occurring and the channel bed is vegetated. The erosive reach is confined to the most proximal section of the channel and is associated with inflow into the channel from tributaries and from the surrounding swamp. Downstream of this reach, the channel becomes aggradational. The aggradational reach is associated with a marked rise in the channel water level relative to the surrounding swamps, which promotes water loss from the channel. Some of the water leaked from the channel supplies the Mboroga Channel to the south. *Cyperus papyrus* grows vigorously along the aggrading reach, and partially constricts the channel. Aggradation results in a decrease in channel gradient and flow velocity declines to below 0.4 m/s, when bottom-rooted vegetation is able to colonise the channel bed, terminating sediment movement. Channel margins in these lower reaches are characterised by *Miscanthus junceus*, a non-invasive plant species, which promotes long-term stability. The zone of aggradation is migrating upstream at about 170 m/a. The study suggests that secondary channels arise due to local oversteepening of the regional gradient, and their role is to redistribute sediment down this gradient.

Introduction

The Okavango Delta of northern Botswana (Fig. 1) is a large alluvial fan situated in a north-easterly striking graben structure, which is an extension of the East African Rift System (UNDP 1977; McCarthy et al., 1993a). Water is supplied by the Okavango River, which rises in the highlands of central Angola. The river enters the Okavango Delta by way of the Panhandle, a narrow, north-westerly trending subsidiary graben structure, and divides at the south-eastern end of the Panhandle into a number of distributary channels. Overflow from the channels inundates up to 18 000 km², to form Southern Africa's largest wetland. At present the Nqoga Channel is the major distributary, and diverts water to the eastern portion of the Delta (McCarthy et al., 1991).

Distribution of water on the fan is constantly shifting (Ellery and McCarthy, 1994), and in the early part of this century, the Nqoga Channel directly

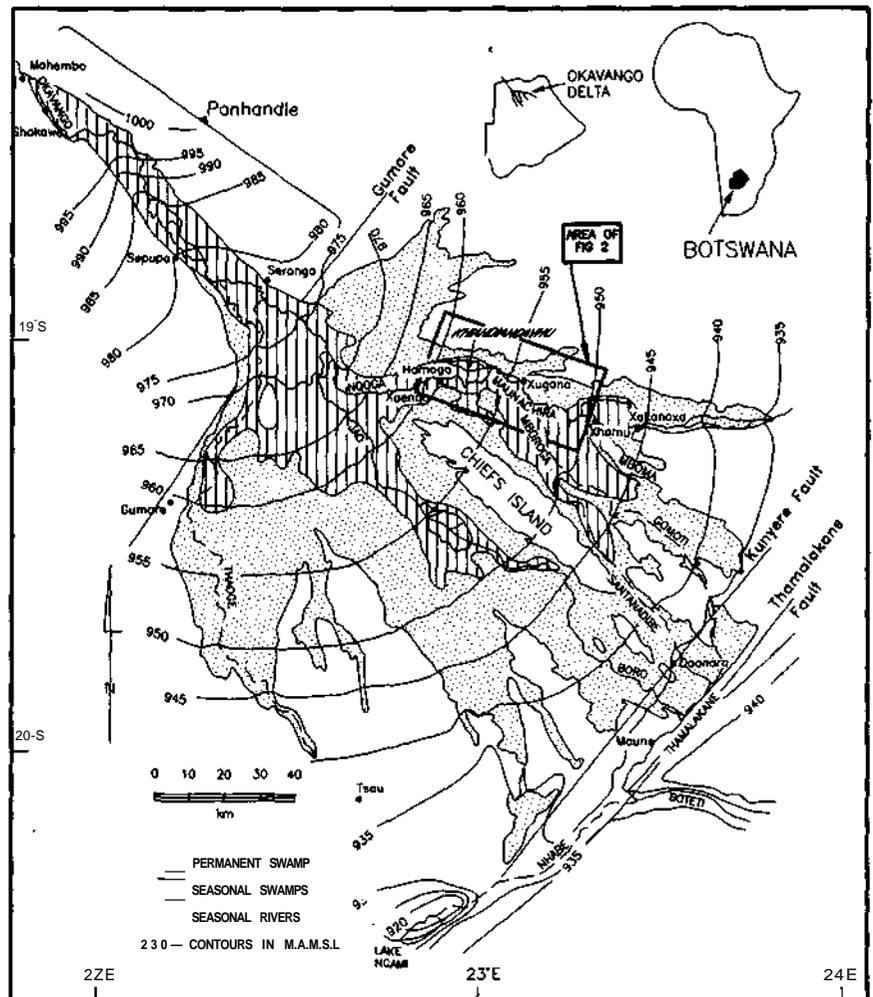


Figure 1

Map of the Okavango Delta showing the location of the study area

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