

# Weather of the Okavango Delta

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## Introduction

Landlocked Botswana is centrally situated in the Southern Africa Region and covers most of the Kalahari Desert — the average height of the plateau is just over 1 000 metres with the low point of 900 metres in the centre of the Makgadikgadi Pan area and the highpoints in the hills to the north-east and south-east of the country, exceeding 1 300 metres.

## Circulation of the atmosphere

The weather in Botswana is controlled to a very large extent by the behaviour of high pressure systems over the Indian Ocean allied to the equatorial low which forms over the central northern area in summer. Circulation patterns are variable as a result of temperature distribution, and some of the incursions of moist air from Rhodesia or Mozambique Channel often defy known simple classifications.

Although the Okavango Swamp area is subject to the same general circulation and interaction of air masses as appertains over the whole of Botswana, and indeed over the whole of the inland plateau, it would I think, be true to say that the preponderance of rainfall over the swampland and adjoining areas, would be more closely associated with the Equatorial air mass than any of the other more clearly defined systems.

Southern African meteorologists generally recognise six clearly defined synoptic weather situations each characterised by fairly distinctive weather trends — other conditions present something of an amalgam of other weather variables.

Botswana lies in the sub-tropical high pressure belt i.e., in one of the main source regions, therefore air masses tend to be of a transitory nature in this region and since convection over land is frequent this is possibly the most powerful modifying agent for changing air mass properties and mixing air masses. These air masses are often shallow, the winds at high levels blowing from entirely different directions; air masses therefore cannot be expected to maintain conservative properties during convective weather conditions.

Air masses which are most easily recognised as exerting important influences on the weather of Botswana and indeed the whole of the inland plateau are:

- (a) Equatorial air mass
- (b) Sub-Tropical Maritime air masses from the Atlantic and Indian oceans.
- (c) Polar and Sub-Polar air masses from the Antarctic and
- (d) Subsidence from high altitudes with the anti-cyclones, of the sub-tropical high pressure belt of Tropical Continental and Superior Air.

The Equatorial air mass represents the southern boundary of the Inter-Tropical Convergence zone and judging by the unusually heavy rains of the last three rainfall seasons, it is likely that a more clearly defined and more southerly movement of the ITCZ has been possible.

The general characteristic of the high pressure belt is its southerly movement in summer — the axis of the Atlantic Anti-cyclone being in the region of Lat. 30° South, the Continental Anti-cyclone persists in weakened form over the eastern edge of the plateau and is separated from the Atlantic anticyclone by a well developed trough of low pressure which extends from the low latitudes across Botswana and

SWA towards the Cape, with the axis of the Indian Anticyclone situated along 35° South, thus separated from the Atlantic anticyclone by a weak Col south of the continent.

In winter, however, the subtropical high pressure belt lies across the southern continent with its axis not far South of the Tropic of Capricorn (more or less in line with Mahalapye) and there is very little movement with steeply falling temperatures at night and rather intense radiation. In the Kalahari areas, below-freezing temperatures with frost are the rule rather than the exception. In the swamp areas, the incidence of frost is somewhat lower.

Generally, the weather of Botswana comes under the influence of three main elements: the Atlantic anti-cyclone, the Continental anti-cyclone and the Indian anti-cyclones. Occasional incursions of Polar or sub-Polar air in winter are only of a transient nature.

#### Ocean currents and insolation

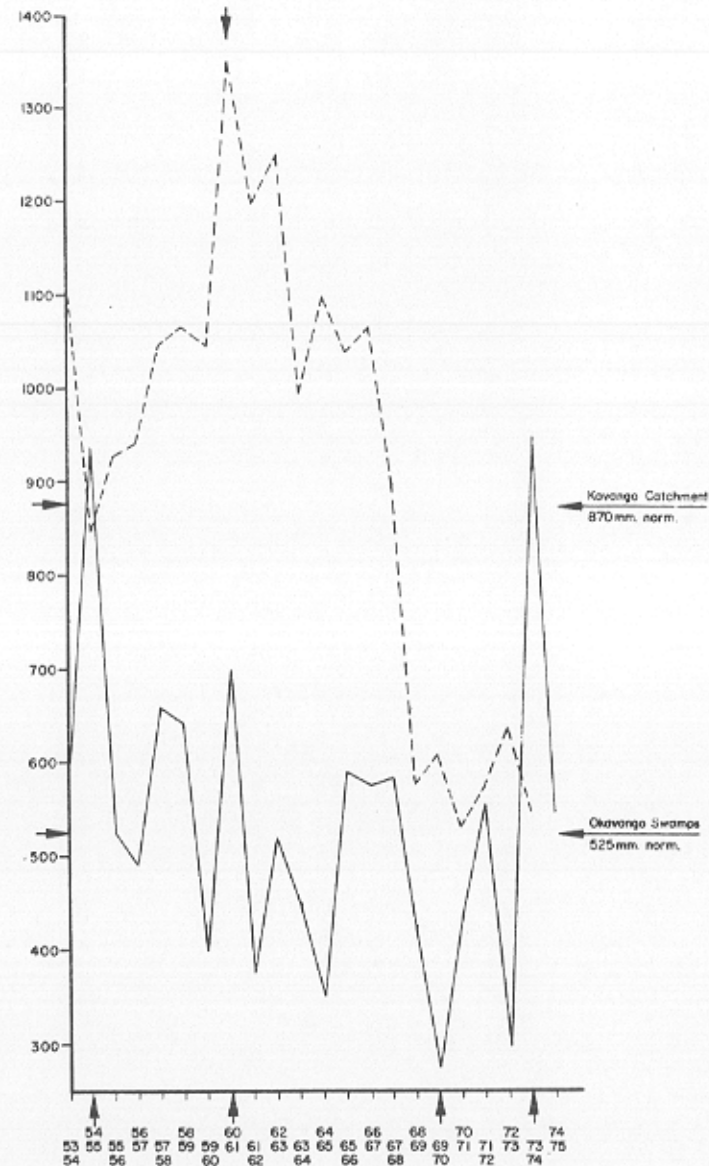
A factor that vitally influences the climate of Botswana is the temperature of the water in the oceans surrounding the Southern continent, particularly that of the Mozambique Channel — this is comparatively cool, about 21°C from August to November, and any such cool airstream entering the interior is heated from below by insolation and readily becomes unstable to give thunderstorms. From January to April, insolation has passed its maximum and the now much damper and warmer air (27°C) from Mozambique is generally more stable — in the heat of day this damp air gives showers and keeps the land reasonably wet, or at least moist. The late summer period of February to early April is usually the dampest time of the year — though there have been exceptions to this pattern in the last three years when rains started somewhat earlier (December to February).

#### Rainfall

The greatest characteristic of rainfall statistics is its extreme limits of variability. Annual totals of rainfall are no indication of its pattern of distribution — and in some areas of Botswana, even a seemingly high rainfall at the commencement of the growing season, is no guarantee that crops could not fail or even partial drought conditions occur, by the end of the season.

On the other hand, the now generally accepted global "lateral shift" of the weather pattern caused floods in the Okavango Swamps in the 1973/74 season whilst Angola suffered acute drought only 50 to 100 miles to the north of the Swamps.

A comparison table of rainfall for the Northern South-West African and Caprivi Strip Stations against that of Angola and the small network in the Okavango Swamps, makes an interesting study.



1973/74 new peak rainfall reached in Okavango Swamps (1183.9mm. in Maun) corresponding to low of 550mm. in Okavango Catchment area.

1960/61 Okavango Catchment area peak of 1350mm. corresponds to minor peak of 700mm. in Okavango Swamps.