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CLIMATE AND METEOROLOGY

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THE CLIMATE AND METEOROLOGY OF NAIROBI.

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Nairobi is a located at longitude 36° 50'E and 1° 18'S. The mean altitude is around 1700 metres above the mean sea level (msl) but as the urban areas has a highly variable topography, this height ranges from 1600 metres (to the east) to over 1800 metres (to the west and Northwest).

Nairobi being close to the equator its climate is greatly influenced by the movement of the over head sun. However, its altitude above the mean ase level has important influence on many of the prevailing meteorological factors. The Indian Ocean is the main water body that plays the influencing role in the meteorology and climate of Nairobi as in many other areas of East Africa.

There are two meteorological stations in Nairobi which make hourly surface observations. They are Jomo Kenyatta International Airport (162m) and the National Headquarters of Meteorological Services Dagoretti (1798m). The meteorological data used in this paper were obtained from observations at the two stations, (Kenya Meteorological Department 1984). On the basis of these data, various aspects of the climatology of Nairobi will be presented in the sections that follow.

WIND

Figures 1-7 show the two way frequency winds roses for Nairobi based on surface wind observations. They give the most frequent wind speeds and directions. It is observed in figure 1 that, the winds at Nairobi have a strong Easterly component throughout the year. The speeds are fairly high also throughout the year with very few cases of calm conditions.

Figure 2 shows the wind conditions during January. This month represents the dry season when the winds are mainly northerly flowing into the heat low to the south. The air is dry having flown over mainly continental regions to the North. Figure 3 show the conditions in April which month represents the long rains period. The winds are mainly easterly flowing from the Indian Ocean onto the highlands They are therefore moisture laden resulting in heavy showers over the city as in most other areas of the country.

Figure 4 shows the conditions during July representing the cold season in the country. The winds have generally lower speeds and are more variable in direction. The situation is associated with the high pressure ridge that has extended into Eastern Africa from Southern Indian Ocean and forms part of the Indian monsoon system. The pressure prevailing over Nairobi during this season results in high frequency of stable atmosphere and calm wind conditions. Many instances of westerly surface flow is observed during this period due to the influence of drainage winds associated with cold air over the highlands to the west (Ramsey, 1966).

Figures 6 & 7 show the wind field during the afternoon and late night. It is seen that the daytime surface winds are highly constant in direction and have generally high speeds. On the other hand the night-time winds have low speeds with many calm conditions and are highly variable in direction. Westerly flow associated with drainage winds is also evident. As a whole the winds at Nairobi are highly constant in direction and this has been shown to be generally the case with the regions within the Trade Wind Belt (Riehl 1954).

RAINFALL

The Inter-Tropical Convergence Zone (ITCZ) is the main

rains coincide with the northward movement of the ITCZ towards the end of May but the advection of moisture from the Indian Ocean continues on to the cool season.

The conditions during the month of July characterise the cool season. A high pressure ridge originating from southern Indian Ocean extends over East Africa as part of the Indian monsoon and the prevailing south easterlies advect moisture into Nairobi area resulting in considerable amount of low clouds during this season. Typical conditions over Nairobi are overcast skies, light rains or drizzle mainly in the morning hours, low temperatures and occasional fog especially in the morning.

The short rains season centred around the month of November are often of short duration but cold air outbreaks from middle latitudes and influx of moisty Congo air mass may bring rains during the month of December. The prevailing winds quickly become northerly to north easterly as the dry season is re-established.

Although from the above discuss it is evident that the seasons are well defined. It is now known that there are year to year variations and periodicities of three, five and ten years have been found especially in case of rainfall (Ogallo,1977). However, studies on climatic variability in East Africa are constrained by the relatively short period that meteorological observations have been taken and significance of some of those periodicities are yet to be confirmed.

Urbanisation itself, has now been found to result in modification of climate.

The removal of natural surface texture and replacing it with concrete and other surfaces result in modification of radiation and heat balance (Duckworth and Sandberg 1954, Demarrais 1961, Ludwig,1968). Heat generated from man made sources such as industries and domestic fires have been found to be significant enough to have an influence