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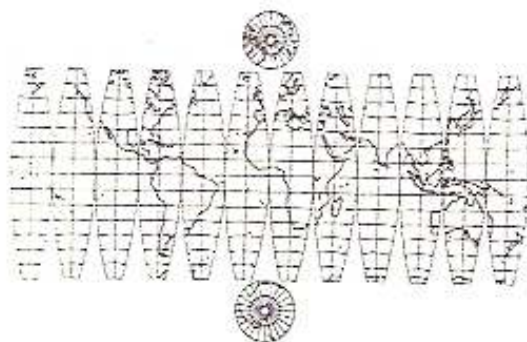
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Variability and Frequency of Daily Rainfall in Riyadh, Saudi Arabia

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ABSTRACT

This study examines the temporal and spatial distribution of rainfall in the city of Riyadh, Saudi Arabia's capital. The city has experienced significant urbanization in the past two decades. Therefore, the impervious surfaces and the restriction of original surface flow routes increase runoff in Riyadh city. Thus, stormwater frequently accumulates in streets because it exceeds the storm sewer capacity, storm sewers are blocked or partially blocked by sediment, or due to the lack of storm sewers. Data from three climatic stations in Riyadh and north of the city are used to characterize the temporal and spatial variations of rainfall amounts and to determine the frequency of annual maximum values of one-day-duration rainfall in the city. The results reveal that Riyadh exhibits spatial and temporal variability, and the derived Extreme Value Type I (EVI) probability distributions have been found to fit the 24-hour annual maximum rainfall at a level of significance greater than 0.20, implying a satisfactory fit.

KEY WORDS: rainfall, climate, drylands, Riyadh, Saudi Arabia.

INTRODUCTION

Riyadh, the capital of Saudi Arabia, lies in the tropical arid climate, where the prevailing air masses are related to subtropical high pressure. However, such areas are occasionally subjected to invasions of precipitation bearing depressions. Moisture, during the months from October to May, is infrequently transported to the study area from both the Mediterranean Sea and the Indian Ocean, (MacLaren International Limited, 1979; Taha *et al.*, 1981; Sen, 1983).

High-intensity is characteristic of rainfall in most of Saudi Arabia. Jones (1981, p. 13) reported that "around 50% of all rain occurs at intensities in excess of 20mm/hour, and 20-30% occurs at intensities in excess of 40mm/hour". Cullen (1982, p. 394) stated that "in places, particularly in holy Mecca, deep and quick-moving flows occur in the streets, sweeping away property, vehicles, animals and