

OROGRAPHIC EFFECT OF THE CENTRAL HIGHLANDS ON THE MONSOON RAINFALL IN SRI LANKA

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The mountains and highlands in the tropical areas receive more rainfall than nearby lowlands, at least on their windward sides. It is a well known fact that most of the rain received on the western part of Sri Lanka is induced by the topographic barrier, known as the Central Highland, lying across the path of the southwest monsoonal winds. Therefore, the objective of this study is to examine the orographic rainfall profiles that more or less agree with the global figures of the orographic rainfall in the tropical mountains. The orographic effect of the Central Highlands on the rainfall in the western and eastern sides of Sri Lanka has been studied for the Southwest monsoon, Northeast monsoon and annual average rainfall using normal rainfall data from 1959 to 2002. The study area comprises of nine representative locations (stations) of both sides of the Central Highlands, ranging from 2 to 1667 m altitude. The locations on the western windward side are Colombo, Kalutara PWD, Rathnapura, Abergeldie Group, Annfield Estate and Sandirigama. While Badulla, Wewessa and Dyraaba are the locations on the eastern side of the Central Highlands.

Monthly average rainfall data of the above locations were obtained from the Department of Meteorology, Colombo. The precipitation is dependent on altitude over the western side, which is on the windward side with respect to the Southwest monsoon, whereas it is independent of altitude over the eastern side, which is on the leeward side. The analysis shows that on the western slopes of the Central Highlands the Southwest monsoon rainfall increases, first from the coast to the foothills, then up to about 1000-1500 m of altitude, but it decreases above that height. The annual average rainfall also increases up to a height of about 1000-1500 m; however, above that it decreases.

This study reveals that the total amount of precipitation on the western slope of the Central Highlands also increases with the altitude, but only up to the altitude of about 1500 m but further up it decreases. Almost in a similar manner on the eastern slope of the Central Highlands the total and average annual rainfall increases up to a maximum at 1500 m, altitude, then it decreases continuously on the still higher elevations.

These analyses clearly show that the orographic effect of the Central Highlands of Sri Lanka has similar patterns with the global figures of the orographic rainfall in the tropical mountains and highlands. This characteristic may be due to strong differences in water vapour contents between the lower and upper layers of the troposphere. The steep lapse rate frequently present in tropical air masses also tends to reduce the capacity of the air to retain water vapour in the higher part of the troposphere. Further, the study also reveals that the rainfall has decreased at some of the locations during the years 1959 to 2002.