

Variation of Slope Environmental Lapse Rate (SELR) in the Western and Eastern Slopes of the Central Highland in Sri Lanka

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The average temperature decrease ($6.5^{\circ}\text{C km}^{-1}$) with increasing elevation in the free atmosphere is generally called as Environmental Lapse Rate (ELR). The Temperature Lapse Rate (TLR) along the mountain slopes significantly differs from the free atmosphere ELR. The TLR along a mountain slope is here termed as the Slope Environmental Lapse Rate (SELR). The main objective of this study was to identify the variation of the SELR in the Western and Eastern slopes of the Central Highland in Sri Lanka during the South-West Monsoon and North-East Monsoon seasons. The seasonal average temperature has been calculated from 2008 to 2017 from three Meteorological stations; Nuwaraeliya (1895 m), Ratnapura-Western slope station (34 m), and Badulla-Eastern slope station (670 m). Elevation and temperature of the Nuwaraeliya were taken as the base location and calculated the SELR by $((T_1 - T_2) / (H_2 - H_1) * 1000)$ for Ratnapura and Badulla. The result revealed that the SELR is $5.9^{\circ}\text{C km}^{-1}$ in the Western slope and $6.5^{\circ}\text{C km}^{-1}$ in the Eastern slope of the Central Highland during the South-West monsoon season. The Western side of Central Highland receives more rainfall than the Eastern side when South-West monsoon occurs. During this season the entire area of Eastern slope in the Central Highland gets dry due to the inverse direction of the monsoon with the effect of orography rainfall. During the North-East monsoon season, the SELR is $6.4^{\circ}\text{C km}^{-1}$ in the Western slope and $4.9^{\circ}\text{C km}^{-1}$ in the Eastern slope due to the stimulating of North-East monsoon on the Eastern side. Considerable spatial differences have been noticed during two seasons. The seasonal monsoon rainfall patterns are highly affected for variation of the Slope Environmental Lapse Rate in the Western and Eastern slopes of the Central Highland in Sri Lanka.

Keywords: Central Highland, Eastern slope, Seasons, Slope Environmental Lapse Rate, Western Slope