

Spatio-temporal variability of climatic parameters across different altitudes of North-Western Himalaya

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ABSTRACT

Climate change impact varies across different altitudinal ranges and demands local specific management strategies for water resource and farming system management. The present study analyses spatio-temporal climate parameters across different altitudes of Himachal Pradesh a hilly state of India. Analysis shows that annually, minimum temperature has significantly decreased by -0.09°C at altitude I (350 - 400 m) while maximum temperature has significantly increased by 0.05°C at altitudes I and II (1400-1500 m) and decreased significantly by -0.08°C at altitude III (2000- 2100 m). Higher regions Altitude – IV (2900-3000 m) received lowest rainfall (746.1 mm) with 30.2 % variation. Seasonal rainfall variability was higher in post monsoon (102 - 174%) and least in monsoon (21 - 57%). Annual rainfall at altitude I is strongly irregular (PCI 20.1 to 22.3), followed by altitude – IV (PCI 15-25); altitude – II irregular (PCI 15-20) and altitude – III moderate to irregular (PCI 12 -19) rainfall. Seasonal Index values for four altitudes fall between 0.91-0.96 revealed that rainfall is irregular and markedly seasonal with longer drier season. Higher wavelet powers in altitude - I and II after 2005 suggests frequency of extreme rainfall occurrence had increased.

Key Words: Altitude, precipitation concentration index, rainfall, seasonality index, temperature, wavelet analysis