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Analysis of Variability of the Number of Days with Hail in the Warm Half of the Year in Different Climatic Zones of Georgia in 1941-2021 and their Expected Change until 2045

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ABSTRACT

Some results of an analysis of time series of the number of days with hail in the warm half of the year (April-October) for 22 weather stations in Georgia from 1941 to 2021, on average for five climatic zones, which includes four climatic groups according to the Köppen classification, are presented. Zones I and III – warm oceanic climate/humid subtropical climate (Cfa): Zone I – Kutaisi, Mta-Sabueti, Senaki, Shovi, Zugdidi; Zone III – Kvareli, Lagodekhi, Telavi. Zone II – warm continental climate/humid continental climate (Dfa): Bolnisi, Gori, Khashuri, Marneuli, Pasanauri, Stepantsminda, Tbilisi, Tianeti. Zone IV – temperate oceanic climate (Cfb): Bakhmaro, Chakvi, Khulo. Zone V - temperate continental climate/ humid continental climate (Dfa): Bakuriani, Borjomi, Tsalka. The statistical characteristics and temporary stationarity of the indicated time series were studied (linear correlation, Kendall's and Spearmen's rank correlation, autocorrelation, periodicity). Forecasting the number of hail days to 2045 was performed using the AAA version of the exponential smoothing (ETS) algorithm taking into account the periodicity in the pre-forecast time series.

Keywords: autocorrelation; hazardous meteorological phenomena; Köppen climate classification; periodicity; statistical forecasting