

# Long-term distribution of snow depth in the Middle-East high mountains

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## Abstract

The critical role of snow in mountainous terrain, characterized by high elevation, make it necessary to measure snow parameters. Snow depth generally measured at meteorological stations, however, because of the sparse distribution and the scarcity of in-situ stations, traditional ground measurement methods do not have the efficiency for intermittent monitoring of snow characteristics. Hence, reanalysis data would be an alternative to study snow properties. In this study, temporal distribution of snow depth in some Middle-East high mountains have been investigated using the MERRA2 database for over 40 years, extending from 1981 to 2020. The study region includes Damavand peak in the Iranian Plateau, Mount Ararat in Anatolia Range in Turkey, Cheekha Dar in Iraq, and Qurnat as Sawda in Levant Ranges in Lebanon. Results differ regionally, particularly concerning the different orographic lifting mechanisms, i.e., Ararat has the highest value of snow depth, followed by Damavand; however, there is no significant trend detected. The trends of snow depth at 10th, 50th and 90th percentiles of monthly snow depth indicate an overall downward trend for the high snow depths. Results also depicted that altitude affects the snow depth amount.

**Keywords:** temporal distribution, snow depth, mountainous region, Alborz, Zagros, MERRA-2.