Hail processes in Georgia and active impact on clouds

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Due to the complex physical and geographical conditions, various natural meteorological events are characteristic of Georgia: drought, frost, blizzard, torrential rains, lightning, hail and others. Hail occupies an important place among dangerous meteorological phenomena. Hail damage is estimated at tens of millions of GEL every year. In Georgia, hail damage the Kakheti region with special frequency.

The terrain of the Kakheti region is characterized by great diversity. From the north it is bounded by the Caucasus watershed; The region is divided into inner and outer Kakheti by the Tsiv-Gombori ridge, which plays an important role in shaping the local atmospheric conditions. Alazni plain is spread between the heights, and to the south and east - Ivri plateau and Shirak valley. Therefore, orographic diversity creates favorable conditions for the formation and development of cumulus and hail-producing, cumulus-rain clouds in the warm period of the year. Consequently, the Kakheti region is characterized by a very high level of hail risk. The paper presents, based on the data of the National Environment Agency and the "Delta" data, the results of the studies of hail and the damage caused by it in Georgia and the Kakheti region, covering the period of 1995-2022 and 2016-2023. Based on the mentioned data, tables have been compiled, where the number of days with hail for the given period is presented according to the regions of Georgia and the municipalities of these regions, as well as the gradation of the duration of hail and the diameter of hailstones for the mentioned period and the types of synoptic process, for the respective regions and its impact on agricultural crops. It is determined that in the Kakheti region, in the area of active impact on hail, in most cases hail was caused by the following aerosynoptic processes: against the background of heterogeneous orography, by the development of intramassive type clouds and convective processes; from the west through the cold atmospheric front and from the south and south-west with wave disturbances.

According to the data of the "Delta" , in the period 2016-2023, the most cases of hail days in the Kakheti region were recorded in 2023, 71 days, 56 of them were neutralized, and during 15 days hail was recorded, which caused economic losses.

In the reporting period, the total area of agricultural fields damaged by natural disasters amounted to 15231.9 ha, with different percentages of damage, which is 0.42% of the total area of the protected area, and 1.903% of agricultural fields.