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# SPATIAL MODELING OF DANGEROUSE FROSTS IN THE REPUBLIC OF MOLDOVA

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For the agriculture of the Republic of Moldova, the late spring and early autumn frosts present a great danger, because they can harm agricultural crops in the early stages of development or towards its end, thus creating frost damage, sometimes quite serious, depending on their resistance to frost. Being located in the southeast of the continent, the territory of the republic is at the cross-road of several trajectories of the air masses movement that ultimately cause such phenomena as frost.

The possibilities of interconnecting the modules of GIS software, of analyzing the data obtained from field measurements and of organizing these data in structures such as meteorological models, lead to obtaining good results compared to the classical methodology.

For the spatial distribution of dangerous frosts, we used the Regional Geographic Information Systems. The date of manifestation of the first and last frost was interpolated, from 18 meteorological stations for the period 2005 - 2020.

The numerical model was obtained based on the regression equation (1, 2), without using the constant in the model, when performing the calculations, we used the number of calendar days (Julian date calendar).

The regression equation based on which the spring frosts' spatial distribution was modeled is: Y=0,0505557*exp-0,0327863*habs-0,0305571*hrel+0,89103*panta-0,00000496262*x+0,00002212*y **(1)**, where exp - slope's exposition, habs - absolute altitude, hrel - relative altitude, panta - the degree of inclination of the slopes, x, y - x and y coordinate respectively. Latitude X and longitude Y both are expressed in meters in WGS84 Transverse Mercator projection with 27º central meridian and false easting 500000 m.

The regression equation for the autumn frosts' spatial distribution is: Y=0,0281752*exp+0,045071*habs+0,0166217*hrel-0,639479*panta+ 0,000070738 *x+ 0,0000461509*y **(2)**, where exp - slope's exposition, habs - absolute altitude, hrel - relative altitude, panta - the degree of inclination of the slopes, x, y - x and y coordinate respectively. Latitude X and longitude Y both are expressed in meters in WGS84 Transverse Mercator projection with 27º central meridian and false easting 500000 m.

As a result of the calculations performed, we conclude the following:

1. Dangerous frosts occur every year and have a spatial distribution throughout the study area.
2. A more in-depth study is required to be carried out for late spring frosts because both their duration and intensity threaten agricultural crops. For example, those registered in Soroca and Camenca on May 10, 2017.
3. The date of manifestation of early frosts as well as of late frosts has a negative impact on the vegetation, especially on agricultural crops, if they are manifested during the important phenological phases, causing economical damage to agriculture sector.

***Keywords:*** agricultural crops, damage, frosts spatial distribution, meteorological models.