

# On the movements of the baric centers in synoptic scale caused by orographic–thermal–baroclinic PBL effects

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It is considered interactions between the atmosphere and the underlying orographic – thermal nonhomogenous surface. An expression for the vertical velocity on the top of PBL is obtained:  $w_H = w_I + c\Omega_g + \Delta w_H$ , where the first two terms are traditional, while  $\Delta w_H$  is correction connected with joint orographic – thermal – friction effects in baroclinic PBL.

Taking into account this  $w_H$  – forcing from the condition for extreme of the geopotential, it is determined the components ( $U_g, V_g$ ) of the velocity of the baric cyclone (L) or anticyclone (H) centers. The analyze of these formulae shows, that L and H centers deviate from the basic elevated flow, as they move along the isohips of the orography  $z_0(x, y)$  (on the left side of the movement direction are the decreasing values of  $z_0(x, y)$ ) and along the isotherms of  $\delta\theta = \theta_H - \theta_0(x, y)$  – “thermal topography” and the mean temperature  $\bar{T}$  in PBL (in both cases on the left side of the movement direction are the increasing values). Besides that the cyclones have additional component towards the concave forms of the orography and towards the increasing stability (increasing  $\delta\theta$ ) and the opposite for the anticyclones. These effects are placed in areas with strongly expressed  $z_0(x, y)$  and  $\delta\theta(x, y)$  nonhomogeneities, where in principle it is grouped the biggest errors in the weather forecast. The significance of these effects is shown at real synoptic cases.

The result can be used for more precise forecast of the baric centers in ares with horizontal nonhomogeneities