



Regimes of baroclinic instability, caused by orographic-thermally induced vertical motions in PBL

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It is developed an approach for parameterization of PBL taking into account the joint effects of orography $Z_0(x, y)$, “thermal topography” $\delta\theta(x, y) = \theta_H - \theta_0(x, y)$, surface friction and baroclinicity. For the vertical velocity on the top of PBL is obtained the expression: $w_H = w_I + c\Omega_g + \Delta w_H$, where the first two terms are traditional, while Δw_H is a correction taking into account in explicit form the joint influence of the listed effects, which depends on the first and second (laplacians) horizontal derivatives of $Z_0(x, y)$ and $\delta\theta(x, y)$. It is shown the synoptic-climatic significance of Δw_H for the genesis and the trajectory of the baric forms, correlations between the laplacians terms and the climatic activity and other.

Basic task in the present work is to explore the influence of the w_H forcing on the baroclinic instability in the atmosphere using multiple levels model of type of Philips. It is studied the criteria for occurrence on the basis of the influence of the dispersion relations on the counted in the beginning factors, for wide range of regimes of baroclinic instability. It is determined at what combinations of the studied factors there is resonance conditions for increasing of the intensity or on contrary for blocking of the processes. Generally speaking, the w_H forcing significantly changes the conditions for baroclinic instability generated by the two basic factors β - effect and thermal wind. The obtained results present self-dependent interest, and can be also used for interpretation of the climatic anomalies in a given region. The later can be considered as long range fluctuations of the mean flow, surface friction and the thermal configuration, while the orographic factors are permanent. In the sense of the conducted study this leads to change of intensity of the baroclinic instability with corresponding time of relaxation in seasonal sense. Of course, these problems need a further and detailed

study on real phenomena.