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On the Wind and Turbulence in the Lower Atmosphere above Complex Terrain

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ABSTRACT
Numerical modeling and studies of the wind fields at the junction of three continents: over the complex terrains of the South-east Europe, Asia Minor, Middle East, Caucasus and over the Black, Caspian and Medi-terranean seas have been carried out for the first time. Traveling synoptic scale vortex wave generation and subsequent evolution of orographic vortices are discovered. Wind fields, spatial distribution of the coefficients of subgrid scale horizontal and vertical turbulence and the Richardson number are calculated. It is shown that the local relief, atmospheric hydrothermodynamics and air-proof tropopause facilitate the generation of β-mesoscale vortex and turbulence amplification in the vicinity of the atmospheric boundary layer and tropopause. Also turbulence parameters distribution in the troposphere has the same nature as in the stratosphere and mesosphere: turbulence coefficients, stratification of the vertical profiles of the Richardson number, thickness of the turbulent and laminar layers.

KEYWORDS
Numerical Modeling, Complex Terrain, Characteristics of Atmospheric Turbulence, Wind Field, Mesoscale Vortex, Bulk Richardson Number

Cite this paper

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