Geophysical Research Abstracts, Vol. 8, 00648, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00648

On the Wave Motion over Mesoscale Mountains

K. Moiseenko (1) and V. Kozhevnikov (2)

(1) Obukhov Institute for Atmospheric Physics, Moscow, Russia,

(2) Dept. of Physics, Moscow State University, Russia

(konst.dvina@mail.ru)

Mesoscale atmospheric wave motions over two-dimensional mountain of arbitrary shape are investigated on the base of two-layer model with an internal dividing surface placed at the tropopause level. The stratosphere is treated as an infinitely deep isothermal layer in which radiation condition is used. The influence of static compressibility on inertial property of the flow and buoyancy is treated separately which provides an efficient technique for reduction of the initial system of equations for motion to the unique equation for the stream function that becomes linear for a wide range of conditions typical for the troposphere. The influence of wind velocity and static stability vertical shear on the flow structure above the typical mesoscale mountains is investigated. The results of model calculations are compared with observations of Ac-lent clouds above the Crimean mountains as well as aircraft measurements by Lilly and Klemp over Rocky Mountains. The possible role of quasi-resonant effects due to energy reflection from the tropopause under wind shear is examined. Non-linear aspects of dynamical interaction of the flows in the troposphere and the lower stratosphere are also discussed.

The research was partially supported by the ISTC under Grant 2770.