Geophysical Research Abstracts, Vol. 9, 00310, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-00310

Simulation of microphysical and optical characteristics of frontal mixed clouds

B. Dorman, V. Bakhanov, O.Kryvobok

Ukrainian Hydrometeorological Research Institute, Kyiv, Ukraine

(bodor@rambler.ru/ Fax: +380 44 525 5363)

The paper is devoted to the study of the interconnection of cloudy microphysical characteristics with optical characteristics including the satellite signal (cloud reflectance) in visible and near-infrared part of spectrum.

We have realized the next numerical models:

1. The time-dependent realistic model of stratiform mixed clouds with detailed microphysics (including the dimension distributions for water drops and 3 forms of ice crystals: needles, plates, columns).

2. Models of computations of scattering characteristics for drops are based on the Mie theory and crystals – on the geometric optic approximation methods. Computations were realized for the next wavelengths: 0.55; 0.78; 1.6; 3.6 mkm

3. The Discrete Ordinate Method (DOM) for simulation of solar radiative transfer in not uniform cloud.

The simulation shows that the cloud optical thickness (COT) in mixed clouds changes with the cloud liquid water path. The ratio of the COT for λ = 1.6 mkm to the COT for λ = 0.55 mkm strong correlates with the cloud particle phase.

So, effective radius of cloud particles and ratio τ (1.6) / τ (0.55) which are retrieved from satellite signal data gives the best possibility to distinguish a cloudiness regions with thick liquid water layers and regions of highly crystallization.