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Coastal Aerosol Simulation in the Atmosphere Surface Layer

G. Kaloshin (*), J. Piazzola (**)

(*)V. E. Zuev Institute of Atmospheric Optics SB RAS, Tomsk, Russia,

(gkaloshin@iao.r u / Fax: +7 3822 492086)

(**) LEPI, University of Toulon-Var, France

The aerosol microphysical model of the marine and coastal atmosphere surface layer is considered. The model is made on the basis of the long-term experimental data received at researches of aerosol sizes distribution function (dN/dr) in the band particles sizes in 0.01 - 100 μk. The model is developed by present time for the band of heights is 0 - 25 m. Bands of wind speed is 3 - 18 km/s, sizes fetch is up to 120 km, RH = 40 - 98 %. dN/dr of the model is characterized by the four modified lognormal functions with modal radiuses, equal r_1 = 0,03; r_2= 0,24; r_3= 2; r_4= 10 μk [1,2].

The model distinctive feature is parameterization of amplitude and width of the modes as functions of fetch and wind speed. In the paper the dN/dr behavior depending at change meteorological parameters, heights above sea level, fetch (X), wind speed (U) and RH is show. The received results are compared to available microphysical models NAN and ANAM.

On the basis of the developed model with usage of Mie theory for spheres the description of last version of developed code MaexPro 5.0 (Marine Aerosol Extinction Profiles) for spectral profiles of aerosol extinction coefficients $\alpha(\lambda)$ calculations in the wavelength band, equal λ = 0.2 - 12 μm, with step $\Delta\lambda$ = 0.0001 μm is presented [3].

Also $\alpha(\lambda)$ profiles for various wind modes (combinations X and U) calculated by MaexPro 5.0 code are given. Results of $\alpha(\lambda)$ profiles calculations are presented at change RH = 40 - 98 % and heights H = 0 - 25 m. The calculated spectrums of $\alpha(\lambda)$ profiles are compared with experimental data of $\alpha(\lambda)$ received by a transmission method in various geographical areas.

References

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