Limited of polarimetry in determining of the Earth's atmospheric aerosol characteristics. A. V. Morozhenko[1], A. P. Vidmachenko[1], P. V. Nevodovskyi[1], [1]Main Astronomical Observatory of NAS of Ukraine, street. Ak. Zabolotnoho 27, Kyiv, 03680. vida@mao.kiev.ua

We draw attention to the inability to determine the exact characteristics of tropospheric aerosol (spectral values of the real part of refractive index, optical thickness τ_o and single scattering albedo, the parameters of the distribution function of particle size and shape of particles) using polarization observations on the Earth's orbit at $\lambda > 400$ nm [4, 8]. If, for example, on Venus [2] diffusely reflected radiation is formed only in the gas-aerosol atmosphere, the surface of the Earth also plays an important (at some λ - dominant) role. A surface optical properties depend on the latitude and longitude ψ, L; diversity of topography causes the dependence of ψ and L, also τ_o values and relative contributions of the gas and aerosol scattering. This causes the two difficulties:

1. Impossibility to receive the phase dependence of the degree of polarization $P(\tau_o, \psi, L, \mu_o, \mu, \alpha)$ and reflectivity $\rho(\tau_o, \psi, L, \mu_o, \mu, \alpha)$, which correspond to optical homogeneity condition (α, μ_o and μ - is phase angle and cosine of the angle of incidence and reflection of light). It can to overcome observation individual parts on the surface while scanning plane in polar orbit and can consider the effects of the Earth's rotation and changing the distance between the satellite and the selected part.

2. Impossibility to separate atmospheric and surface components of these dependencies. This can be done only by using appropriate assumptions in respect of surface: consider the phase dependence known [3]; analyze the spectral dependence at some phase angles allowed in some empirical connection (for example, the Umov's effect) $A(\alpha, \lambda)\cdot P(\alpha, \lambda)^n = \text{Const}$ [1], or the results of observations in the so-called inversion point α_i in which the plane of polarization is changed to 90°, and for surface - values of the degree of polarization $P_s(\alpha_i) = 0$ [5].

But these difficulties disappear when observed at $\lambda < 300$ nm, where the ozone layer cuts contribution as the Earth's surface and lower atmosphere too. Therefore, there is a good opportunity to identify the main characteristics of stratospheric aerosol [6].

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