THE CORRELATION BETWEEN MAXIMUM SKY POLARIZATION AND THE VERTICAL TRANSMISSION OF LIGHT THROUGH THE ATMOSPHERE A SUPPLEMENT TO LASER ATMOSPHERIC STUDIES

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ABSTRACT

In his 1960 essay entitled "Light Scattering in the Atmosphere", G. V. Rozenberg called attention to a correlation between the maximum polarization in the cloud-free, daytime sky and the vertical transmission of light through the atmosphere. According to measurements made by Rozenberg and others the degree of polarization at the maximum is equal to the vertical transmission of light through the atmosphere, independent of the position of the sun. In order to investigate the possibilities of those observations, a Monte-Carlo simulation of radiative transfer in a plane-parallel, stratified atmosphere was developed and tested. The model was then used to verify the correlation between the maximum sky polarization and vertical atmospheric transmission and to study its sensitivity to changes in the aerosol density and height distributions. Investigations were also made for correlations with other matrix elements. The results of these investigations and their use in Laser Atmospheric studies will be discussed.