ATMOSPHERIC LASER SOUNDING AT WAVELENGTHS OF 3472 Å, 5300 Å, 6943 Å, 10600 Å

V. M. Zakharov, O. K. Kostko and V. S. Portasov
Hydrometeorological Service of the USSR, Moscow, USSR

ABSTRACT

In the atmospheric soundings a lidar with two lasers /ruby and neodymium/ was used; the single pulse energy was equal to 0.8 J at a 30 nsec pulselength. KDP crystals converted the output pulse wavelength into 3472 Å and 5300 Å at a power conversion efficiency of ∿ 2%. The optical receiving antenna used in the lidar had a diameter of 0.5 m and the angle of the field of view of 1.5 mrad. The interference filters halfwidth averaged 20 Å. The maximum altitude from which backscattered signals were received was equal to 45 km /λ = 6943 Å/. In this case there were detected aerosol layers at altitudes between 20 km and 30 km, their intensity and altitude being in good agreement with other available data. The method of two-frequency sounding /1,2/ allowed to separate signals scattered by molecules and aerosols and obtain an atmospheric density profile up to 12 km which is the maximum altitude from which a backscattered signal at 10600 Å was received. The experiments conducted at all the wavelengths showed a significant aerosol pollution of the troposphere. So, transmissivities of 0.39 up to 5 km and 0.32 up to 10 km were obtained by a two-angle sounding at λ = 6943 Å.

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