



Remote detecting of organic emissions from trees

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The study of the organic components content in the atmosphere is very important from the viewpoint of ecological monitoring and radiation balance of territories. Organic components, as a rule, exist in the atmosphere as gas or aerosol formations. As applied to the problem of the measurement of the organic aerosol content the lidar has been developed on a basis of Nd:YAG laser with the radiation conversion into the second and fourth harmonics. The fourth harmonic of Nd:YAG laser is used for the excitation of the fluorescence of organic components in the atmosphere in the UV and blue spectral regions. This channel is effective for analyzing the fluorescent organic matter connected with vegetation metabolites.

The second harmonic of Nd:YAG laser is used for the fluorescence excitation of vegetation covers. The lidar receiving system detects the fluorescent fluxes in the UV and blue spectral regions from the atmosphere and in the red spectral region from vegetation at the spectral resolution 2 nm. Simultaneous detection of the fluorescence from the atmosphere and vegetation makes it possible to obtain the information on the interaction of the atmosphere and underlying surface covered with vegetation. In particular, it is shown that disarrangement of vegetation feeding or the influence of toxins on the vegetation result in the increase of the fluorescence intensity of chlorophyll and the simultaneous occurrence of organic aerosol in the atmosphere in the vicinity of vegetation. This fact can serve as a basis for a new technique of ecological monitoring.