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PRECISION REQUIREMENT IN MEASURING AEROSOL LOAD FOR REMOTE SENSING APPLICATIONS

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The effects of atmospheric aerosol on remote sensing application have been widely studied, and the possibility of actually measuring the aerosol optical thickness either by ground-based devices or by sensors on board satellites has begun to attract attention. It is thus essential to estimate the required precision in such measurement for improving classification accuracy.

Forestry data from intensively studied area of New Hampshire and Maine* have been classified with several simulated aerosol distributions. It is assumed that the actual aerosol optical thickness was 0.15 over the area classified. Radiance is transformed according to parameters obtained from a doubling model to simulate aerosol effects. Atmospheres with aerosol distributions of average optical thickness 0.05, 0.25, 0.35 and 0.45 were simulated for both homogeneous and inhomogeneous conditions.

Preliminary results show that difference of 0.1 in the optical thickness between training and application sites leads to a decrease of 5 to 30% in the relative classification accuracy for various types of forest. It is concluded that measurements of aerosol optical thickness must be made with a precision of 0.01.

*Dodge and Bryant, J. of Forestry, Vol. 74, No. 8, 1976.