

Optimal nadir scan angle for a space-based Doppler lidar wind sounder

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Abstract

A Laser Atmospheric Wind Sounder computer simulation model was used to conduct a series of trades between scan angle and accuracy/coverage to determine the optimal scan angle for a space-based Doppler lidar wind sounder. Attention is given to vertical backscatter profiles, advanced signal processing, pulse length, shot density, and vertical velocity variance. The LOS speed uncertainty (m/s) projected into the horizontal plane as a function of the nadir scan angle for a single laser shot into the upper troposphere and lowest 1 km of the earth's atmosphere for expected backscatter values is shown.