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Modeling the Performance of Direct-Detection Doppler Lidar Systems in Real Atmospheres

By Matthew J. McGill

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 36 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. Previous modeling of the performance of spaceborne direct-detection Doppler lidar systems has assumed extremely idealized atmospheric models. Here we develop a technique for modeling the performance of these systems in a more realistic atmosphere, based on actual airborne lidar observations. The resulting atmospheric model contains cloud and aerosol variability that is absent in other simulations of spaceborne Doppler lidar instruments. To produce a realistic simulation of daytime performance, we include solar radiance values that are based on actual measurements and are allowed to vary as the viewing scene changes. Simulations are performed for two types of direct-detection Doppler lidar systems: the double-edge and the multi-channel techniques. Both systems were optimized to measure winds from Rayleigh backscatter at 355 nm. Simulations show that the measurement uncertainty during daytime is degraded by only about 10-20 compared to nighttime performance, provided a proper solar filter is included in the instrument design. This item ships from La Vergne, TN. Paperback.



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