RETRIEVAL OF BOUNDARY LAYER HEIGHT IN COMPLEX ATMOSPHERIC STRATIFICATION SCENE BASED ON LIDAR INTENSITY AND DEPOLARIZATION

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The height of the atmospheric boundary layer is a basic parameter to describe the structure of the lower troposphere, which determines the vertical diffusion space of pollutants emitted from the ground. Lidar can accurately describe the vertical structure of the atmosphere through aerosol tracing, but in the scenarios of local aerosol accumulation and advective aerosol intrusion, there is a great uncertainty in the estimation of the height of the boundary layer. In order to improve the inversion of the boundary layer height in complex atmospheric scenes, this project proposes a new algorithm, which adds the depolarization ratio gradient on the basis of the traditional search for. A pronounced change at the top of the boundary layer is identified as the boundary layer height based on the vertical gradient of the intensity (distance correction) signal. The algorithm performs wavelet covariance transformation on the distance correction signal and depolarization ratio at the same time, selects different vertical gradients as candidate heights, and obtains the boundary layer height by comparing the relative positions of the candidate heights and threshold constraints. Further, the parameters and thresholds in the inversion algorithm are adjusted and optimized using the sounding observation results of several observation cases. Finally, the inversion accuracy of the new algorithm is evaluated by comparing with the long-term sounding data and the traditional algorithm. This algorithm will effectively improve the inversion accuracy of the boundary layer height in complex atmospheric stratification scenes, and provide important support for improving the parameterization of the boundary layer and the numerical simulation of atmospheric composition.