

# ***Interactive comment on “CALIPSO Lidar Calibration at 1064 nm: Version 4 Algorithm” by Mark Vaughan et al.***

**Anonymous Referee #1**

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The authors present an excellent, comprehensive paper detailing a revised, new version, V4, data processing/assessment procedure for significantly improving the calibration of the 1064 nm channel of CALIOP. They present a detailed assessment of the deficiencies of the current version, V3, calibration procedure, followed by a detailed presentation of the new, V4, calibration procedure that discusses how the deficiencies of the V3 procedure are removed with the new V4 procedure. A key aspect of the V4 procedure is the selection of quality cirrus clouds for transferring the 532 nm calibration to 1064 nm. The authors present detailed assessments of data examples which support the new procedure for selecting quality cirrus clouds for the calibration transfer. The new procedure is validated by comparison with alternate calibration procedures (i.e., using dense water clouds, ocean surface lidar returns and attenuated

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backscatter comparisons with nearly concurrent airborne High Spectral Resolution Lidar (HSRL) observations). They conclude that the cirrus cloud calibration approach as implemented with the V4 procedure is the best of these various calibration approaches in both providing the most coverage over orbits and estimated relative calibration accuracy (within  $\sim 3\%$ ). With this level of accuracy, the 1064 nm attenuated backscatter data can now be used for a variety of quantitative applications of the CALIOP 1064 nm observations.

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