

Altitude registration analysis of limb scattering observations

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Altitude registration remains one of the most challenging problems for retrieving atmospheric composition profiles from limb scattering observations, mainly because, unlike solar occultation, there is no well-defined target. Inaccuracies in altitude registration often affect the accuracy and precision of the retrieved trace gas profiles, and hence hinders the scientific value of such measurements. Pointing offset has been identified as the largest contributor to Ozone Mapping and Profiler Suite (OMPS) limb precision errors between the tropopause and the ozone peak.

In this work, we investigate the limb scattering pointing accuracy of SAGE III, OSIRIS, and SCIAMCHY, by comparison between retrieved ozone profiles and highly accurate correlative measurements, such as occultation sensors, balloonsondes and lidars. Using these comparisons we assess the accuracy of the limb scattering altitude registration. The limb scattering instruments obtain their pointing information via various techniques, including RSAS and the knee method (SAGE III), star-tracker (OSIRIS), and knowledge of internal scan-mirror position and satellite location and orientation (SCIAMCHY). Preliminary results of this work are in good agreement with the known altitude registration errors for these sensors.