



Satellite measurements of air density and ozone distributions in the mesosphere using ultraviolet limb-scan technique

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For joint retrieval of vertical distributions of both air density and ozone concentration in the mesosphere, which are two of the most important atmospheric parameters in this region, a retrieval scheme is suggested by using satellite limb scanning observations at two UV wavelengths, i.e. 265 nm and 296 nm. The retrieval scheme is similar to the Direct Method for ozone retrieval by Aruga and Heath with two UV wavelengths. Feasibility study is made based on simulated earth limb scattered radiances and the inversion technique. Results indicate that it is feasible to retrieve air density and ozone concentration vertical distributions simultaneously over an altitude range of 50-90 km with relative high precision for ozone of 3~5% and 1~3% for air density, provided the ratio of signal to noise are better than 100 and errors from limb pointing and aerosol uncertainty are also ignored. Data of channels 265 and 296 nm by the Ultraviolet spectrometer onboard Solar Mesospheric Explorer (SME) are applied to retrieve profiles of air density and ozone concentration in the mesosphere over a global basis, which are validated in great consistency with other SME and model results. Presently, SCIAMACHY/ENVISAT limb scattered data are being also applied to the retrieval algorithms and comparison work are being done.