# Combined retrieval of trace gases and aerosol from data of Sun occultation SAGE III experiment

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The algorithm of combined retrieval of vertical profiles of ozone, NO2, spectral aerosol extinction coefficient and different microphysical properties of stratospheric aerosol is described. Principal features of the algorithm are: &#61485; statistical regularization (optimal estimation) method used for solving the nonlinear inverse problem,&#61485; simultaneous retrieval of profiles of the all unknown parameters,&#61485; statistical aerosol models employed as a priori information.Data of multispectral slant path transmittance measurements by SAGE III device (Meteor-3M) have been processed and analyzed. Results of retrieving the different atmospheric parameters (ozone, NO2, aerosol optical and microphysical properties) from SAGE III data are compared with independent measurements (ozonosondes, lidar, different satellite measurements – POAM III, HALOE and etc.). Retrieved profiles of atmospheric parameters have been compared with data of on-line processing the SAGE III measurements by NASA. A comparison of the two approaches for interpreting the SAGE III data – the use of slant path transmittance data (SPbSU method) and atmospheric optical depths (NASA method) – illustrates some serious systematic differences for the lower stratosphere and upper troposphere. Possible causes of differences between SPBSU and NASA retrieved profiles of atmospheric parameters and data of independent measurements are analyzed.