Ozone and Aerosol Retrieval from Backscattered Ultraviolet Radiation

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In this presentation we will discuss the techniques to estimate total column ozone and aerosol absorption optical depth from the measurements of backscattered ultraviolet (buv) radiation. The total ozone algorithm has been used to create a unique record of the ozone layer, spanning more than 3 decades, from a series of instruments (BUV, SBUV, TOMS, SBUV/2) flown on NASA, NOAA, Japanese and Russian satellites. We will discuss how this algorithm can be considered a generalization of the well-known Dobson/Brewer technique that has been used to process data from ground-based instruments for many decades, and how it differs from the DOAS techniques that have been used to estimate vertical column densities of a host of trace gases from data collected by GOME and SCIAMACHY instruments.

The buv aerosol algorithm is most suitable for the detection of UV absorbing aerosols (smoke, desert dust, volcanic ash) and is the only technique that can detect aerosols embedded in clouds. This algorithm has been used to create a quarter century record of aerosol absorption optical depth using the buv data collected by a series of TOMS instruments. We will also discuss how the data from the OMI instrument launched on July 15, 2004 will be combined with data from MODIS and CALIPSO lidar data to enhance the accuracy and information content of satellite-derived aerosol measurements. The OMI and MODIS instruments are currently flying on EOS Aura and EOS Aqua satellites respectively, part of a constellation of satellites called the "A-train".