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PHOTOCHEMICAL OZONE OVERBURDEN CORRECTION

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One-half of the total ozone column is predominantly under photochemical control under all conditions except polar winter. The other half is dynamically controlled. Since the photochemical forcing is phased with the solar declination and modulated by air temperature variations in the upper stratosphere and the dynamic forcing is tied to wave activity in the upper troposphere, the total ozone column is a mixture of the two drivers. If we want to use the total ozone to infer a property of the dynamic field, namely the tropopause height, it is necessary to correct for the photochemical variations.

It should be possible to remove the photochemical component of the total ozone by using SBUV profile information along the orbital track as long as the spatial variations are low frequency. We are examining the column integral above Umkehr levels in the lower stratosphere (50 to 10 mb) to determine the level where the spatial variability decreases to the expected photochemical range to find an approximate dividing line between photochemical and dynamic control. Given this we will fit a spherical harmonic function to the ozone field and subtract this from the TOMS total ozone field. This residual field will then be correlated with tropopause height to determine whether an improvement is obtained over the total ozone correlation.