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Preliminary anticorrelations between UV and ozone using ground-based ultraviolet radiometer (GUV-511C) measurements at southern space observatory

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The solar ultraviolet radiation (10-400 nm) in the range 280-320 nm is known as UV-B, and may cause many damages to animals, plants and humans. UV-B radiation is strongly absorbed by atmospheric ozone. The UV radiation between 320 and 400 nm is known as UV-A and is not significantly absorbed by any component through the atmosphere. Instruments for ozone and UV monitoring have been installed at the Southern Space Observatory (OES/CRSPE/INPE-MCT - Lat. 29.44°S, Long. 53.82°W) and one of them, the Ground-based Ultraviolet Radiometer (GUV-511C), provides UV measurements in the wavelengths 305, 320, 340 and 380 nm, and also measures PAR (Photosynthetically-Active Radiation). Correlations between daily integral of each wavelength measured by GUV and ozone total column data obtained by TOMS satellite equipment were done using only days with clear sky or with few clouds, in the years 2002 and 2003. The correlation coefficients for 305, 320, 340 and 380 nm with ozone, in October/2003 (month with great ozone variations and with the largest number of clear sky days), were, respectively, -0.83, -0.12, 0.11 and 0.04, showing, as it is well-known, that only the UV-B wavelength (305 nm) is dependent of ozone. Aiming to improve the anticorrelation behavior between ozone and UV at 305 nm, ratios between daily integral of 305 nm and daily integral of each one of the other wavelengths, were calculated. The correlation coefficients between ozone and ratios 305/320, 305/340 and 305/380 were -0.94, -0.95 and -0.94, respectively. The ratio is a simple method to eliminate the influence of other factors (besides the ozone) in the UV-B variations and that also influence the other wavelengths of UV-A. The daily integral of UV weighted with Erythema Action Spectrum calculated from GUV data was also correlated with ozone, and the correlation coefficient was -0.72. The ratios with radiation in 320, 340 and 380 nm, were also applied and the correlations with ozone resulted -0.94, -0.95 and -0.93, respectively. It was observed that a decrease of about 1% in ozone can lead to an increase of about 1,48-1,61% in daily integral of 305 nm, and 0,83-1,01% in daily integral of Erythemal UV.

Keywords: **ozone, ultraviolet, anticorrelation, GUV**

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