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## UVI and total ozone column: 3 days in September 2018

I wrote many times on the relationship between the total thickness of the ozone layer (TOC) and the UVB radiation at ground level (see [paper](#), and comments [here](#), [here](#)). Roughly speaking, the ozone column is a filter for UVB, so when this filter becomes thinner (the measure of TOC gives decreasing Dobson units), the UVB irradiance should increase. One common relationship to quantify this increase is the radiation amplification factor RAF defined by  $RAF = -[\ln(DU1/DU0)]/[\ln(TOC1/TOC0)]$ .

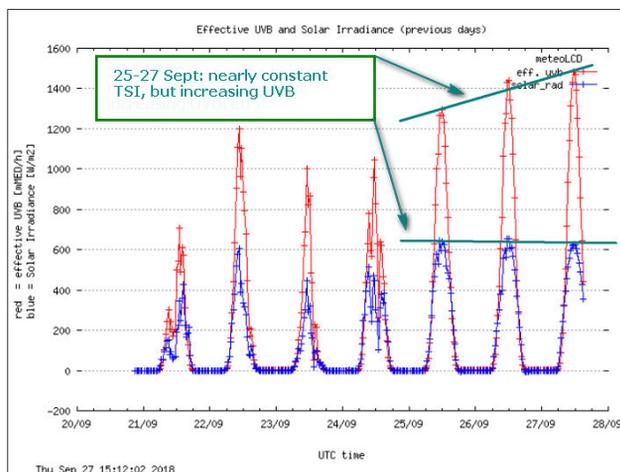
Today and the two previous days (27, 26, 25 Sep. 2018) gives illustration.

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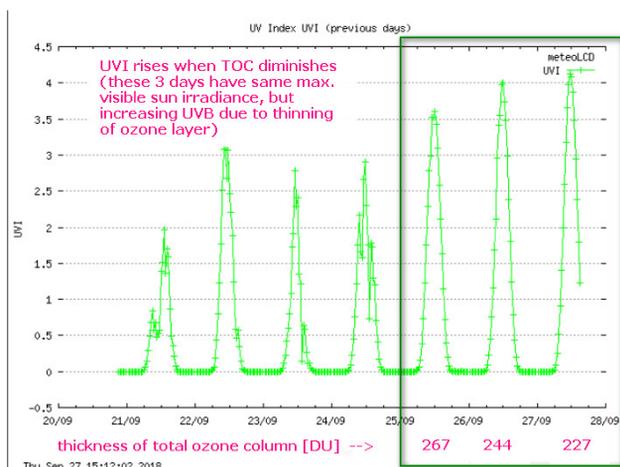
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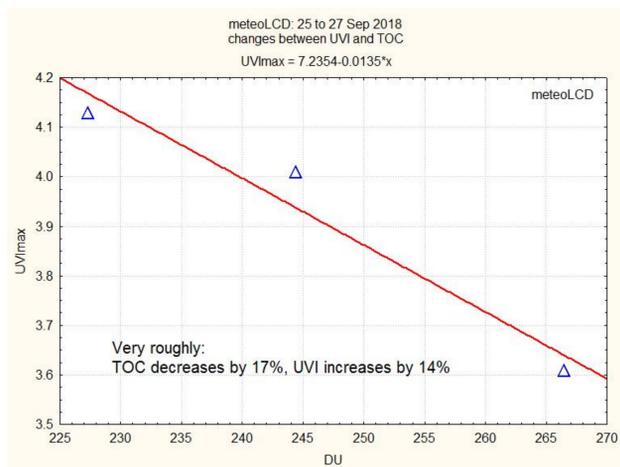
First note that the maximum of the total solar irradiance was more or less constant, whereas the UVB irradiance increases markedly:



The next plot shows the variation of the UVI (UV index, here  $UVI = 0.00278 * UVB$  when UVB is given in mMED/h):



The TOC numbers are given in DU below the x-axis: they decrease from 267 to 227. A quick X/Y graph shows a possible linear relationship:



From the 25th to the 27th September, a TOC decrease by 17% causes an increase of the UVI by 14% (please note that the relationship is logarithmic, so this line should be seen as a linear approximated segment of the "real" curve).

Using the RAF formula given above for the second and last days and replacing the DU readings by  $DU/\cos(SZA)$  as stated in the paper yields an **average RAF of 1.086**, close to the values found in the paper

**Conclusion:** our measurement clearly show the inverse relationship between TOC and UVB irradiance.

### History:

29 Sep 2018:

changed calculation of RAF's by using "slanted" formula given in the [paper](#) (DU replaced by  $DU/\cos(SZA)$ ) and calculating the RAF's for the second and third day by taking the 25th September as base-line (index 0 in the formula)

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