

Cuban National Report
9th WMO/UNEP Ozone Research Managers
Meeting

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OBSERVATIONAL ACTIVITIES

Program of measurements of the total amount of atmospheric ozone and ultraviolet solar radiation (UV-B)

Total Ozone

- The measurements of total amount of ozone at Havana Ozone Station continues from February 2011 until present without interruptions and Dobson No.67 was calibrated last time in the IV Regional Dobson Intercomparison in Buenos Aires, Argentina between Nov and Dec 2010 where the instrument was subjected to a deep revision.
- On the other hand results of measurements are sent daily to the http://exp-studies.tor.ec.gc.ca/e/ozone/Curr_allmap_g.htm.
- We have assisted and supported the colleagues at the Solar Radiation Observatory of the National Autonomous University of Mexico to restart total ozone measurements with Dobson spectrophotometer #98 after being repaired at NOAA/ESRL/GMD in charge of Robert Evans. Currently the instrument is operational and the station of Mexico City is reporting daily to http://exp-studies.tor.ec.gc.ca/e/ozone/Curr_allmap_g.htm

UV Measurements

- Due to problems with the radiometer (Biometer 501 No.2853 No.2853 manufactured by Solar Light) for UV solar radiation measurements and UV index determination at Havana station these measurements are interrupted since April 2012.
- In any case, partly compensating the lack of ground measurements, an analysis was made of the behavior of the UV index for Havana based on information from OMI (aura_omil2ovp_omuvb_vO3_havana.txt). The statistical analysis of these data were the subject of a bachelor degree thesis at Havana University, no significant trend was found for UV solar radiation for the period 2004-2013 at Havana station.

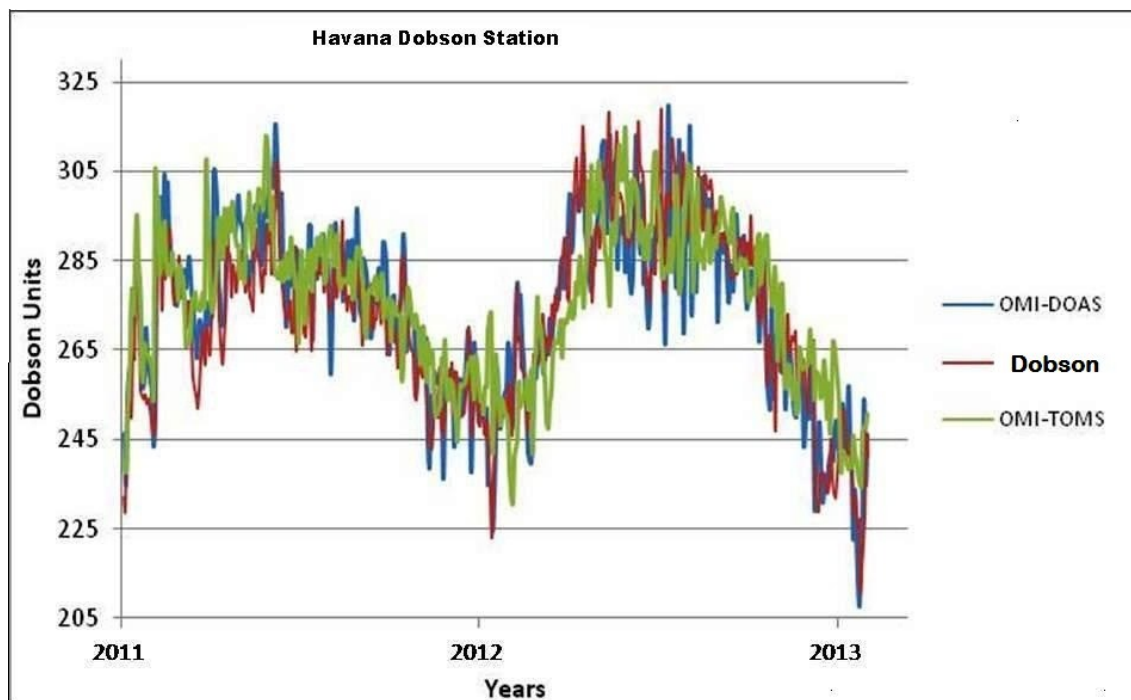
RESULTS FROM OBSERVATIONS AND ANALYSIS

The study of ground measurements at Havana station and those from the OMI instrument over the same location, and at Camaguey station, located Eastward on the National Territory show, in agreement with former reports, the following results.

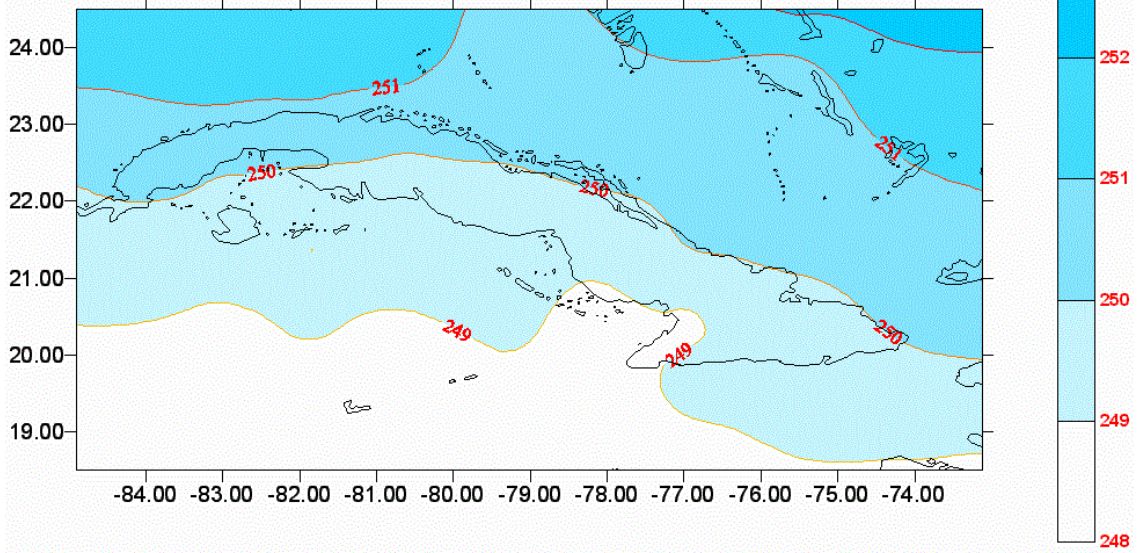
The total ozone distribution over the National Territory is well defined by an annual cycle with maxima in the summer months and minima in the winter months. The amplitude of this cycle is of about 40 Dobson Units and its mean value is 275 Dobson Units

Regarding the spatial distribution over the National Territory, the total ozone content shows a small latitudinal gradient of about 2 DU between the Eastern and the Western regions in the winter season. In the summer this gradient turns bigger reaching 10 DU in May. The small values in latitude are explained by the disposition of our territory, which practically spans over a single latitude (rigorously just a range no larger than 3.5 degrees). As previously pointed out, the most relevant feature is the wide annual cycle of the TOC.

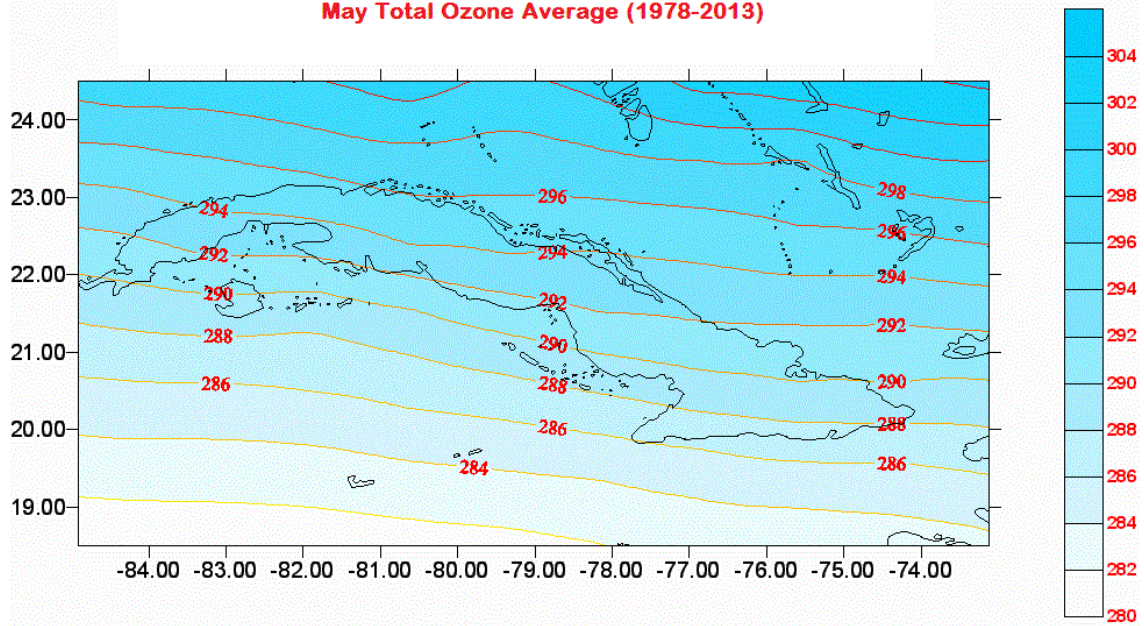
In addition to the annual cycle, TOC also shows two other seasonal cycles. It is known the variation of ozone following the quasi-biannual oscillation of stratospheric wind, with its greater value precisely over the Equatorial region. At our territory's location, this signal is less visible, but still existent (Bojkov and Fioletov, 1996).

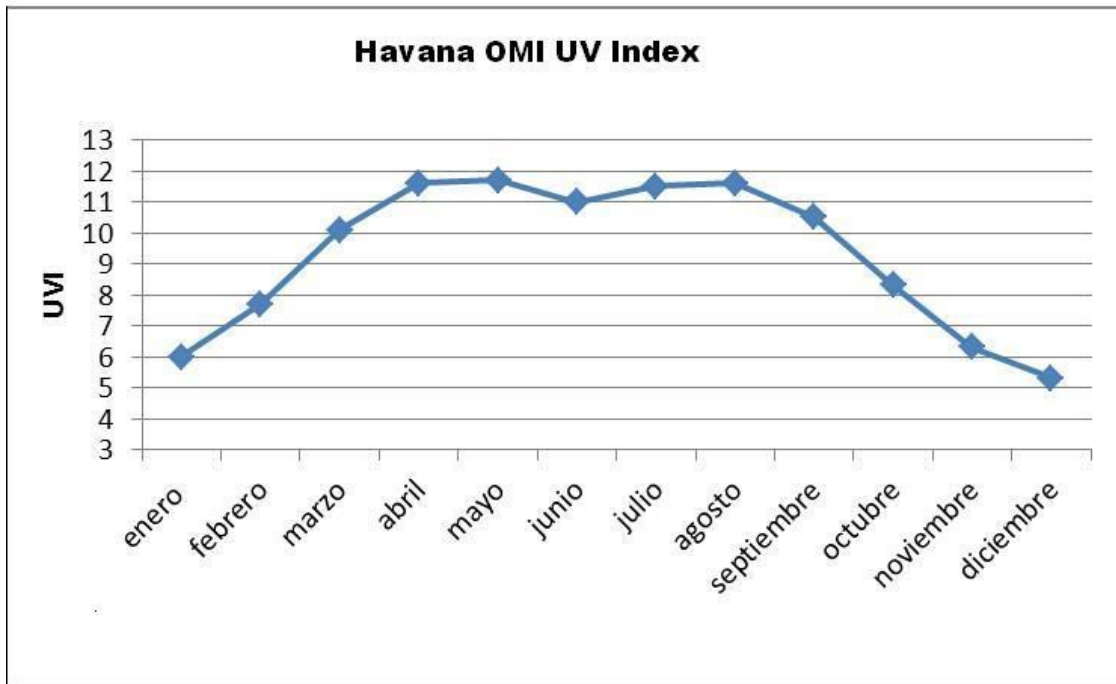


December Total Ozone Average (1978-2013)



May Total Ozone Average (1978-2013)





FUTURE PLANS

- We hope, that in the course of this year, and the next, thanks to the collaboration with the Solar Radiation Observatory of the National Autonomous University of Mexico and the National Meteorological Service of Mexico, we will be able to count with the necessary equipment to start a program of UV solar radiation monitoring at two locations on Cuba's National territory.
- Present the actual TOZ and UV-Index values at the portal of the Cuban Meteorological Institute for public information..

RECOMMENDATIONS

- It would be very useful if workshops (The Dobson Data Quality Workshop) were held like the one at Hradec Kralove (Czech Republic) in 2011.