

## A BREWER-DOBSON-TOMS TOTAL OZONE DATA INTERCOMPARISON AT NATAL

V.W.J.H. Kirchhoff, N. Paes Leme, and C.Boian  
Instituto Nacional de Pesquisas Espaciais, INPE  
12201-970 S.José dos Campos, S. Paulo, Brasil  
kir@dge.inpe.br

### Abstract

A new 6 year data set of total column ozone is described at a southern tropical station, Natal (6° S, 35° W), which operates Dobson and Brewer spectrophotometers, and these are compared with the Total Ozone Mapping Spectrometer, Toms. In terms of the difference parameters, for the entire period,  $100*(Brw-Dob)/Brw$  and  $100*(Brw-Tms)/Brw$  monthly means are  $0.2\pm 1.2$  and  $0.0\pm 2.1$ . Separating the data set in two periods, from 1997 to 2001, and from 2001 onwards, a significant change in the difference parameters is obtained for the Toms series. The difference between the two periods is then:  $-0.1\pm 2.9$  and  $-0.1\pm 2.5$  %, for the Dobson series; and  $-1.0\pm 2.9$  and  $1.9\pm 3.0$  %, for the Toms series, respectively, thus showing a larger variability in the second part of the period.

### 1.0 INTRODUCTION

The Brewer and Dobson spectrophotometers are well known and widely used instruments to measure ozone. In this work only ds measurements are considered. The Total Ozone Mapping Spectrometer, Toms (Heath et al., 1975), is a scanning spectrometer especially built to be flown on a satellite, thus providing excellent spatial coverage (Stolarski et al., 1986). Natal (6° S, 35° W) is located at the INPE/Natal complex, at the coast of the Atlantic Ocean. This site has been used during several years to make different surface trace gas measurements and ozone sonde and rocket measurements (Kirchhoff et al, 1991; 2003). The objective of this work is to present new ozone data at Natal obtained with a Brewer spectrophotometer, and compare it with Dobson and Toms data.

### 2.0 RESULTS AND DISCUSSION

The data period is from 1997 to 2003 (May). The original Toms data set used in this work is the latest version available (version 7). **Fig. 1** a) and b) shows the difference parameters  $100*(Brw-Dob)/Dob$  and  $100*(Brw-Tms)/Tms$ . In the left hand upper corner are shown the total number of points in the comparison, the average and the standard deviation. For example, panel a) shows the comparison with the Dobson data; there are 991 data points with an average of 0.1 % and a standard deviation of 2.8 %. In panel b) there is a larger number of data points, 1872, the overall average is 0.1 %, and the standard deviation is 3.2 %. This means that there is only a small offset between the Brewer-Dobson and Brewer-Toms data at Natal. In the lower part of each panel two other averages are shown: one for the period until December 2000; and another one, for the remaining period. The period 2001 to May 2003 is shown hatched. A change in the offset value occurs, and the data variability is larger. This period coincides with calibration problems in the Toms data series, as acknowledged by the NASA/Toms website.

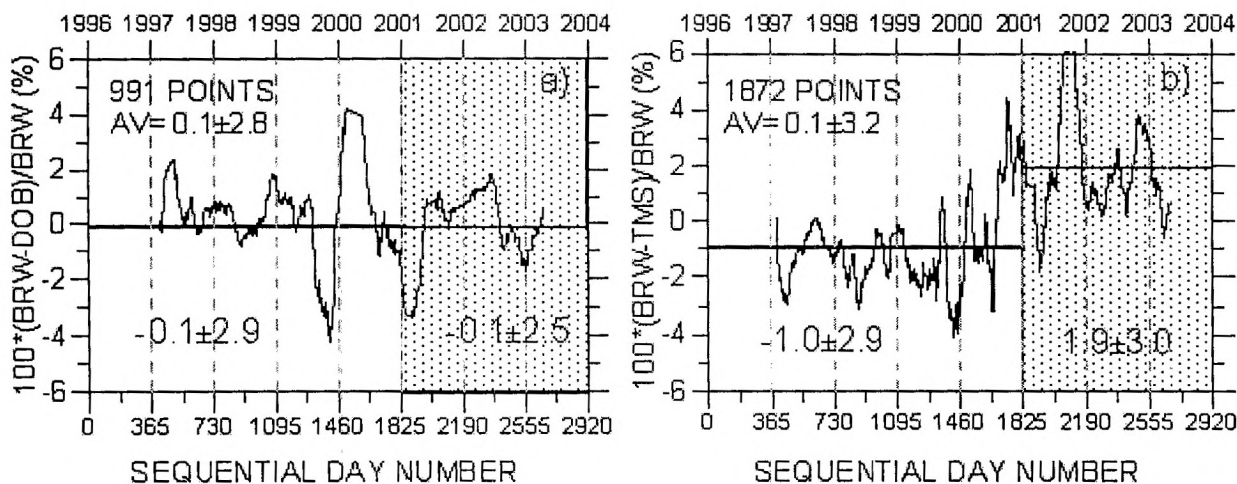


Fig. 1. - Comparison of the difference parameters  $100*(Brw-Dob)/Brw$ , shown in a) and  $100*(Brw-Tms)/Brw$ , shown in b) both expressed in % for Natal.

### 3.0 CONCLUSIONS

Original ground based Brewer total column ozone measurements have been compared with Dobson and satellite Earth Probe Toms data, from January 1997 to May 2003, at Natal. In general these comparisons are very good, that is, over the entire period, the differences are 0.1 %, and the standard deviations for the daily means are within 2 to 3%. The comparison with Toms changed after 2001: it had negative averages for the previous 4 years, after which it turned positive, presenting also higher variability. The comparison between Brewer and Dobson show no significant changes or variations after 2001, which seems to be an indication that Toms O<sub>3</sub> measurements became slightly lower and more erratic from that point on.

### ACKNOWLEDGMENTS

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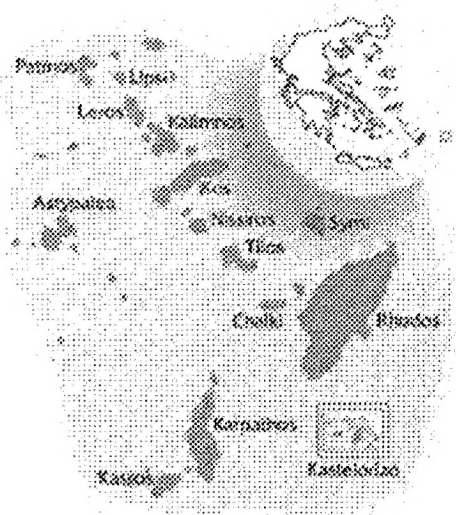
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“Kos 2004”

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## First Announcement

*The International Ozone Commission (IOC) of the International Association for Meteorology and Atmospheric Sciences (IAMAS) announces that the next International Quadrennial Ozone Symposium “Kos 2004” will be held in Kos, Greece from 1 - 8 June 2004.*



The Symposium will be held at five star Kipriotis Hotels at Kos, Greece. The mean air temperature of Kos in June is 24,7°C and the average relative humidity is 57,6%.

Kos is the island that gave the world Hippocrates, the father of medicine and it is the third largest island of the Dodecanese.

Kos can be accessed by airplane from several major European airports as well as from Athens (flight time from Athens is approximately 35') or by ferryboat (from the port of Piraeus with Fast Ferries approximately 6,5 hours). Kos is close to Rhodes (2 hours with Flying Dolphins) and about 40' from the Turkish coast.

### Scientific topics:

The Symposium will solicit scientific papers on all aspects of atmospheric ozone such as:

- Observations and analyses of total and vertical ozone distributions
- Observation techniques and inter-comparisons
- Tropospheric ozone in particular, past and future budgets and trends
- Observations and budgets of minor constituents related to atmospheric ozone
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- Ozone and ultraviolet radiation

The Scientific Program Committee will review the submitted papers before the acceptance for presentation. The presentation of a paper should be oral or on a poster. The detailed information on paper submission will be publicized in the second announcement to be issued in May 2003.

### Contact points:

Professor Christos S. Zerefos

Secretary of IOC

University of Athens, Faculty of Geology, Athens 15784, Greece

Tel: +30 210 7274133, Fax: +30 210 7274157, E-mail: [zerefos@geol.uoa.gr](mailto:zerefos@geol.uoa.gr)