

National Reports for the 8th WMO/UNEP Ozone Research Managers Meeting 2 – 4 May 2011, Geneva, Switzerland

1. OBSERVATIONAL ACTIVITIES

Two Dobson Spectrophotometers have been setup in Kunming, Yunnan province and in Xianghe, Beijing, by the Institute of Atmospheric Physics (IAP), the Chinese Academy of Sciences since 1938 and 1958 respectively. Four MK II Brewer Spectrophotometers have been set up by Chinese Meteorological Administration (CMA) in Waliguan, Lin'an, Longfengshan WMO GAW station, and Chinese Zhongshan South Pole station in 1990s. The Brewer was used in Taiwan and Hongkong to observe ozone and UVB as part of the current total ozone and UVB observation net in China. Their data are reported to WOUDC routinely. Another Brewer Spectrophotometer has been set up in Lhasa, Tibet in 2008. Total ozone observation from space have been implemented since May 2008 via FY-3 satellite. The orbit altitude of FY-3A is 831 km, inclination is 98.81°, quasi-repeat time is 5 days, local time of the descending node is 10:30. The FY-3 satellite is a second-generation Chinese polar-orbit meteorological satellite. The Solar Backscatter Ultraviolet Sounder (SBUS), one of the main payloads on the FY-3 satellite, is the first Chinese ozone-monitoring instrument on a meteorological satellite. The retrieval FY-3 data are comparable with NOAA dataⁱ.

1.1 Column measurements of ozone and other gases/variables relevant to ozone loss.

Station	Institution	Instruments	Location	Start of observations
Xianghe	Institute of Atmospheric Physics, Chinese Academy of Science	Dobson	116°E, 39°N	1979
Kunming	Institute of Atmospheric Physics, Chinese Academy of Science	Dobson	102°E, 25°N	1980
MT. Waliguan	China Meteorological Administration	Brower#54 MKII	100°E, 36°N	1991-
Longfengshan	China Meteorological Administration	Brower#76 MKII	127°E, 44°N	1993 -
Lin'an	China Meteorological Administration	Brower#77 MKII	119°E, 30°N	1993-
Zhongshan	China Meteorological Administration	Brower#74 MKIV	South Pole	1993-
Hongkong		Brower#115	114°E, 22°N	
Taiwan		Brower	121°E, 24°N	
Lhasa	China Meteorological Administration	Brower#177	91°E, 23°N	1998; 2008-

1.2 Profile measurements of ozone and other gases/variables relevant to ozone loss

There are two stations for ozone profile observation which are in constructing by CMA. One is in Lhasa, another is in Beijing. Ozone sondes have been routinely released in Shanghai by Shanghai Meteorological Bureau since 2007.

Since 2008, the FY-3 also provides vertical ozone profiles which is deduced from measurements of SBUS on the satelliteⁱⁱ

1.3 UV measurements

Station	Institution	Instruments	Location	Start of observations
MT. Waliguan	China Meteorological Administration	Brewer/UVB-1	100°E, 36°N	1991
Longfengshan	China Meteorological Administration	Brewer	127°E, 44°N	2003
Lin'an	China Meteorological Administration	Brewer	119°E, 30°N	2003
Zhongshan	China Meteorological Administration	Brewer	South Pole	1993
Hongkong		Brewer	114°E, 22°N	
Taiwan			121°E, 24°N	
Lhasa	China Meteorological Administration	Brewer	91°E, 29°N	1998; 2007-
Shangdianzi	China Meteorological Administration /Institute of Urban Meteorology, CMA, Beijing	KIPP&ZONEN	117°E, 40°N	
Dangxiong	Chinese Academy of Meteorological Sciences	UVB-1	30.2°N,91.1°E	2009.10-2011.9

1.3.1 Broadband measurements

1.3.2 Narrowband filter instruments

1.3.3 Spectroradiometers

1.4 Calibration activities

The Brewers are calibrated by WMO/GAW Brewer Spectrophotometer Ozone Calibration Centre about every two year. A calibration lab in CMA was setup in 2009ⁱⁱⁱ.

2. RESULTS FROM OBSERVATIONS AND ANALYSIS

The pulished and unpublished results all shows the total ozone concentration was changing during last 20 years.

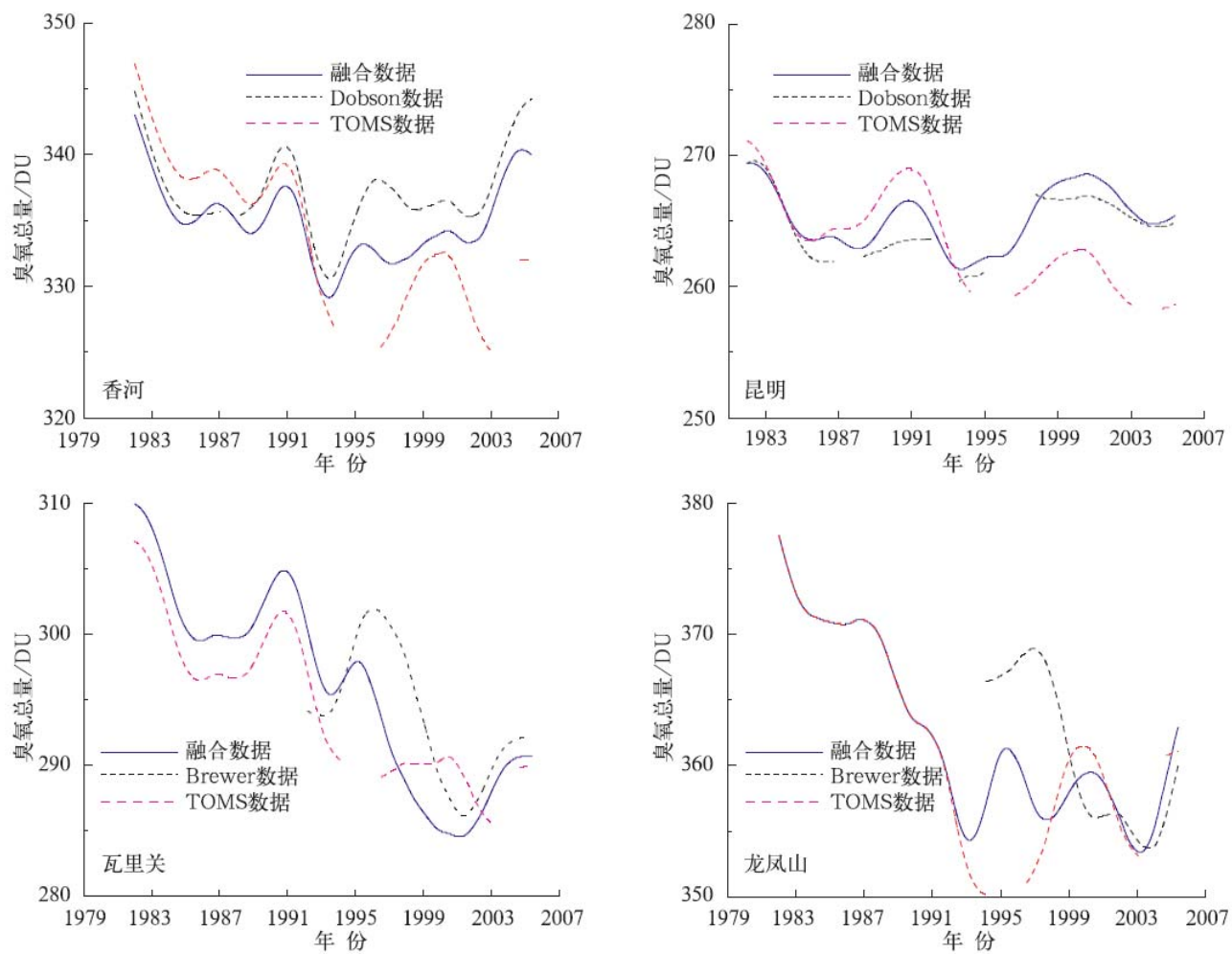


Fig. 1 The total ozone trends since 1978 from 3 kinds data sets: ground based, TOMS and integrated of ground based and TOMS observation

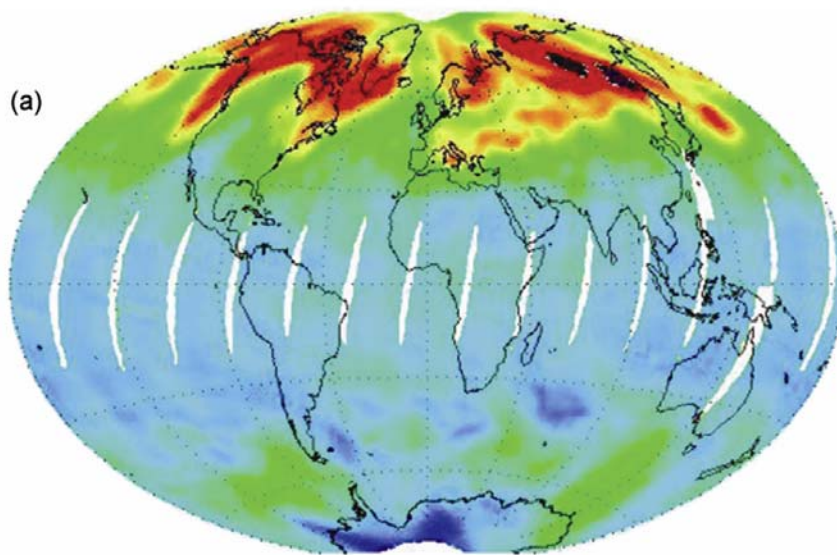


Fig. 2 Global total column ozone distribution of March 21, 2009, monitored by S FY-3A/TOU

3. THEORY, MODELLING, AND OTHER RESEARCH

School of Earth and Space Science, University of Science and Technology of China and other research organizations, have done some research on the vertical distributions and variation characters of ozone over the Iranian Plateau and Tibetan Plateau by using the FY-3, TOMS, HALOE and SAGE II data.^{iv}

4. DISSEMINATION OF RESULTS

4.1 Data reporting

The data from the current ozone and UVB observation net in China are reported to WOUDC routinely.

4.2 Information to the public

- The National Meteorological Service has included UV-Index in the public weather forecasts and reports.
- Relevant information can be seen on the China Meteorological Data Sharing Service System, <http://cdc.cma.gov.cn/>.

4.3 Relevant scientific papers

Zheng Xiangdong. Investigation on effect of cloud on the precision of total ozone from satellite measurements over China regions. *Chinese Journal of Atmospheric Sciences*. 2008, 32(6): 1431-1444

Zheng Xiangdong and Wei Xiaoli. Long-term Total ozone comparisons between space-based and ground-based observations at 4 sites in China. *Journal of Applied Meteorological Science*. 2010, 21(1): 1-10

Wang W H, Zhang X Y, An X Q, et al. Analysis for retrieval and validation results of FY-3 Total Ozone Unit(TOU). *Chinese Sci Bull*, 2010, 55, doi:10.1007/s11434-010-3240-2

Huang F X, Liu N Q, Zhao M X, et al. Vertical ozone profiles deduced from measurements of SBUS on FY-3 satellite. *Chinese Sci Bull*, 2009, 54, doi: 10.1007/s11434-009-0251-y

5. PROJECTS AND COLLABORATION

Table 1 List of recent projects supported by the National Science Foundation of China (NSFC) and other funds

No.	Project	Institution	Period of the project
40775024/D0503	Quantitative Evaluation on accuracy of retrieval method for ozone vertical profiles based on the satellite measurement	National Satellite Meteorological Center	2008.1 – 2010.12
GYHY(QX)200706038	Travelling standards of the calibration system of Brewer ozone spectrophotometers in CMA	Chinese Academy of Meteorological Sciences	2008-2010

	UVB spectral irradiance measurements	Chinese Academy of Meteorological Sciences	2004-2006
--	--------------------------------------	--	-----------

6. FUTURE PLANS

The current monitoring networks are to be maintained in operation. However, there is no special plan or project for building new capacities to conduct ozone or UV radiation, some projects, such as projects focusing on climate change, may include instruments installation and research related to ozone and UV.

7. NEEDS AND RECOMMENDATIONS

Much work needs to be carried out to understand many aspects of the ozone evolution and change, including impact of HCFCs, ozone-climate relationships, UV relationships, etc.. The international cooperation and assists for improvement the research level and quality are appreciated.

ⁱ Wang W H, Zhang X Y, An X Q, et al. Analysis for retrieval and validation results of FY-3 Total Ozone Unit(TOU). *Chinese Sci Bull*, 2010, 55, doi:10.1007/s11434-010-3240-2

ⁱⁱ Huang F X, Liu N Q, Zhao M X, et al. Vertical ozone profiles deduced from measurements of SBUS on FY-3 satellite. *Chinese Sci Bull*, 2009, 54, doi: 10.1007/s11434-009-0251-y

ⁱⁱⁱ Zheng Xiangdong and Wei Xiaoli. Long-term Total ozone comparisons between space-based and ground-based observations at 4 sites in China. *Journal of Applied Meteorological Science*. 2010, 21(1): 1-10

^{iv} ZHOU Renjun, CHEN Yuejuan. Ozone Variations over the Tibetan and Iranian Plateaus and Their Relationship with the South Asia High. *Journal of University of Science and Technology of China*, 35(6): 899-908, 2005.