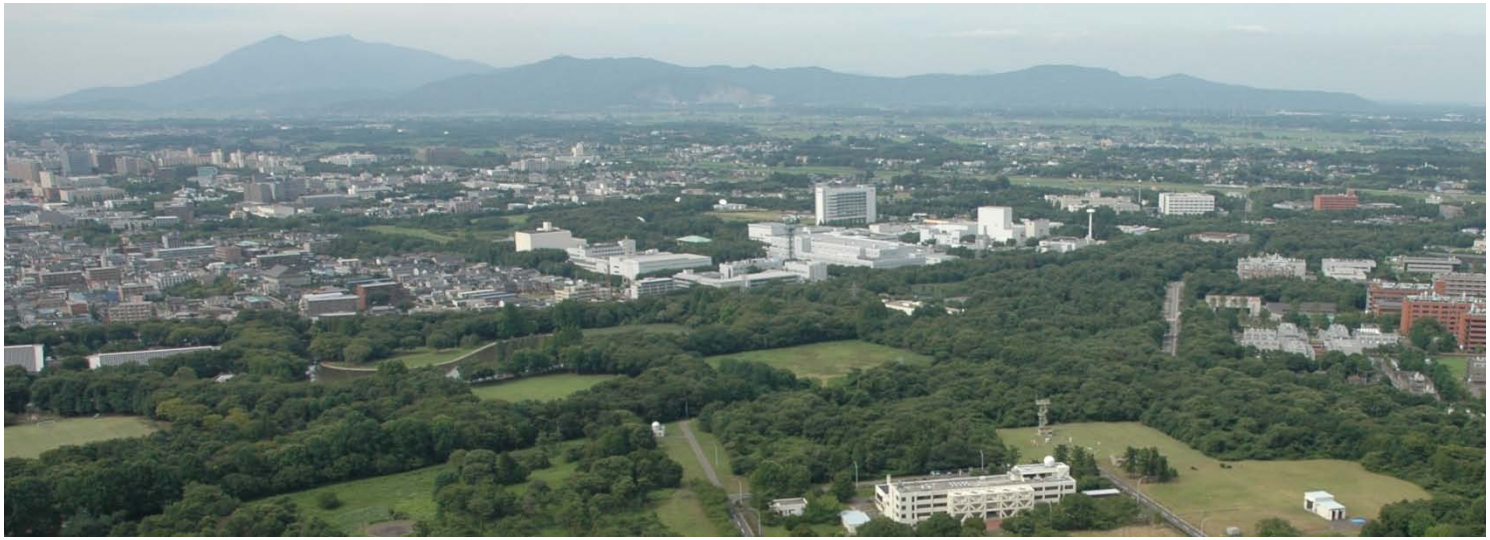
UPPER-AIR OBSERVATION AT TATENO (AEROLOGICAL OBSERVATORY) JMA

Hiroatsu MAKI
Director of Aerological Obserbatory JMA

AEROLOGICAL OBSERVATORY　JMA

- founded in 1920 at Tateno
- Now, Tsukuba is a New city for research and education
- Tateno is a part of Tskuba-city



WIKIPEDIA
The Free Encyclopedia

Article Discussion Read

Jet stream

From Wikipedia, the free encyclopedia

Discovery [edit]

Weather watchers following the 1883 eruption of the Krakatoa volcano tracked and mapped the effects on the sky over a period of years. They labeled the phenomenon the "equatorial smoke stream."[3][4] In the 1920s, a Japanese meteorologist Wasaburo Ooishi[5] detected the jet stream from a site near Mount Fuji. He tracked pilot balloons, also known as pibals (balloons used to determine upper level winds),[6] as they rose into the atmosphere. Ooishi's work largely went unnoticed outside of Japan. American pilot Wiley Post, the first man to fly around the world solo in 1933, is often given some credit for discovery of jet streams. Post invented a pressurized suit that let him fly above 6,200 metres (20,300 ft). In the year before his death, Post made several

13年12月2日10時7分飛揚 —90

分	高サ	方位	度高	水平距離		
0	0	—	—	0		
1	264	195.7	27.9	1059	19.8	132
2	707	201.9	42.6	1068	33.6	134
3	1050	199.1	58.0	1117	44.0	140
4	1373	171.3	49.3	1410	44.3	176
5	1684	189.3	54.0	1688	45.0	211
6	2015	191.0	41.6	2199	42.6	275
7	2364	192.7	42.9	3048	37.9	351
8	2622	116.2	42.9	4026	33.8	401

觀測地 Z

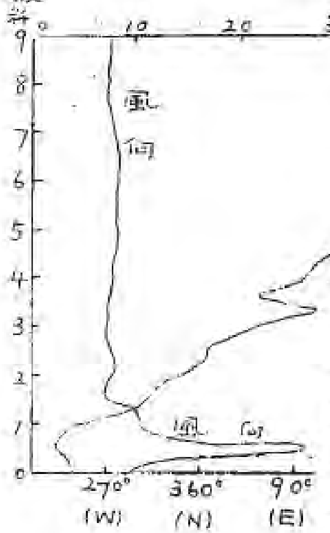
海拔	風向	風速
214	317	3.8
561	100	2.4
904	304	3.4
1237	302	9.8
1554	272	11.1
1875	271	12.0
2215	282	16.4
2543	277	16.8
2860	272	20.4

觀測者 觀球 高度 方位 時 記錄: 高橋 [illegible]

經緯儀: Bosch

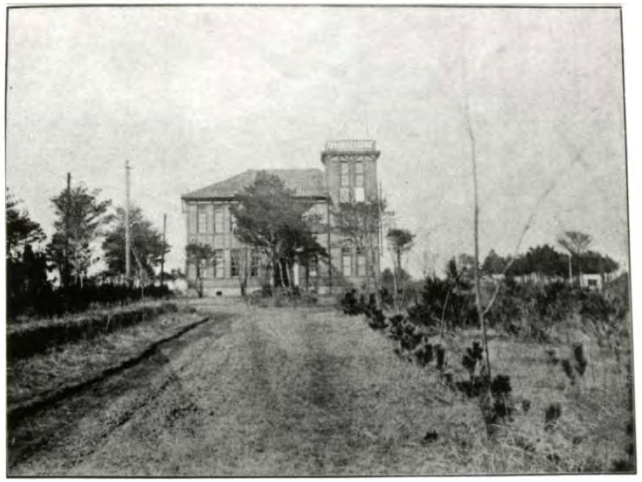
氣球: 重サ / 浮力 / 昇騰速度 / 種類

(III) 大正十三年十二月二日十時舘野ニ於ケル
風向風速垂直的配布ノ圖



本州中部内陸ニ於
ケル高氣壓ノ影響ヲ受ケ
テ地面近クニアリテハ北西ノ風吹ケドモ海
抜500米ニテハ既ニ東風ニ変ゼリ然レドモ此日オホー
ツク海ニ728粍ノ低氣壓アリ為メニ海抜900米ニ
アリテハ再ビ北西風ニ轉ゼリ是レヨリ高キニ上ルニ從ヒ大氣一般
循環ノ氣流ニ合シ海抜1.5粁以上ニアリテハ殆ンド全ク一定
不變ノ西風ヲ觀測セリ風力ハ海抜1粁以下ニアリテハ微弱ニシテ
風速僅カニ4米/秒ニ過ギズト雖モ其レヨリ以上ハ急ニ速度ヲ増シ其
ノ割合高サ一粁ニ付約7米/秒ナリ尚ホ海抜7粁以上ニ至レバ
高サ一粁ニ付風速約15米/秒ノ割合ヲ以テ之ヲ劇増スルヲ見ル
而シテ海抜9粁ニアリテハ實ニ72米/秒ノ大速度ヲ顯ハスニ至レリ

2 December 1924



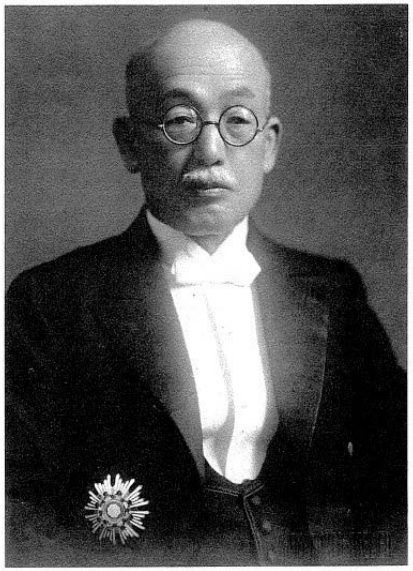
main building

tethered balloon

pilot balloon and theodolite, on a base

theodolite

monument commemorating the early measurement of strong westerlies



Mr. Wasabro OOISHI
Founder of Aerologocal Observatory

An Esperantist

Lewis,J.M.(2001):Oishi's Observation: Viewed in the context of Jet Stream Discovery, Bulletin of American Meteorological Society Vol.84, No.3, 357-369

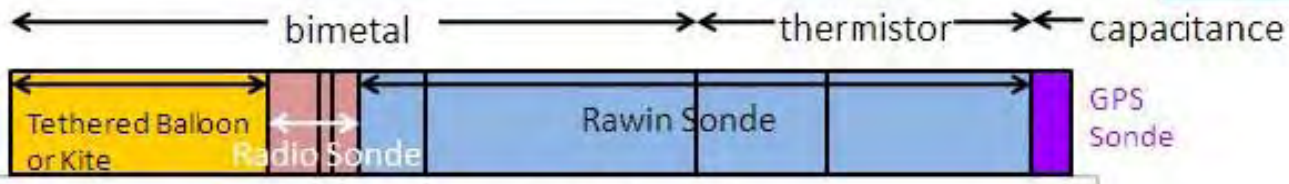
WORLD METEOROLOGICAL ORGANIZATION

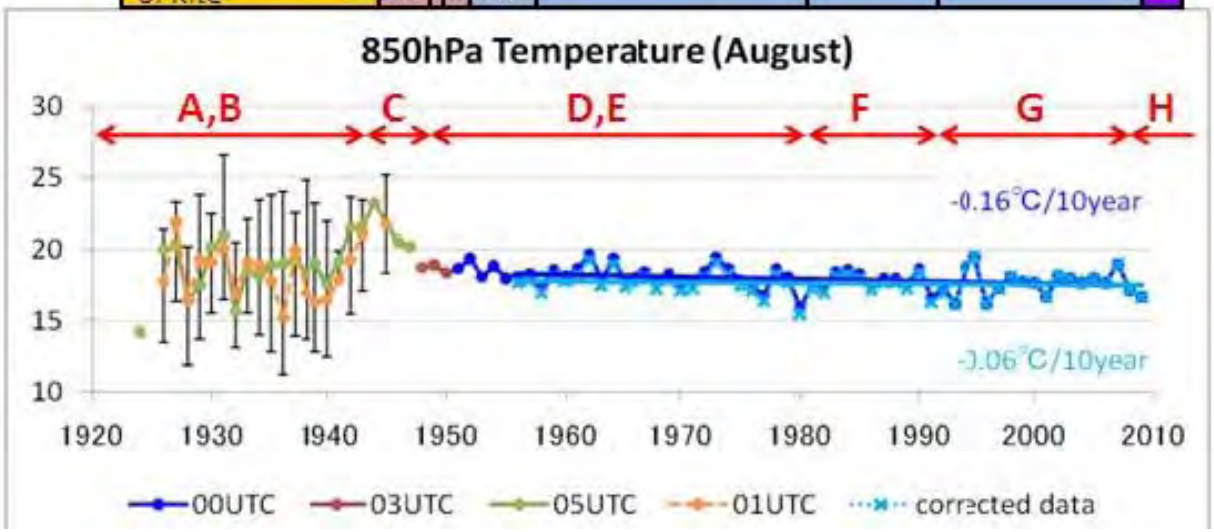
INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION

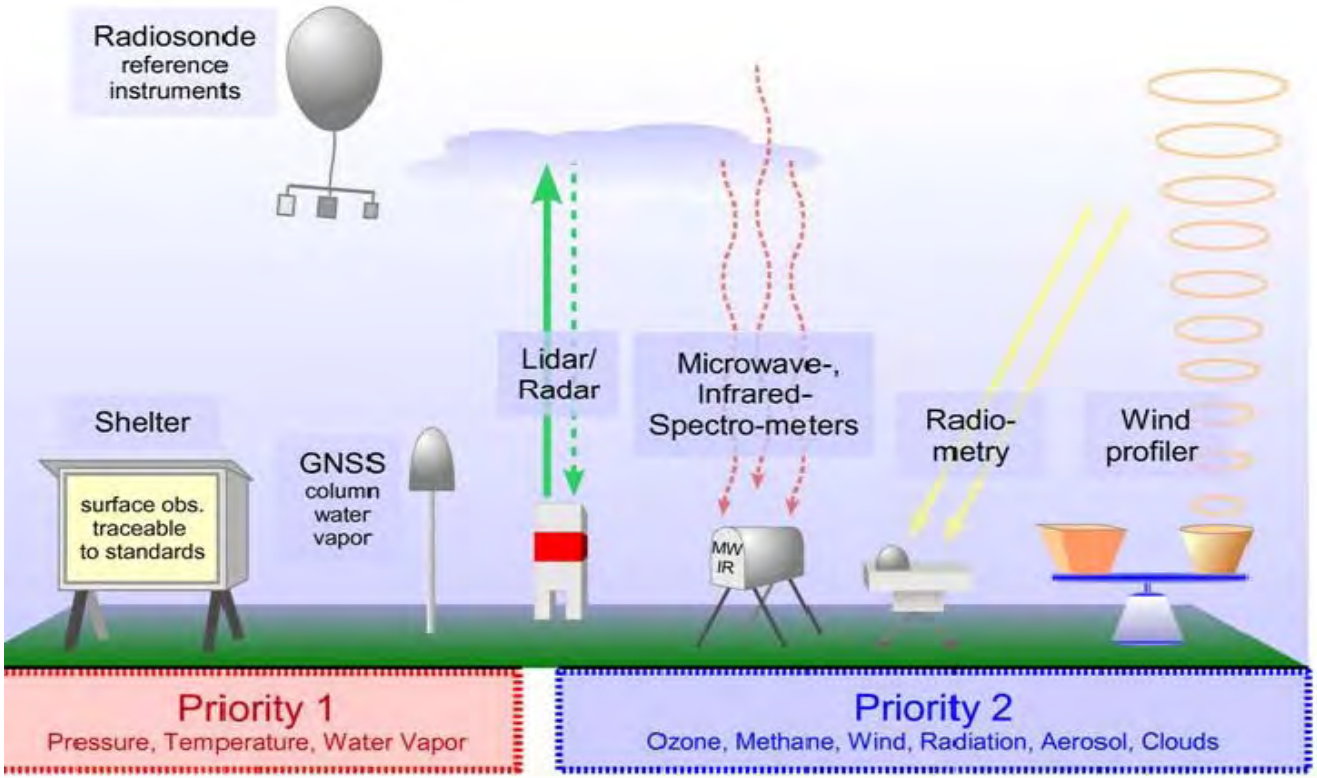
Report of the Second GCOS Reference Upper Air Network Implementation and Coordination Meeting (GRUAN ICM-2)

GCOS - 140
(WMO/TD No. 1526)


A
B
C
D
E
F
G
H


bimetal
thermistor
capacitance
Tethered Balloon or Kite
Radio Sonde
Rawin Sonde
GPS Sonde


850hPa Temperature (August)
A,B
C
D,E
F
G
H
30
25
20
15
10
-0.16°C/10year
-0.06°C/10year
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
00UTC
03UTC
05UTC
01UTC
corrected data



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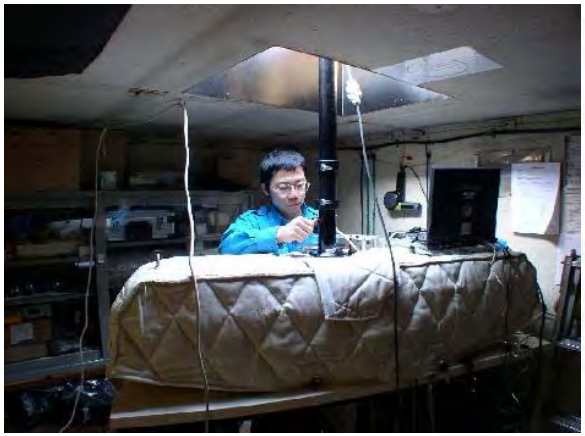
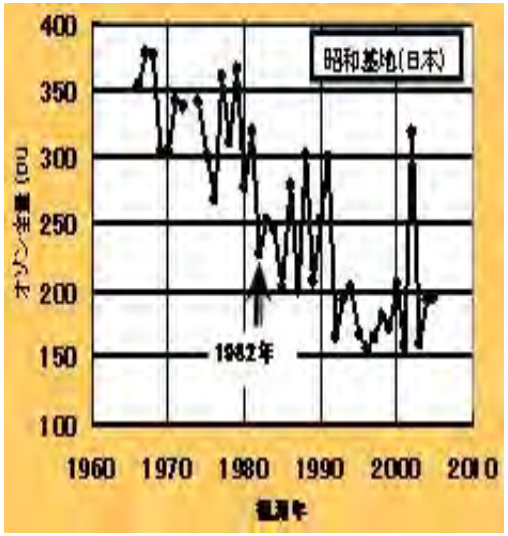
Data Server

GPS Precipitation Water Vapor

Doppler Lider

Contribution for the discovery of Ozone Deplation





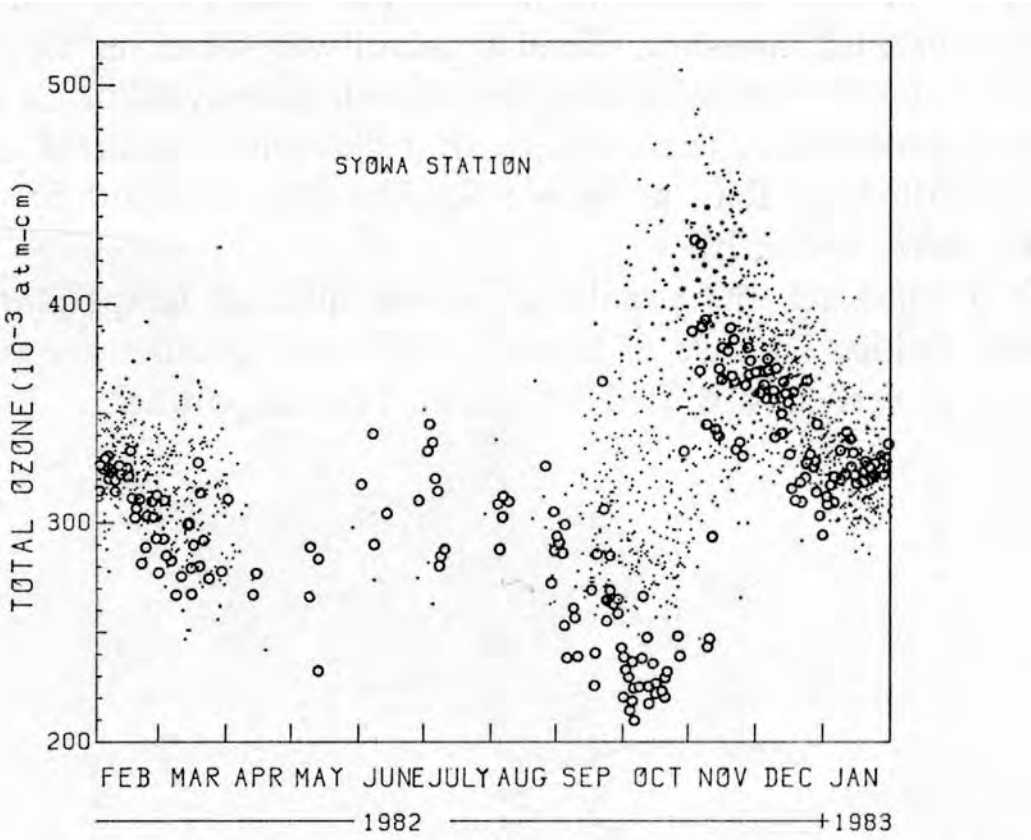
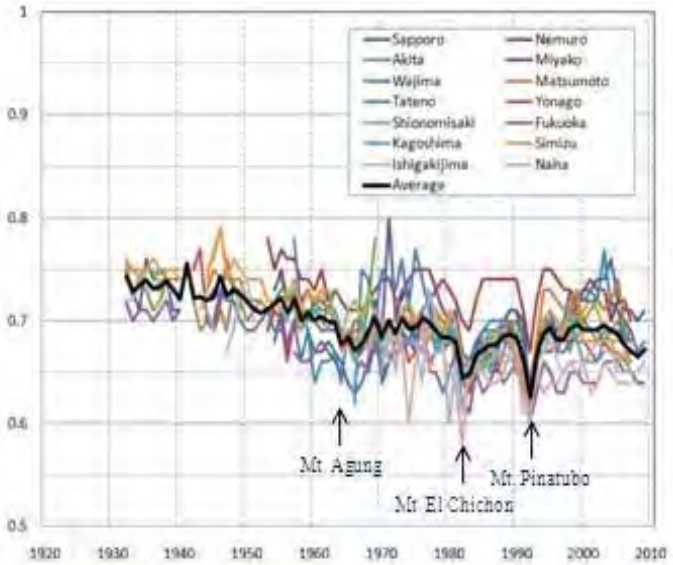


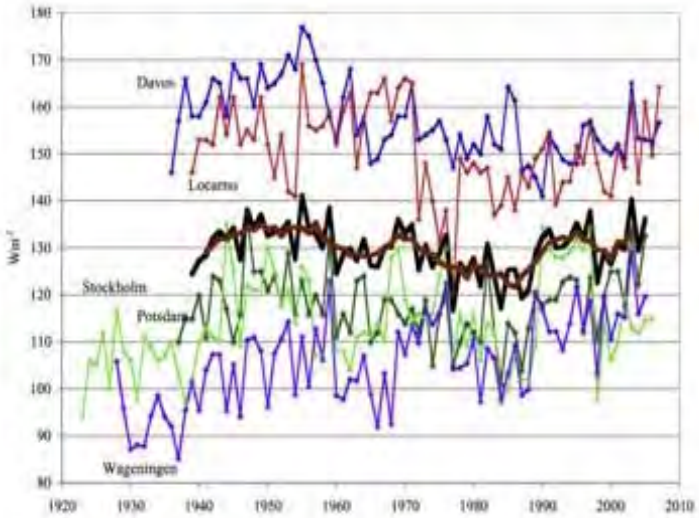
Fig. 4. Total ozone observed at Syowa Station from 1966 to 1980 (●) and from February 1982 to January 1983 (○).

Chubachi, S. Mem. Natl. Inst. Pol. Res. Spec. Iss. 34, 13-19(1984)

Contribution for BSRN(Baseline Surface Radiation Network)



Annual mean direct solar transmittance (unitless) for 14 sites in Japan from 1932. The average for all the sites is also plotted.



Annual mean global solar irradiance (in W/m^2) for five sites in western Europe, where the observations lasted for more than 60 years (A. Ohmura, 2009).

Ohmura, A. (2009), Observed decadal variations in surface solar radiation and their causes, J. Geophys. Res., 114, D00D05, doi:10.1029/2008JD011290.

Development of New Technologies for Dobson Ozone Spectrophotometers

1920's — Gordon Dobson developed Spectrophotometer

1950's — Global network of Dobson spectrophotometers established during IGY

1980's — Measures low ozone over Syowa, Antarctica. Shigeru Chubachi (MRI) discover springtime Antarctic ozone hole

1990's — Phase-out of CFC production. Abnormally low ozone observed globally

2010's — Possible recovery detected?

1930's – 1980's
Dobson ozone observation is operated manually

All the measurement operations are performed manually.

1990's
The first domestic version of automated Dobson in the DOS environment was developed.

2000's
The automation of the international version which advanced most was developed.

2006

2009

2010

Ozone automation observation system for Dobson ozone spectrophotometers

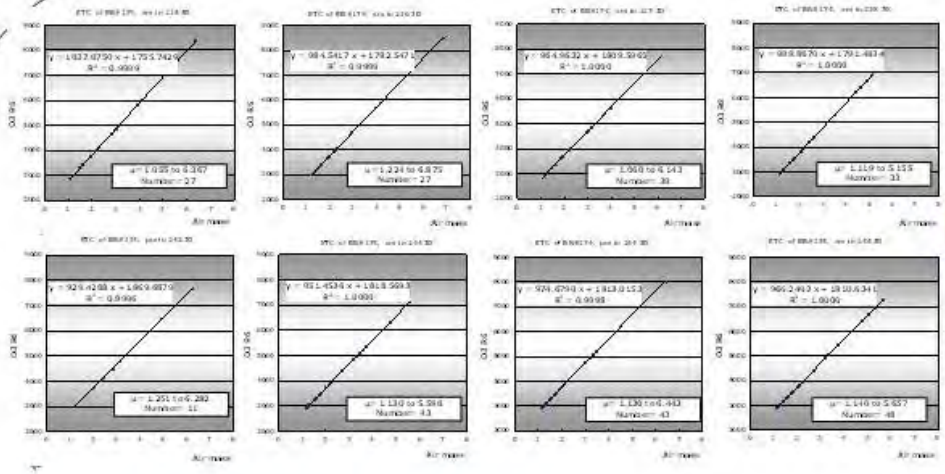
- ✓Commission for Atmospheric Sciences (CAS) recommended that this work be continued so that more stations could take more frequent measurements.
- ✓CAS appreciated the JMA's contribution of GUI-based DOBSON processing software.
- ✓We continue the collaboration between NOAA for development of automation system.

2010, next project

- Melbourne, Australian
- US network
- South America
- Other regional networks

Ozone and Radiation Division, Aerological Observatory

Research for Absolute Calibration Site at Mt. Norikura



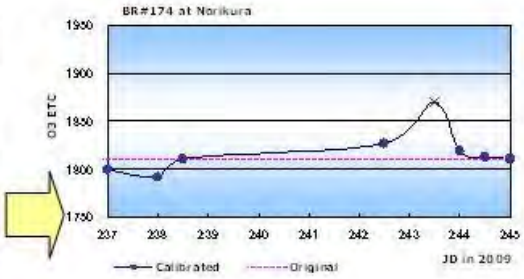


Fig.1 ETC for O3 observation by absolute calibration with BR#174 at Norikura.
Left figures: Example of ETC with BR#174
Upper figure: Trend of ETC of BR#174.

Photo.1 Observation site (upper) and Brewer spectrophotometers (right), BR#113 (left) and BR#174 (right), at Norikura observatory, ICRR. Univ. of Tokyo.

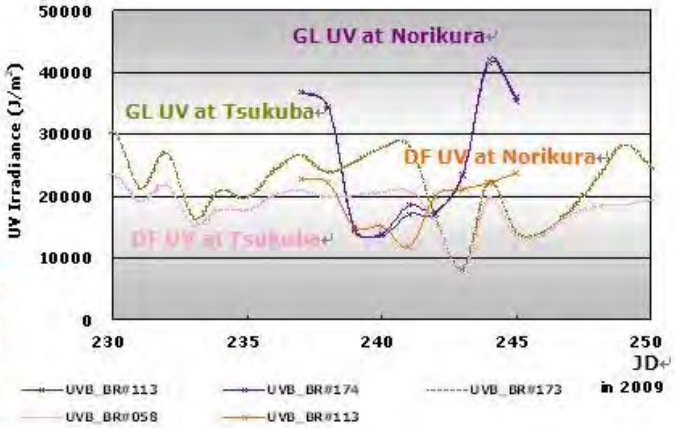


Fig.2 GL (Global UV) and DF (diffuse UV) with BR#174 and BR#113 at Norikura and with BR#173 at Tsukuba.

- contribution for improvements of pyrgeometer calibration within the frame work of WMO.

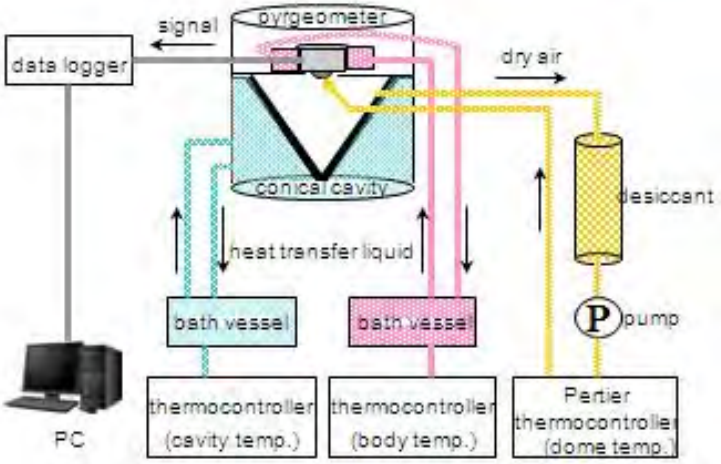
Performance of JMA's Black body (BB) cavity

Comparisons of mean difference from reference longwave radiation by class of pyrgeometer body temperature.

Temp. class (deg.C)	difference without BB calibration (W/m^2)	difference with BB calibration (W/m^2)
0 - 10	-0.58	0.13
10 - 20	0.02	-0.06
20 - 30	0.40	-0.30

Comparisons of pyrgeometer calibration coefficients by WMO/World Radiation Center(WRC) with those by JMA.

Coefficient	WRC (Dec. 2006)	JMA (Jun. 2004)	JMA (Jan. 2007)
C	3.91	3.9647	3.9328
k_1	0.01	0.0146	0.0143
k_2	1.0024	1.0025	1.0028
k_3	3.2	2.8752	2.9012



Picture and schematic figure of JMA's BB cavity

Automatic Ozonesonde Pump Flow Efficiency Measurement System

- The pump flow efficiency is individually measured in the observatory before pre-flight preparation
- This system measures pump efficiency from surface pressure to 3hPa by program control automatically (About 4 hours required)
- The program does a regression analysis of a result and calculates a coefficient for approximate equation

$$PCF(p) = \left(1 - c_0 \left(\frac{1}{p} - \frac{1}{p_0}\right)^{c_1}\right.$$

Aerological Observatory Technical Tour Map
(29 Jul 2010)