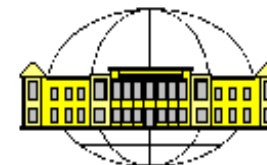


# World Radiation Data Center

***2012: - 48 Years of Activity under BMO***



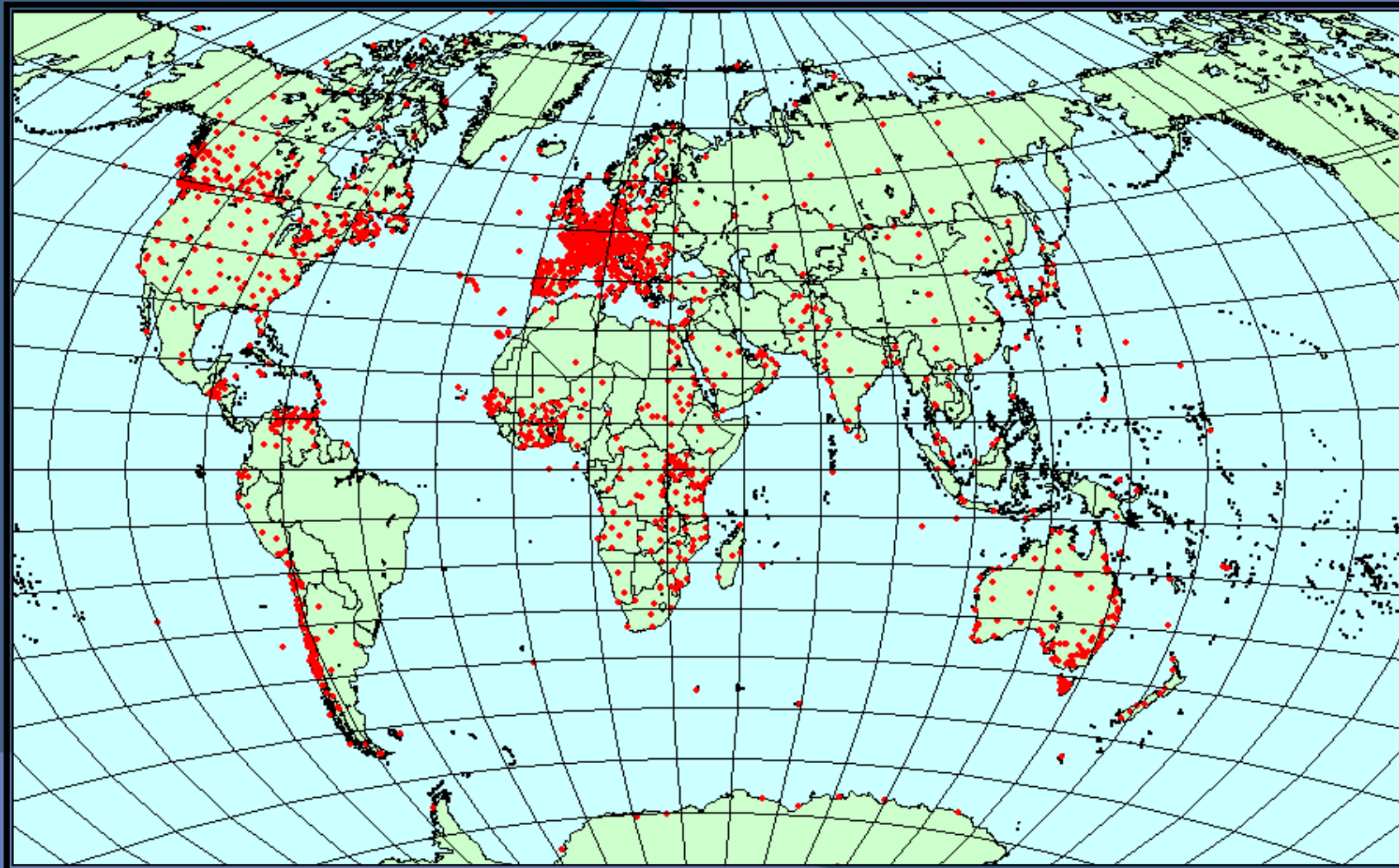
Main Geophysical  
Observatory.  
Founded in 1849



# Status Report from WRDC

*Anatoly Tsvetkov*  
***Voeikov Main Geophysical Observatory***  
***St. Petersburg***

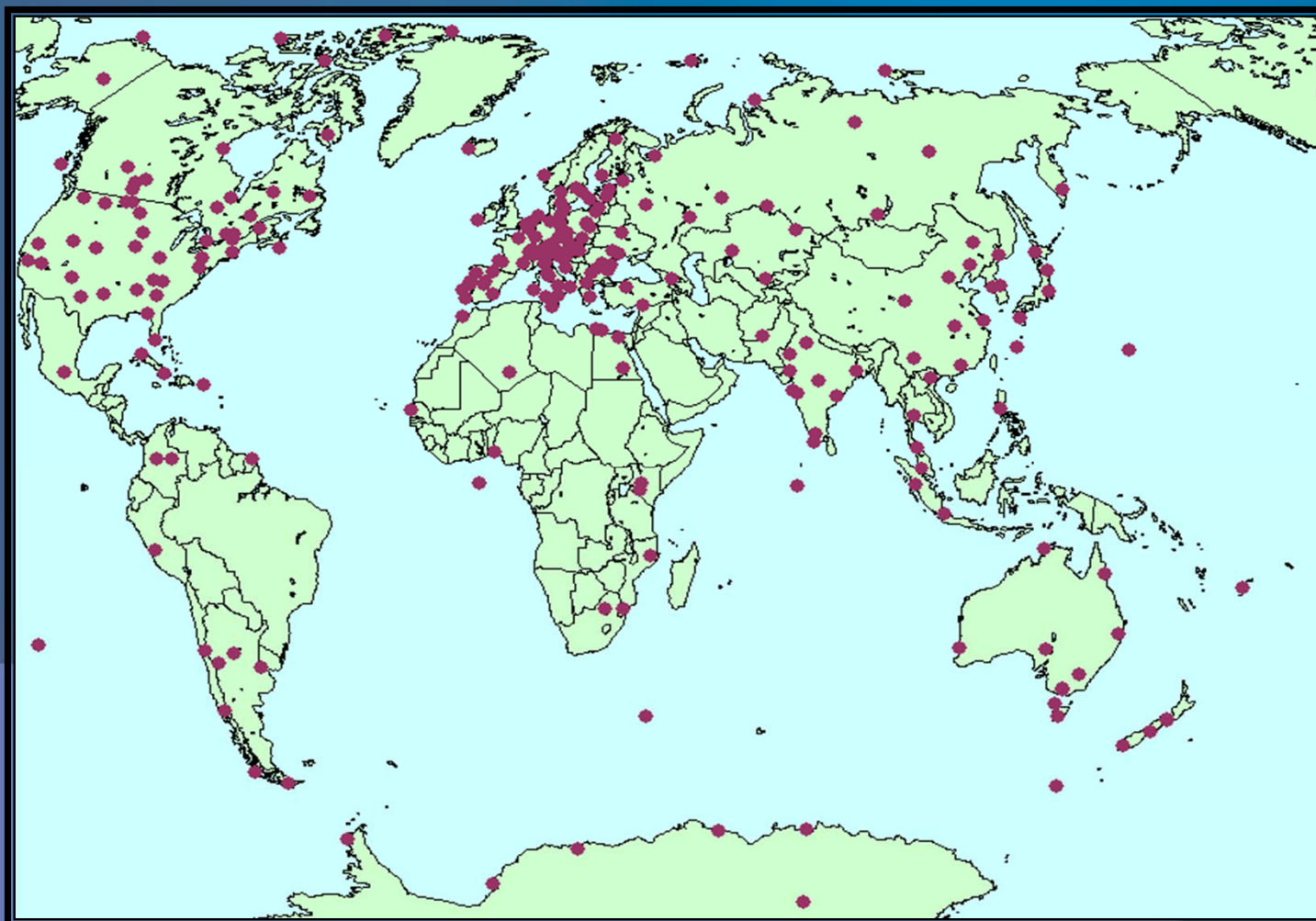
Meeting of the ET GAW WDC Managers,  
At WMO, Geneva, Switzerland,  
22-25 May 2012



Radiometry Stations at WRDC Data Archive: 1964 - 2011.



## Stations GAW with Data in WRDC Archive and on the Site





## Main Page of WRDC Site

Wrdc - Microsoft Internet Explorer

Файл Правка Вид Переход Избранное Справка

Назад Вперед Остановить Обновить Домой Поиск Избранное Журнал Каналы Во весь экран Почта

Адрес <http://wrdc.mgo.rssi.ru/wrdccgi/protect.exe?wrdc/wrdc.htm>

Ссылки Microsoft Windows Update Бесплатная почта HotMail Знакомство с Интернетом Лучшая страница Настройка cc

**Welcome to WRDC database!**

**S-W PACIFIC**  
**SINGAPORE**  
SINGAPORE / CHG

- Year 1994**
- Year 1995
- Year 1996
- Year 1997
- Year 1998
- Year 1999
- Year 2000
- Year 2001
- Year 2002

Station SINGAPORE / CHANGI ARPT

WMO	48698	Elevation	5 m
Longitude	103 59'E	Latitude	1 22'N

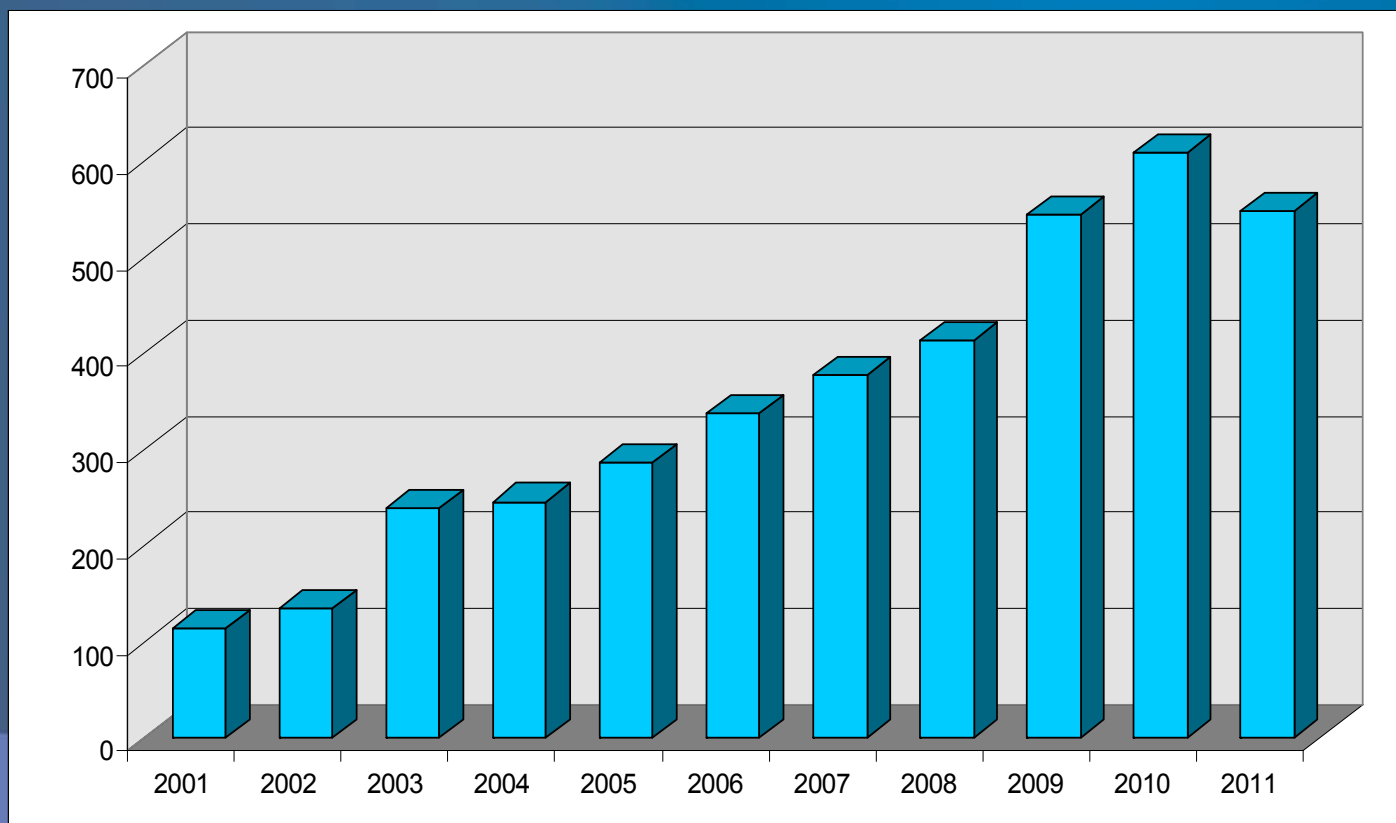
Show non-active

Пуск | miroVIDEO DRX Co... | WRDC - Microsoft I... | Wrdc - Microsof... | En 16:01

WRDC Site address: <http://wrdc.mgo.rssi.ru>



## WRDC Users since 2001 - 3840





# Quality Checks at the WRDC

- *Physically meaningful limits*
- *Follow up Control according to WRDC procedures applied to daily and monthly totals*
- *Checks of calculated and actual totals*
- *Checks of hourly and daily values in the within setup ranges*
- *Control of exceedings above TOA values*
- *Control of values higher than those of probabilistic and climatological levels*
- *Control of correlation: data of neighbour sites*
- *Homogeneity Analysis (HA)*
- *Build up of Metadata for 1500 Stations from paper archive*



## GCOS Climate monitoring principles:

*“The details and history of local conditions, instruments, operating procedures, data processing algorithms and other factors pertinent to interpreting data (i.e. metadata) should be documented and treated with the same care as the data themselves.” (WMO 2002).*





## Tasks formulated for Toronto 2010:

- *Formation of WRDC Metadata Database (MDB);*
- *Upload of MDB to the WRDC Server;*
- *Update Interface helpful to download the WRDC data.*



## Table of Metadata according the WMO recommendations



<b>CATEGORY</b>	<b>METADATA TYPE</b>
<b>STATION IDENTIFIERS</b>	<b>Local Code</b> <b>WMO Code</b> <b>Name and aliases</b> <b>Active/Closed</b> <b>Beginning/End Date</b>
<b>GEOGRAPHICAL DATA</b>	<b>Latitude</b> <b>Longitude</b> <b>Elevation</b> <b>Dates of relocation</b>
<b>LOCAL ENVIRONMENT</b>	<b>Local land use/land cover</b> <b>Instruments exposure</b> <b>Skyline diagrams</b>
<b>STATION INSTRUMENTATION AND MAINTENANCE</b>	<b>Instrument Sheltering and Mounting</b> <b>Type of recording</b> <b>Calibration results</b> <b>Special Maintenance/Faults</b>
<b>DATA PROCESSING</b>	<b>Units</b> <b>Special codes</b> <b>Algorithms</b> <b>Calculations</b> <b>QC applied? (yes/no)</b> <b>Homogenization applied? (yes/no)</b>
<b>HISTORICAL EVENTS</b>	<b>Changes in the social, political and institutional environment</b>



# Метаданные: XML, HTML файлы МЦРД

Сafari Document  
Изменен: 17-01-2012 15:57  
Размер: 265 байт

afghanistan	hungary	saint-pierre_and_miquelon	colombia.html	maldives.html	ukraine.html
algeria	iceland	san_tome_and_prinsipe	cote_d_ivoire.html	mali.html	united_kingdom.html
angola	india	saudi_arabia	country_index.html	malta.html	usa.html
argentina	indonesia	senegal	croatia.html	marshall_isls.html	uzbekistan.html
australia	ireland	singapore	cuba.html	martinique.html	venezuela.html
austria	israel	slovakia	czech_republic.html	mexico.html	viet_nam.html
azores	italy	spain	denmark.html	moldova.html	wake_is.html
bangladesh	jamaica	sri_lanka	djibouti.html	netherlands.html	yugoslavia.html
barbados	japan	sweden	dprk.html	new_caledonia.html	zaire.html
belgium	johnston_is	switzerland	east_timor.html	new_zealand.html	zambia.html
benin	kazakhstan	syria	ecuador.html	niger.html	zimbabwe.html
brunei	kenya	egypt.html	egypt.html	nigeria.html	
bulgaria	latvia	el_salvador.html	el_salvador.html	norway.html	
burkina_faso	lebanon	estonia.html	estonia.html	oman.html	
canada	lithuania	ethiopia.html	ethiopia.html	pakistan.html	
canton_is	macao	falkland_isls.html	falkland_isls.html	papua_new_guinea.html	
cape_verde	madagascar	fiji.html	fiji.html	peru.html	
car	mali	finland.html	finland.html	philippines.html	
chile	maldives	france.html	france.html	poland.html	
china	malta	gambia.html	gambia.html	portugal.html	
colombia	marshall_isls	georgia.html	georgia.html	puerto_rico.html	
cote_d_ivoire	martinique	ghana.html	ghana.html	republic_of_korea.html	
croatia	mexico	greece.html	greece.html	republic_of_yemen.html	
cuba	moldova	guadeloupe.html	guadeloupe.html	reunion.html	
czech_republic	mongolia	guam_is.html	guam_is.html	romania.html	
denmark	morocco	guiana.html	guiana.html	rsa.html	
djibouti	mozambique	guinea_bissau.html	guinea_bissau.html	russia.html	
dprk	namibia	hawaii_isls.html	hawaii_isls.html	saint_pierre_and_miquelon.html	
east_timor	netherlands	honduras.html	honduras.html	san_tome_and_prinsipe.html	
ecuador	new_caledonia	hong_kong.html	hong_kong.html	saudi_arabia.html	
egypt	new_zealand	hungary.html	hungary.html	senegal.html	
el_salvador	niger	iceland.html	iceland.html	singapore.html	
estonia	nigeria	india.html	india.html	slovakia.html	
ethiopia	norway	indonesia.html	indonesia.html	spain.html	
falkland_isls	oman	ireland.html	ireland.html	sri_lanka.html	
fiji	pakistan	israel.html	israel.html	sudan.html	
finland	papua_new_guinea	italy.html	italy.html	sweden.html	
france	peru	jamaica.html	jamaica.html	switzerland.html	
gambia	philippines	japan.html	japan.html	syria.html	
georgia	poland	johnston_is.html	johnston_is.html	tanzania.html	
germany	portugal	kazakhstan.html	kazakhstan.html	thailand.html	
ghana	puerto_rico	kenya.html	kenya.html	trinidad_and_tobago.html	
greece	republic_of_korea	latvia.html	latvia.html	tunisia.html	
guadeloupe	republic_of_yemen	lebanon.html	lebanon.html	turkey.html	
guam_is	reunion	lithuania.html	lithuania.html	uae.html	
guiana	romania	macao.html	macao.html	uganda.html	
guinea_bissau	rsa	madagascar.html	madagascar.html		
hawaii_isls	russia	madeira.html	madeira.html		
honduras		malaysia.html	malaysia.html		
hong_kong					

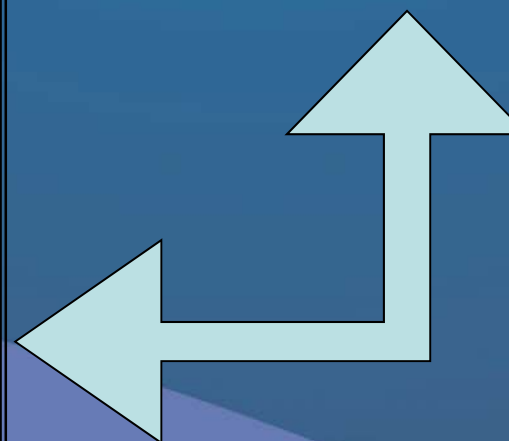


**MINAMITORISHIMA  
Instrumentation**

Element	Type of instrument	Start date of instrument
Global radiation	TT/MG/	
	TT	1974-03
	TT/EKO/	1987-03
	PREDE&KZ/CM3/	2002-02
Diffuse radiation	KZ/CMP22/	2010-04
Sunshine duration	SS/J/	
	SS/EKO/	1987-01
	SS/PREDE/	2002-02

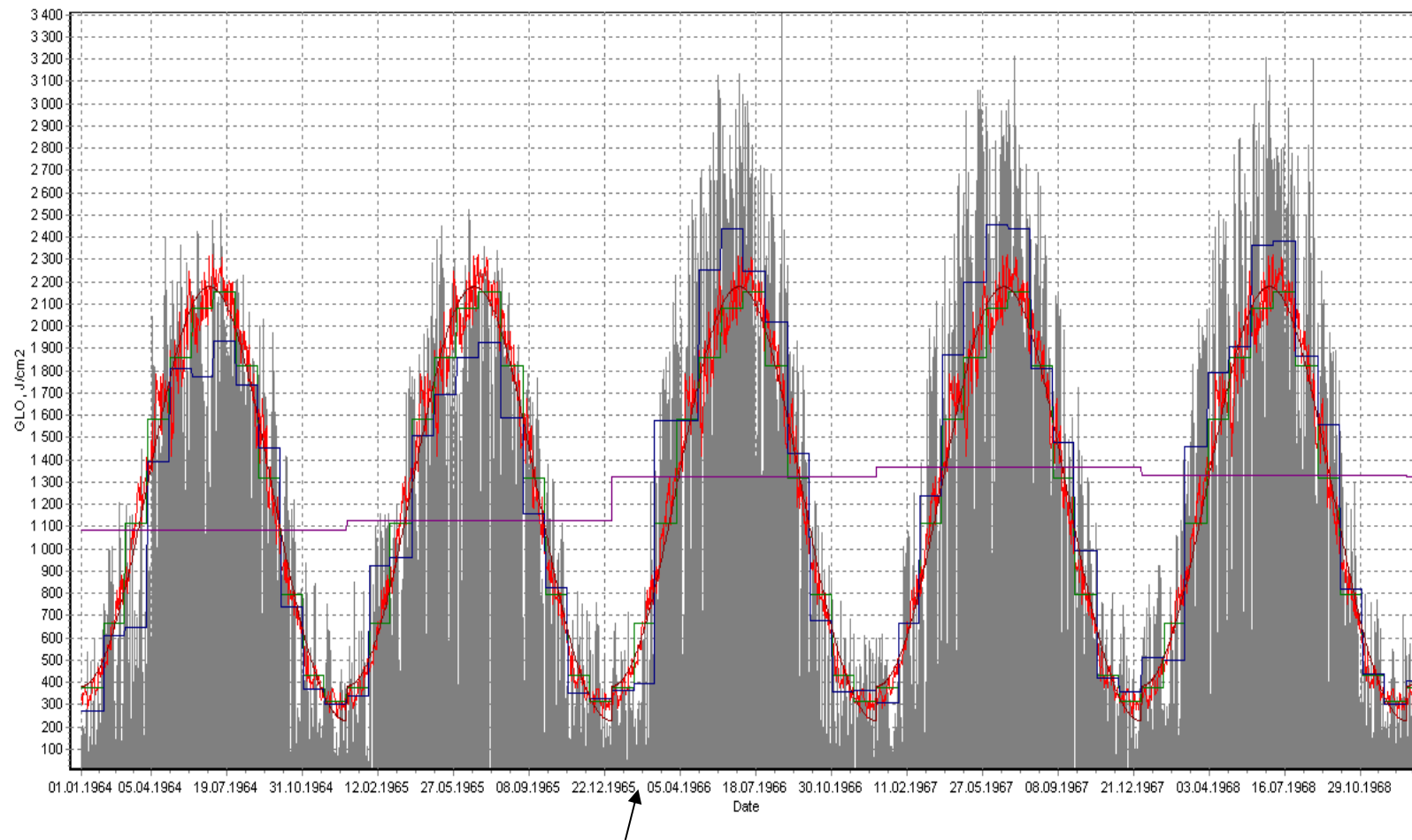
**STATION INFO**

Region	2 (Asia)
Country	<b>JAPAN</b>
Station	<b>MINAMITORISHIMA</b>
WMO Index	47991
Changes of WMO Index and (or) station and country names	-
Latitude	24°17'N
Longitude	153°59'E
Elevation	6 m
Station relocation	-
Elements	Global Radiation Diffuse Radiation Sunshine Duration
Instrumentation	<a href="#">Info</a>
Units	J/cm2
Scale	WRR
Time system	TST
Instrumentation relocation	-



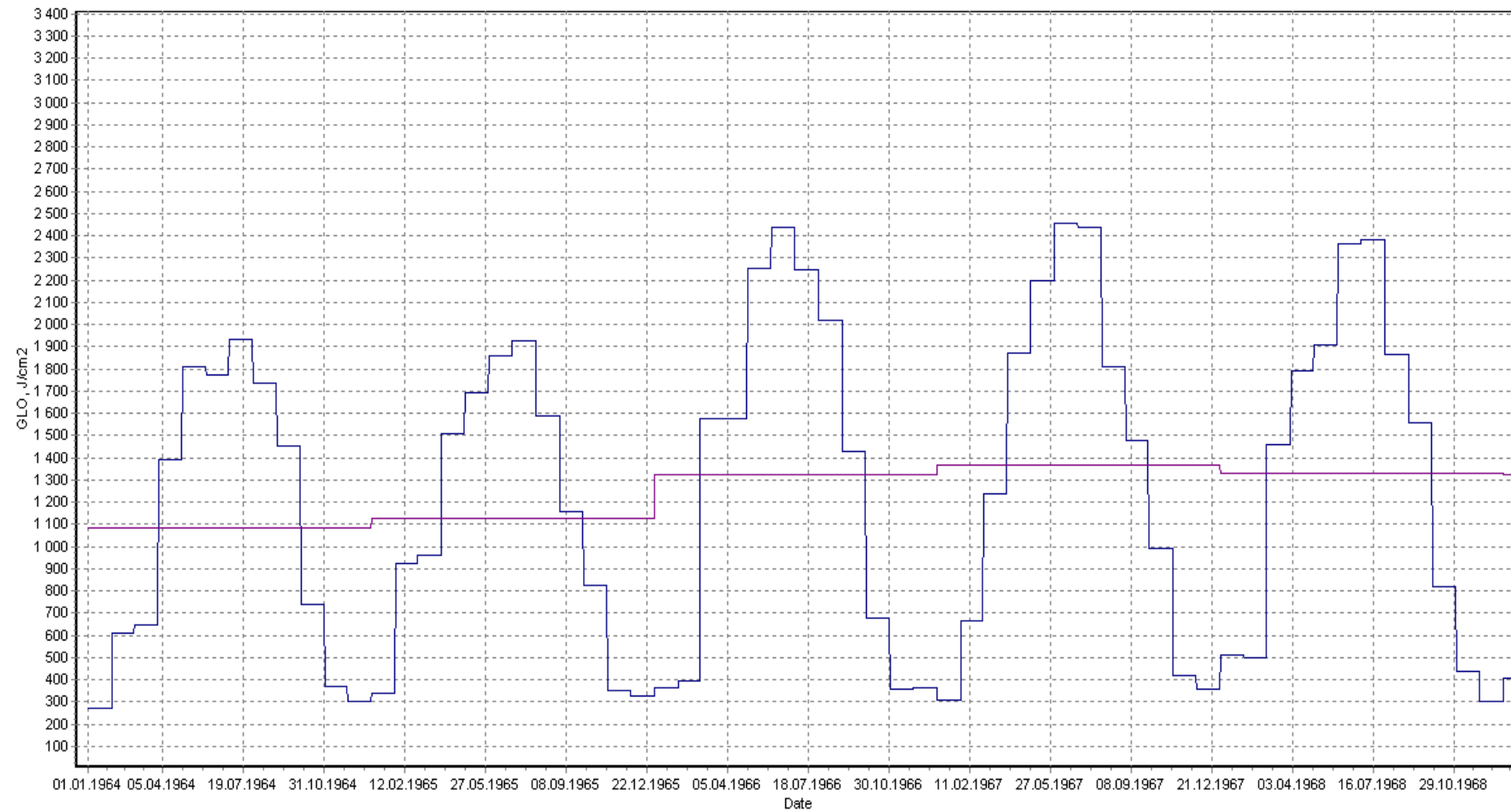
# Example

MILANO / LINATE (ITALY), 1964 - 2010  
Global Radiation



# Example

MILANO / LINATE (ITALY), 1964 - 2010  
Global Radiation





## Metadata in XML format. An Example

### STATION INFO

Region	6 (Europe)
Country	<b>ITALY</b>
Station	<b>MILANO / LINATE</b>
WMO Index	16080
Changes of WMO Index and (or) station and country names	-
Latitude	45°28'N
Longitude	9°17'E
Elevation	105 m
Station relocation	-
Elements	Global Radiation Sunshine Duration
Instrumentation	<a href="#">Info</a>
Units	J/cm2
Scale	WRR
Time system	TST
Instrumentation relocation	-

### MILANO / LINATE Instrumentation

Element	Type of instrument	Start date of instrument
Global radiation	TB/R/	
	TB/R/	1966-03-09
	TB/R/	1971-11-29
	KZ/CM11/	1990-07-01
Sunshine duration	SS/C/	





## BERGEN Instrumentation

Element	Type of instrument	Start date of instrument
Global radiation	TT/E/	
	PSP/E/	1982-01-01
	KZ/CM11/	1995-03-03
Diffuse radiation	KZ	
	PSP/E/	1982-01-01
	KZ/CM11/	1995-03-03
Direct radiation	NIP/E/	
Downwelling radiation	BT/S/	
	PIR/E/	1989-01-01
Sunshine duration	SS/C/	



## ZILANI Instrumentation

Element	Type of instrument	Start date of instrument
Global radiation	TT/M80/	
	TT/M115/	2000-01-01
Diffuse radiation	KZ/CM21/	2002-06-01
	TT/M115/	
Direct radiation	KZ/CM21/	2002-06-01
	AT/M/	
Reflected radiation	KZ/CH1/	2002-06-01
	TT/M80/	
Net radiation	KZ/CM21/	2002-06-01
	BT/M/	



Navigation icons: Home, Back, Forward, Stop, Refresh, Print, etc.

**AUSTRALIA**

Wagga Wagga AMO

[Daily data](#)

[Hourly data](#)

**AUSTRIA**

Sonnblick

[Daily data](#)

[Hourly data](#)

**AUSTRIA**

Wien / Hohe Warte

[Daily data](#)

[Hourly data](#)

**ESTONIA**

Tartu-Toravere

[Daily data](#)

[Hourly data](#)

[Skyline](#)

**GREECE**

Thessaloniki

[Daily data](#)

**Station Information:**

**Name:** Wien / Hohe Warte  
WMO index: 11035  
Latitude: 48.25 N  
Longitude: 16.35 W  
Elevation (m): 203  
Time: Local mean time, local time offset from GMT: +1.0

**Instrumentation:**  
Global Horizontal Q: Star pyranometer heated, manufacturer Schenk  
Diffuse horizontal D: Star pyranometer heated, manufacturer Schenk in combination with a radiation screen

**Contributor:**  
Wolfgang Lipa  
Climate and Weather Information  
ZAMG  
Hohe Warte 38  
A-1190 Vienna  
Austria

Daily and monthly averages in J/cm<sup>2</sup> are computed according to WRDC protocol (and subject to rejection by the flagging protocol):

- Daily total values are the total of each hourly irradiance for the day
- Monthly averages are the sum of the daily values divided by the number of days available
- Monthly totals are the monthly average multiplied by the number of calendar days in the month
- Monthly statistics for hourly intervals are the sum and average of the hourly interval for each day under a process similar to the monthly averages and totals above.

flag (F) = 0 (blank in the table) means that a value has good quality flag = 1 - questionable value flag = 2 - bad or missing value



## Reference

- 1. E. Aguilar, et al. GUIDELINES ON CLIMATE METADATA AND HOMOGENIZATION. WMO/TD No. 1186 World Meteorological Organization. 2003.***



*Thank you!*