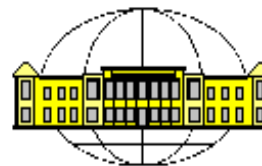


# World Radiation Data Center

*2019: - 55 Years of Activity under BMO*



**GLOBAL  
ATMOSPHERE  
WATCH**



Main Geophysical  
Observatory.  
Founded in 1849

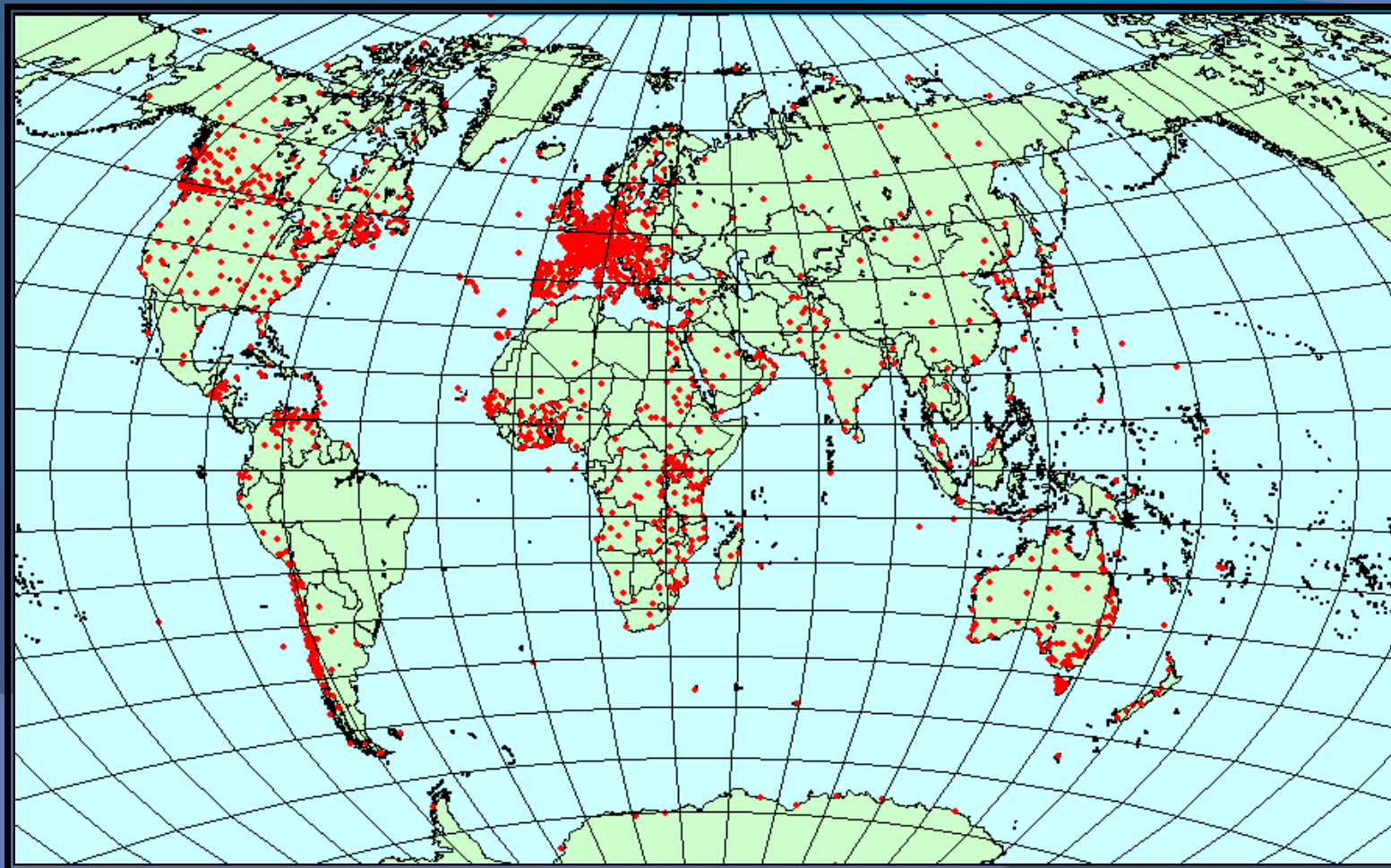
# GAW Data at WRDC. Current Activity

Anatoly Tsvetkov  
WRDC

prepared for ET-WDC GAW Meeting, NASA Langley 1 – 3 October 2019



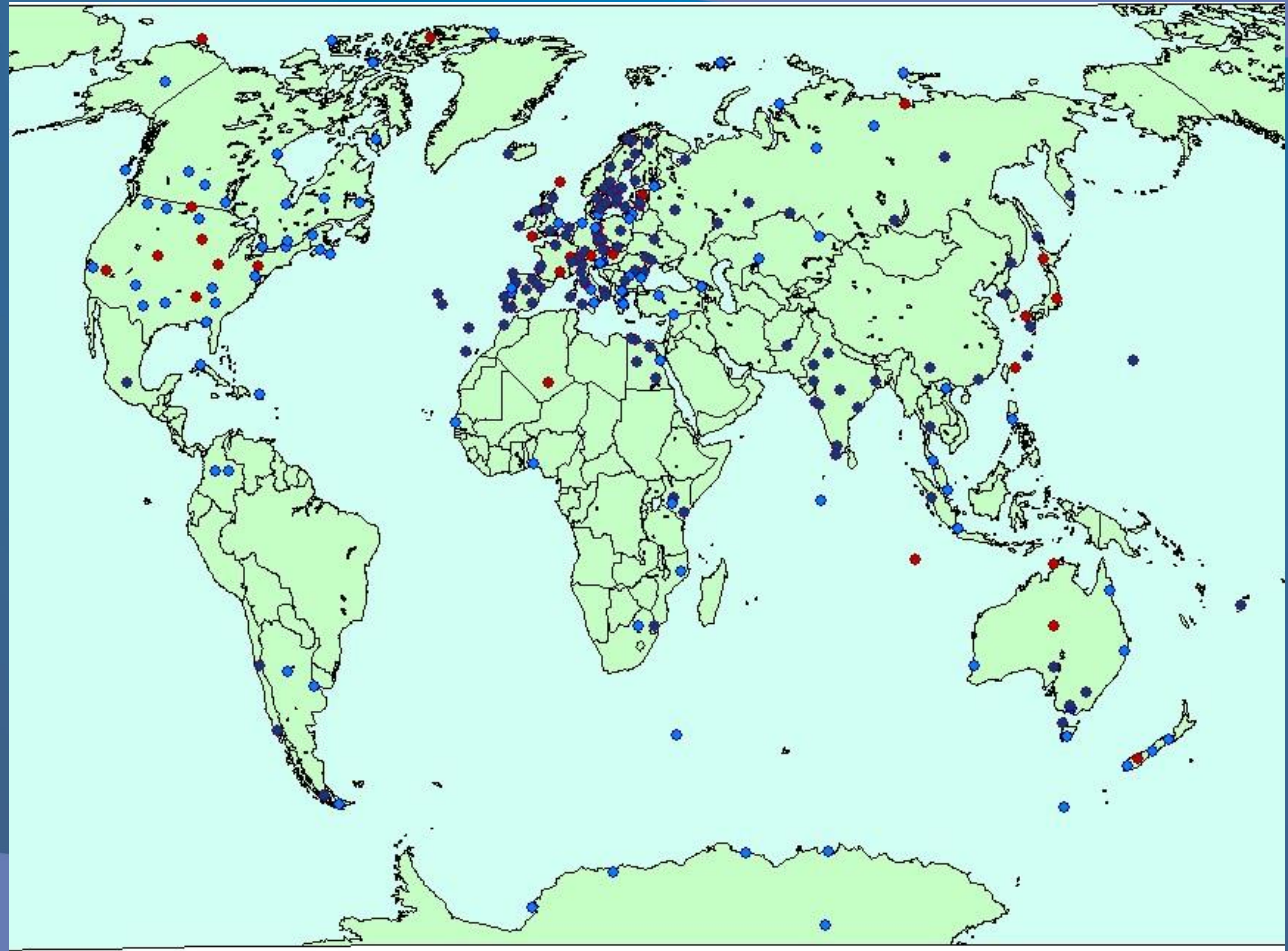
The distribution of stations with the data available at the WRDC archive.



Years: 1964 – 2019



**WRDC Archive:**  
*Map with GAW/BSRN  
Stations*



BSRN stations



GAW stations, active



GAW stations, not active

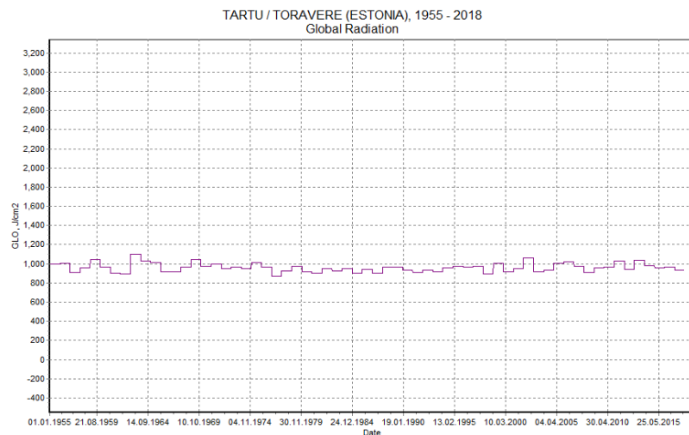
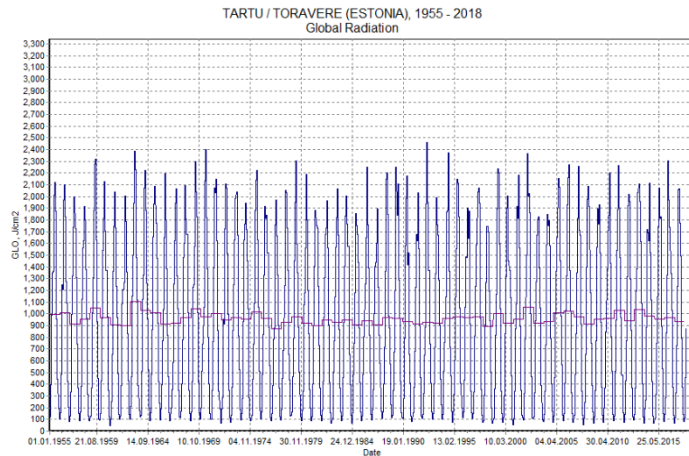
239 Stations in GAWSIS

## Quality Checks at the WRDC

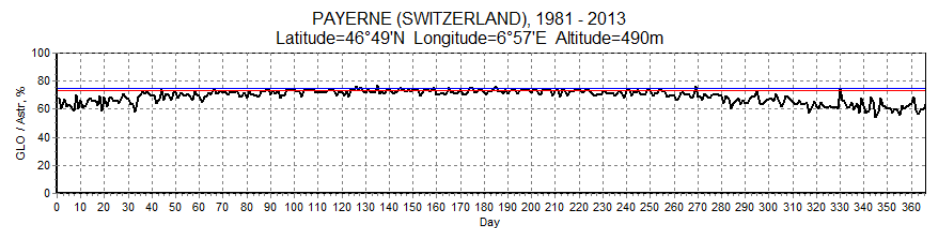
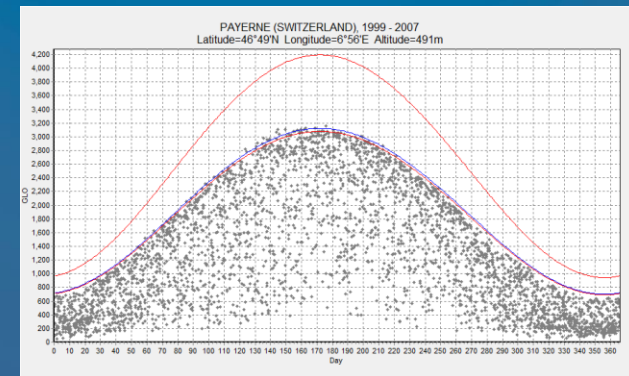
- Physically meaningful limits
- Checks of calculated and actual totals (just arithmetic's)
- Checks of hourly and daily values in the within setup ranges
- Control of exceedings above TOA values
- **Control of values higher than those of probabilistic and climatological levels**
- Control of correlation: data of neighbour sites (if it's possible)
- Homogeneity Analysis (HA) for long time-series
- Build up of Metadata for 1500 Stations from paper archive by the end of 2019
- (including GAW stations with solar radiation data)



An Example of visualizing data flow during QC - Homogeneity check (a), and 95% probability level of global radiation highest daily values (“clear sky”) for all years under analysis relative to TOA irradiance (b).

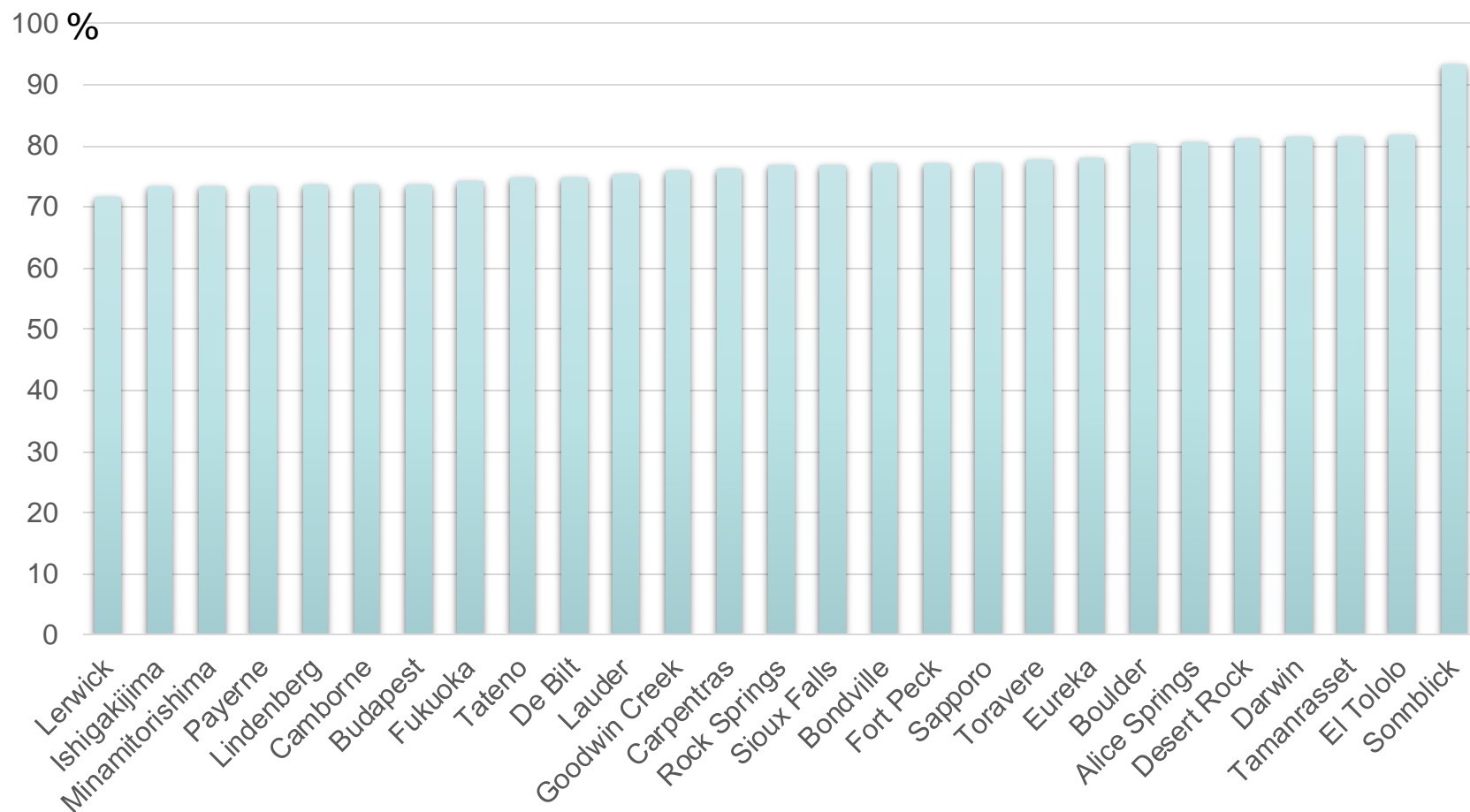


a



b

## The 95% Probability Level ("clear sky") for selected stations





*“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).*



## Metadata structure – information on countries

- The number of stations presented at the WRDC
- Territorial changes
- The country name change
- The reorganization of actinometry network: instrument replacement,
- station transfer, the reorganization period
- Transition to the international radiometric standard
- The change of solar radiation measurement units



# WRDC Site.GAW Page

[HOME](#)

## GAW STATIONS

Station	GAW Station Type	Info	Daily data	Hourly data
<b>ALGERIA</b>				
TAMANRASSET	Global	<a href="#">Info</a>	<a href="#">Daily data</a>	<a href="#">Hourly data</a>
<b>ARGENTINA</b>				
USHUAIA	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>AUSTRALIA</b>				
CAPE GRIM	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
DARWIN ARPT	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
MELBOURNE ARPT	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
WAGGA WAGGA AMO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>AUSTRIA</b>				
GROSSENZERSDORF	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
SONNBLICK	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
WIEN / HOHE WARTE	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>CHILE</b> Images				
EL TOLOLO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>ESTONIA</b> Skyline				
TARTU-TORAVERE	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>GREECE</b>				
THESSALONIKI	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>ICELAND</b>				

### Station Information:

**Name :** Tamanrasset, Algeria

WMO Index: 60680

Latitude : 22.78 N

Longitude: 5.52 E

Elevation: 1377 m

Local time offset from GMT: 0.0

### Instrumentation:

Global Horizontal (Eppley QPSP\*)

Direct Normal (Eppley NIP)

Diffuse Horizontal (Eppley QPSP\*)

[with shadowband through March 7, 2000 13:59]

[with tracking disk starting March 7, 2000 14:00]

RG8 Global Horizontal (Eppley PSP with RG8 dome)

Downwelling longwave (Eppley PIR with tracking disk)

\*QPSP is a conventional PSP fitted with a quartz dome.

### Contact information:

Mr. Mohamed Mimouni

Office National De La Meteorologie

Direction Meteorologique Regionale Sud

P.O. Box 31

Tamanrasset, 11000 Algeria

Phone: 213-29-34-46-73

Fax: 213-29-34-42-26

Email: m.mimouni@usa.net

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

## STATION INFO

Region	6 (Europe)
Country	<b>NETHERLANDS</b>
Station	<b>MAASTRICHT</b>
WMO Index	06380
Changes of WMO Index and (or) station and country names	–
Latitude	50°55'N
Longitude	5°47'E
Elevation	114 m
Station relocation	–
Elements	Global Radiation Sunshine Duration
Instrumentation	<a href="#">Info</a>
Units	J/cm2
Scale	WRR
Time system	TST
Instrumentation relocation	–

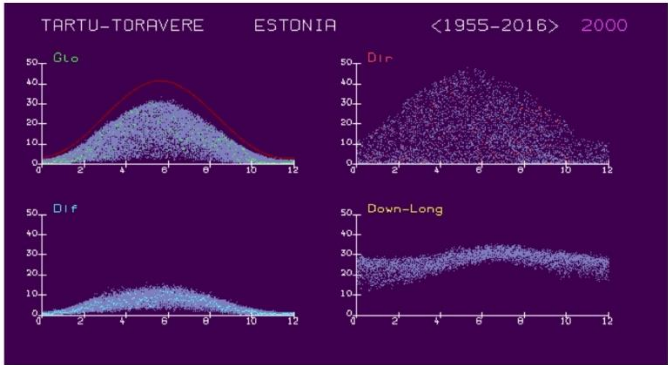
← → ↻ http://wrdc.mgo.rssi.ru/ WRDC


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GROSSENZERSDORF	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
SONNBLICK	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
WIEN / HOHE WART	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>CHILE</b> Images				
EL TOLOLO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>ESTONIA</b> Skyline				
TARTU-TORAVERE	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>GERMANY</b>				
HOHENPEISSENBERG	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>GREECE</b>				
THESSALONIKI	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>ICELAND</b>				
REYKJAVIK	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>INDONESIA</b>				
BUKIT KOTOTABANG	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>IRELAND</b>				
VALENTIA OBSERVATORY	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>JAPAN</b>				
FUKUOKA	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
KAGOSHIMA	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
MINAMITORISHIMA	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
NAHA	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
SAPPORO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
TATENOMI	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>

**TARTU-TORAVERE ESTONIA <1955-2016> 2000**



17:30  
27/3/2017



WMO

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WIEN / HOHE WARTE	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>CHILE</b> Images				
EL TOLOLO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>ESTONIA</b> Skyline				
TARTU-TORAVERE	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>GERMANY</b>				
HOHENPEISSENBERG	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>GREECE</b>				
THESSALONIKI	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>ICELAND</b>				
REYKJAVIK	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>INDONESIA</b>				
BUKIT KOTOTABANG	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>IRELAND</b>				
VALENTIA OBSERVATORY	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>JAPAN</b>				
FUKUOKA	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
KAGOSHIMA	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
MINAMITORISHIMA	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
NAHA	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
SAPPORO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
TATENO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>KENYA</b>				
MOUNT KENYA	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>KOREA, R. OF</b>				

## Station Information:

**Name :** Hohenpeissenberg, Germany  
**WMO Index:** 10962  
**Latitude :** 47.80 N  
**Longitude:** 11.00 E  
**Elevation:** 988 m  
**Local time offset from GMT:** + 1.0

## Instrumentation:

Global Radiation	
1953.01.01 - 1984.12.31	Pyranometer Kipp & Zonen CM-5
Since 1985.01.01	Pyranometer Kipp & Zonen CM-11
Diffuse Radiation	
Since 1997.04.01	Pyranometer Kipp & Zonen CM-11 with tracking disk
Longwave Downwelling Radiation*	
Since 2002.11.01	Pyranometer Kipp & Zonen CG-4

\*) longwave downwelling radiation within spectral band 4.5 - 42  $\mu\text{m}$ ;

## Contributor:

Thomas Elste, Dipl. Phys. Ing. (FH)  
Deutscher Wetterdienst  
Meteorologisches Observatorium  
Albin-Schwaiger-Weg 10  
D-82383 Hohenpeissenberg  
Tel: #49(0)69/8062-9743 Fax:-9707  
E-mail: Thomas\_Elste@dwd.de  
www.dwd.de/mohp

Daily and monthly averages, in J/cm2 are computed according to WRDC protocol (and subject to rejection by the flagging protocol):

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TARTU-TORAVERE	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>GERMANY</b>				
HOHENPEISSENBERG	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>GREECE</b>				
THESSALONIKI	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>ICELAND</b>				
REYKJAVIK	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>INDONESIA</b>				
BUKIT KOTOTABANG	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>IRELAND</b>				
VALENTIA OBSERVATORY	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
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FUKUOKA	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
KAGOSHIMA	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
MINAMITORISHIMA	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
NAHA	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
SAPPORO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
TATENO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>KENYA</b>				
MOUNT KENYA	Global	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>
<b>KOREA, R. OF</b>				
SEOUL	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a>	<a href="#">Hourly Data</a>

**GLOBAL ATMOSPHERE WATCH (GAW)**

Downwelling Longwave Radiation: daily totals, monthly sums and means

Country: GERMANY

Station: HOHENPEISSENBERG

Coordinates:

Latitude =47°48'N

Longitude =11°00'E

Elevation = 988

WMO Identifier: 10962

Year 2018

DATE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2585	2781	2236	2748	3162	3166	2791	3231	3441	3014	2660	2587
2	2616	2407	2329	2423	3089	3045	2839	3181	3234	2869	2840	2929
3	2907	2645	2531	2841	3328	2822	3143	3119	3195	3047	3085	2928
4	3070	2403	2446	2728	3432	2902	3036	3125	3088	2560	3015	2897
5	2936	2512	2663	2738	3219	2942	3194	3191	2785	2629	2725	2813
6	2600	2322	2798	2386	2987	3018	3505	3132	3080	2970	2690	2885
7	2681	2649	-2	2461	2683	3229	2935	3246	3270	3036	2561	2914
8	2686	2723	2445	2620	2686	3187	3081	3239	2929	3020	2794	2598
9	2508	2744	3025	2880	2771	3116	2858	3208	2749	3133	2671	2886
10	2329	2643	3123	2804	3078	3029	3231	3384	2779	2739	2495	2707
11	2727	2656	2939	2587	2770	3041	3109	2809	2801	2868	2670	2536
12	2820	2525	2825	2679	2942	3337	2806	2886	2874	2808	2604	2475
13	2807	2010	2658	2607	3006	3519	2954	3187	3225	2745	2754	2540
14	2763	1784	2641	2454	3344	3084	3011	3273	3316	2642	2381	2517






  
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<b>JAPAN</b>			
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MINAMITORISHIMA	Global	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
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SAPPORO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
TATENO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
<b>KENYA</b>			
MOUNT KENYA	Global	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
<b>KOREA, R. OF</b>			
SEOUL	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
ANMYEONDO	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
<b>LATVIA</b>			
LIEPAJA	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
RUCAVA	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
ZILANI	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
ZOSEN	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
<b>MOLDOVA</b>			
Skyline			
KISHINEV	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
<b>NETHERLANDS</b>			
DE BILT	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
<b>PHILIPPINES</b>			
QUEZON CITY	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
<b>SLOVAKIA</b>			
POPRAD	Regional	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>
GANOVCE			
<b>SWITZERLAND</b>			
DAVOS-DORF	Contributing	<a href="#">Info</a>	<a href="#">Daily Data</a> <a href="#">Hourly Data</a>

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### FUKUOKA

Daily data

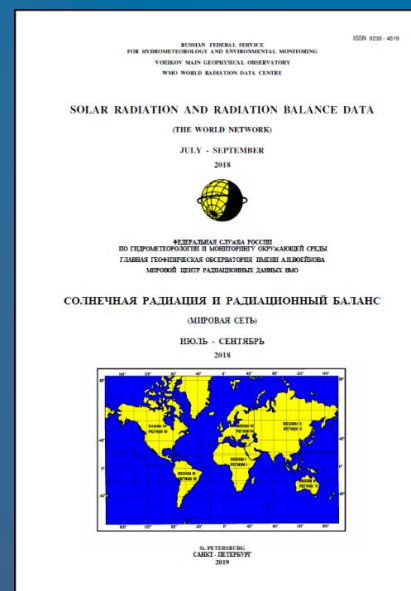
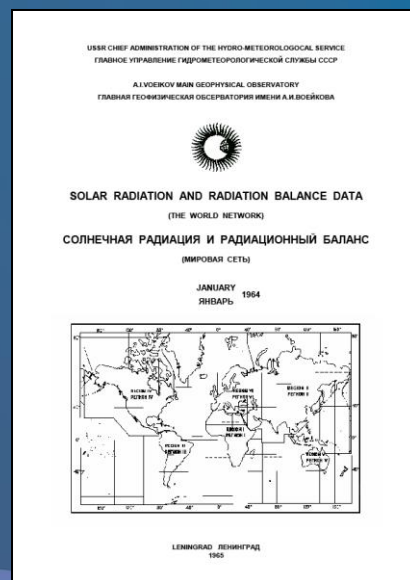
Global rad.	Diffuse rad.	Direct rad.
-	<a href="#">2010</a>	-
-	<a href="#">2011</a>	-
-	<a href="#">2012</a>	-
-	<a href="#">2013</a>	-
<a href="#">2014</a>	<a href="#">2014</a>	<a href="#">2014</a>
<a href="#">2015</a>	<a href="#">2015</a>	<a href="#">2015</a>
<a href="#">2016</a>	<a href="#">2016</a>	<a href="#">2016</a>
<a href="#">2017</a>	<a href="#">2017</a>	<a href="#">2017</a>
<a href="#">2018</a>	<a href="#">2018</a>	<a href="#">2018</a>
<a href="#">2019</a>	<a href="#">2019</a>	<a href="#">2019</a>

[Graph](#)





# WRDC issues

1965 ..... 2019





<http://wrdc.mgo.rssi.ru>

user: tsv; pass: tsv

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Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra  
  
Swiss Confederation  
Federal Department of Home Affairs FDHA  
Federal Office of Meteorology and Climatology MeteoSwiss

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Quick access

Generate station report by:

Station name

GAW ID

Generate station lists by:

Country

Type

Class

Observed variable

Find people by:

Contact name

GAW World Data Centres

WDC-RSAT (World Data Center for Remote Sensing of the Atmosphere)  
 WDCA (World Data Centre for Aerosols)  
 WDCGG (World Data Centre for Greenhouse Gases)  
 WDCRG (World Data Centre for Reactive Gases)  
 WOUDC (World Ozone and UV Data Centre)  
 WRDC (World Radiation Data Centre)

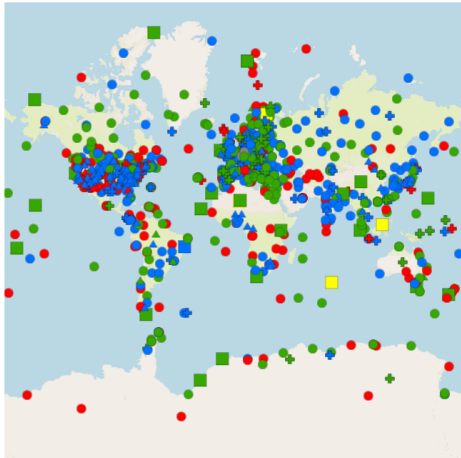
Contributing Data Centres

CASTNET (Clean Air Status and Trends Network)  
 EMEP (EMEP)  
 GALION (GAW Aerosol Lidar Observation Network)  
 GAW-PFR (GAW Precision Filter Radiometer Network)  
 IDAF (IGAC/DEBITS Africa)  
 IMPROVE (IMPROVE Optical Aerosol)  
 NADP (National Atmospheric Deposition Program)  
 NDACC (NDACC Data Center)  
 TCCON (Total Carbon Column Observing Network)

Welcome to GAWSIS

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10000km

[mapbox](#) | [WMO](#) | [Mapbox](#) | [OpenStreetMap](#) | [Improve...](#)

☒ Global
 ☒ Regional
 ☒ Contributing networks
 ☒ Local

☒ Other elements

☒ Planned
 ☒ Pre-operational
 ☒ Operational
 ☒ Partly operational

☒ Non-reporting
 ☒ Closed
 ☒ Stand-by



Thank you!