



Baseline Surface Radiation Network



Ellsworth Dutton
† 2012-10-11





**BSRN-Meeting
AWI Potsdam
August 2012**



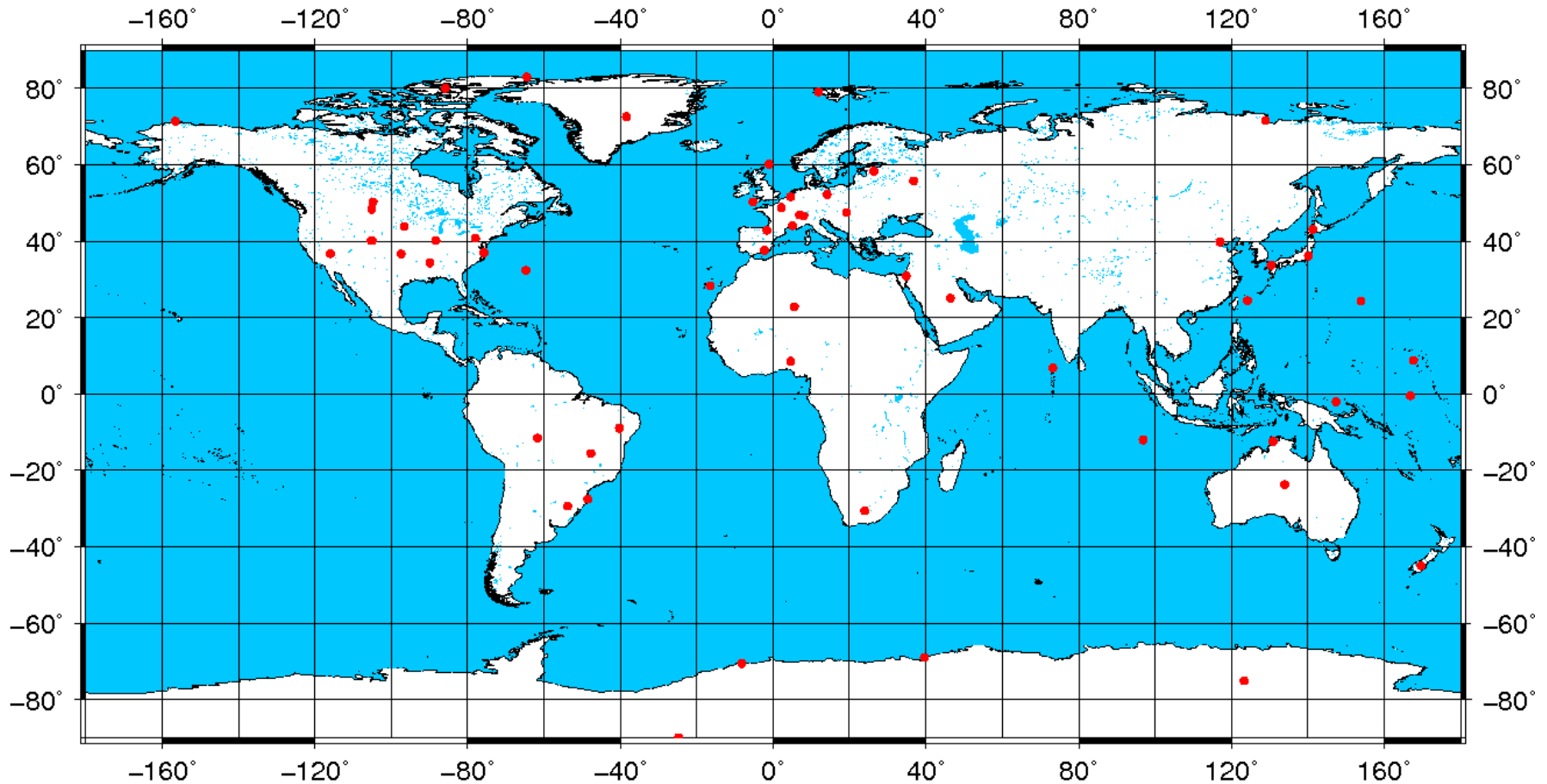
Brief BSRN History:

1. 1988: The WMO proposed the establishment of the BSRN.
2. 1992: The BSRN started with 5 sites and the WRMC at ETH Zurich under the direction of Prof. Atsumu Ohmura.
3. 2004: BSRN officially became a contributor to the Global Climate Observing System (GCOS).
4. 2008 July: After 15 years of nearly continuous operation at ETH Zurich, the archive moved to Alfred Wegener Institute (AWI) in Bremerhaven, Germany under the direction of Dr. Gert König-Langlo.
5. 2011 July: Cooperating Network with NDACC
6. 2012-10-11: Sudden death of the BSRN project manager Ellis Dutton...



Present State of the WRMC:

54 stations providing data





Present State of the WRMC: Datasets

The typical average interval for radiation data is 1 minute:

1. LR 0100: (Global, Diffuse, Direct, Long-wave down)	54 stations
2. LR 0300: (Reflex, Long-wave up)	9 stations
3. LR 0500: (UV)	12 stations
4. LR 1000: (Synops)	12 stations
5. LR 1100: (Upper air soundings)	29 stations
6. LR 1200: (Total ozone)	9 stations
7. LR 1300: (Aerosol optical depths) (under construction)	(14) stations
8. LR 1300: (Ceilometer data)	3 stations
9. LR 30x0: (Radiation measurements from tower)	13 stations

Infrastructure

1. Homepage:

<http://www.bsrn.awi.de>



The screenshot shows the homepage of the World Radiation Monitoring Center (WRMC) and Baseline Surface Radiation Network (BSRN). The browser window title is "BSRN - World Radiation Monitoring Center Home - Mozilla Firefox". The address bar shows "www.bsrn.awi.de". The page features a navigation menu with links for Home, Project, Stations, Data, Products, Software, and Other. A search bar is located in the top right. The main content area includes a "Welcome" message and a section for "Internet Explorer users". The right sidebar contains "Related Pages", "Contact persons", and logos for GEMEX, WCRP, and NDACC.


BSRN - World Radiation Monitoring Center Home - Mozilla Firefox

File Edit View History Bookmarks Tools Help

BSRN - World Radiation Monitoring Center H... +

www.bsrn.awi.de

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WRMC-BSRN
World Radiation Monitoring Center- Baseline Surface R
hosted by 

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BSRN

WRMC

Workshop_2012

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Welcome


Welcome to the World Radiation Monitoring Center (WRMC), the central archive of all measurements performed within the Baseline Surface Radiation Network (BSRN). These pages offer both: Information for all scientists who will use BSRN-data as well as information to any station scientist who delivers data.

For Internet Explorer users


These web-pages are optimized for "Firefox". Customers using the Internet Explorer should change into the compatibility mode (marked in the [linked picture](#) with a red ring) to get better results.

[>] Related Pages

[>] Contact persons



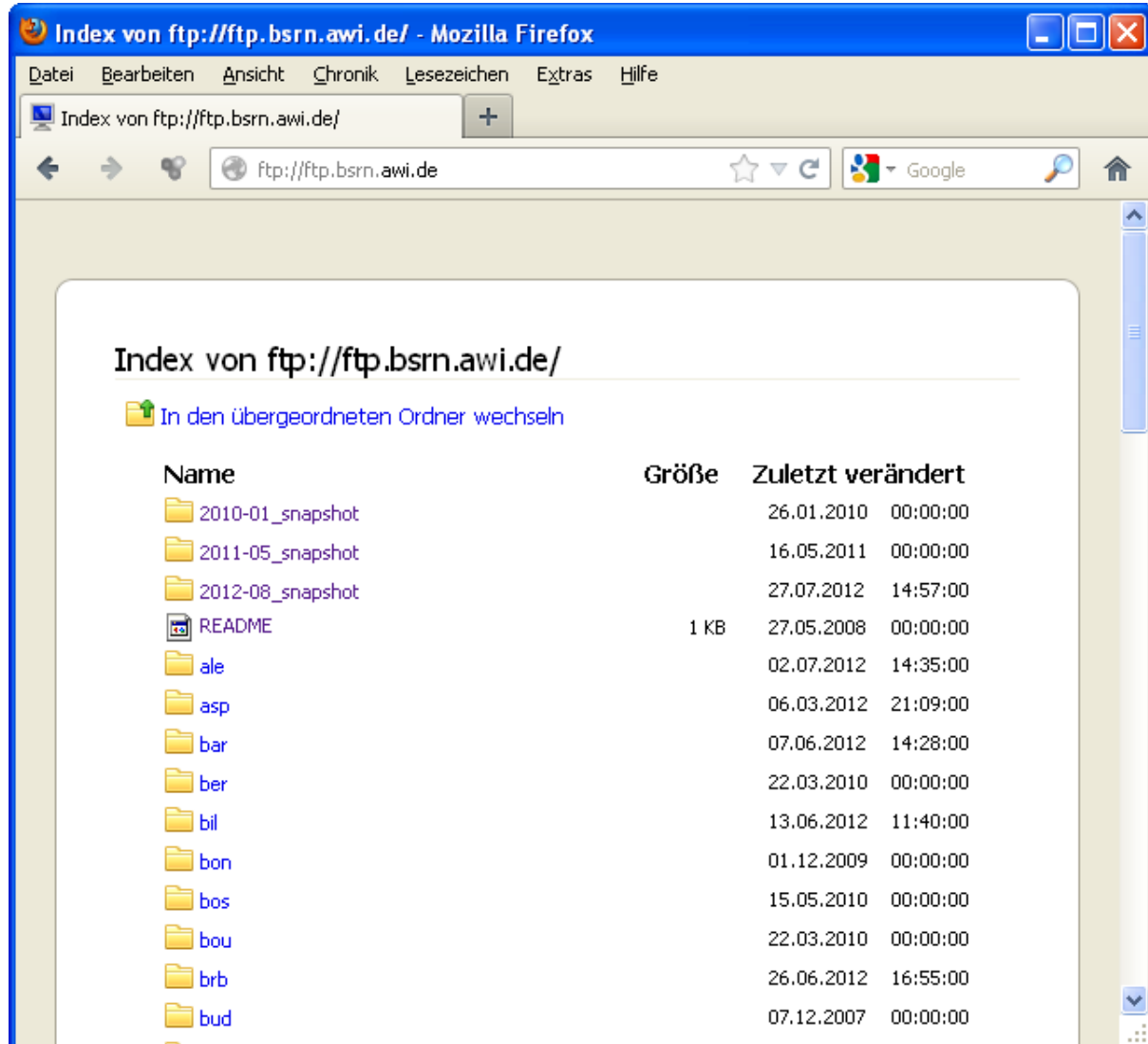




Cooperating network with NDACC

Infrastructure

1. Homepage:
<http://www.bsrn.awi.de>
2. Ftp access:
<ftp://ftp.bsrn.awi.de/>



Index von ftp://ftp.bsrn.awi.de/ - Mozilla Firefox

Index von ftp://ftp.bsrn.awi.de/

In den übergeordneten Ordner wechseln

Name	Größe	Zuletzt verändert
2010-01_snapshot		26.01.2010 00:00:00
2011-05_snapshot		16.05.2011 00:00:00
2012-08_snapshot		27.07.2012 14:57:00
README	1 KB	27.05.2008 00:00:00
ale		02.07.2012 14:35:00
asp		06.03.2012 21:09:00
bar		07.06.2012 14:28:00
ber		22.03.2010 00:00:00
bil		13.06.2012 11:40:00
bon		01.12.2009 00:00:00
bos		15.05.2010 00:00:00
bou		22.03.2010 00:00:00
brb		26.06.2012 16:55:00
bud		07.12.2007 00:00:00

Infrastructure

1. Homepage:
<http://www.bsrn.awi.de>.
2. Ftp access:
<ftp://ftp.bsrn.awi.de/>
3. PANGAEA access:
<http://www.pangaea.de/search?q=project:BSRN>



Data Publisher for Earth & Environmental Science - Search - Mozilla Firefox

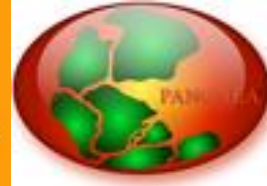
www.pangaea.de/search?q=project:BSRN

Not logged in (log in or sign up)

More than 10000 datasets found on search for »project:BSRN«

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1. **Chhatbar, K; Meyer, R (2011):** List of citations and data sets used in the publication
Supplement to: Chhatbar, K; Meyer, R (2011): The influence of meteorological parameters on the energy yield of solar thermal plants. SolarPACES 2011 Conference (Concentrating Solar Power and Chemical Energy Systems, 20-23 September 2011 - Granada, Spain (<http://www.solarpaces2011.org>))
 Size: 224 data points
 doi:10.1594/PANGAEA.763963 - Score: 100% - Similar datasets
2. **Lanconelli, C; Busetto, M; Dutton, EG et al. (2011):** Baseline surface radiation during the International Polar Year 2007-2009
Supplement to: Lanconelli, C; Busetto, M; Dutton, EG et al. (2011): Polar baseline surface radiation measurements during the International Polar Year 2007-2009. Earth System Science Data
 Size: 400 data points
 doi:10.1594/PANGAEA.737608 - Score: 100% - Similar datasets
3. **Cuevas-Agulló, E (2009):** Radiosonde measurements from station Izana (2009-09)
 Size: 873658 data points
 doi:10.1594/PANGAEA.728397 - Score: 33% - Similar datasets
4. **Cuevas-Agulló, E (2009):** Ultra-violet measurements from station Izana (2009-09)
 Size: 344864 data points
 doi:10.1594/PANGAEA.728396 - Score: 33% - Similar datasets
5. **Behrens, K (2010):** Meteorological synoptical observations from station Lindenberg (1999-09)
 Size: 10240 data points
 doi:10.1594/PANGAEA.736206 - Score: 33% - Similar datasets
6. **Behrens, K (2010):** Meteorological synoptical observations from station Lindenberg (1999-10)
 Size: 11042 data points
 doi:10.1594/PANGAEA.736210 - Score: 33% - Similar datasets
7. **Ohkawara, N (2008):** Meteorological synoptical observations from station Tateno (2007-06)
 Size: 3928 data points
 doi:10.1594/PANGAEA.681681 - Score: 33% - Similar datasets
8. **Behrens, K (2010):** Radiosonde measurements from station Lindenberg (1997-06)
 Size: 206570 data points
 doi:10.1594/PANGAEA.735922 - Score: 33% - Similar datasets
9. **Behrens, K (2010):** Basic measurements of radiation at station Lindenberg (1994-10)
 Size: 688252 data points
 doi:10.1594/PANGAEA.735973 - Score: 33% - Similar datasets



What is PANGAEA?

1. PANGAEA is a Publishing Network for Geoscientific & Environmental Data (<http://www.pangaea.de/>).
2. PANGAEA guarantees long-term availability of its content.
3. PANGAEA follows the “Recommendations of the Commission on Professional Self Regulation in Science for safeguarding good scientific practice”.
4. Each dataset can be identified, shared, published and cited by using a Digital Object Identifier ([DOI](#)).



What offers PANGAEA?

PANGAEA®
Data Publisher for Earth & Environmental Science

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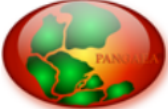
What offers PANGAEA?

Data Publisher for Earth & Environmental Science - Search - Mozilla Firefox

BSRN - World Radiation Monitoring Centre... x Data Publisher for Earth & Environmental... x

www.pangaea.de/search?count=10&q=BSRN+Barrow&minlat=&minlon=&maxlat=&maxlon=&mindate=&maxdate=&env=All&offset=250

Meistbesucht | NM | NYA | Wetter | Klima | Sprache | Wremen | News | EDV | PS | WEB | BSRN | Copernicus | DatenZentren | DB BAHN - Verbindung...

 Not logged in (log in or sign up)

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Always quote citation when using data!

460 datasets found on search for »BSRN Barrow« [Show Map](#) [Google Earth](#) [Data Warehouse](#)

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251. **Dutton, EG (2007):** Basic and other measurements of radiation at station Barrow (1996-12)
 Size: 49840 data points
 doi:10.1594/PANGAEA.688471 - Score: 22% - [Similar datasets](#)
252. **Dutton, EG (2007):** Basic and other measurements of radiation at station Barrow (1997-01)
 Size: 75431 data points
 doi:10.1594/PANGAEA.688472 - Score: 22% - [Similar datasets](#)
253. **Dutton, EG (2012):** Basic and other measurements of radiation at station Barrow (1992-04)
 Size: 34124 data points
 doi:10.1594/PANGAEA.783811 - Score: 22% - [Similar datasets](#)
254. **Dutton, EG (2012):** Basic and other measurements of radiation at station Barrow (1992-05)
 Size: 42182 data points
 doi:10.1594/PANGAEA.783815 - Score: 22% - [Similar datasets](#)



What offers PANGAEA?

PANGAEA presents well defined metadata for any dataset (no login)

Dutton, Ellsworth (2007): Basic and other measurements of radiation at station Barrow (2001-12) - Mozilla Firefox

Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe

http://doi.pangaea.de/10.1594/PANGAEA.668531

Citation: **Dutton, Ellsworth (2007):** Basic and other measurements of radiation at station Barrow (2001-12), *Climate Monitoring & Diagnostics Laboratory, Boulder*, doi:10.1594/PANGAEA.668531

Project(s): **Baseline Surface Radiation Network (BSRN)**

Coverage: West: -156.6070 * East: -156.6070 * South: 71.3230 * North: 71.3230
Minimum HEIGHT above ground: 2.0 m * Maximum HEIGHT above ground: 2.0 m
Date/Time Start: 2001-12-01T00:00:00 * Date/Time End: 2001-12-31T23:59:00

Event(s): **BAR** (Barrow) * Latitude: 71.3230 * Longitude: -156.6070 * Elevation: 8.0 m * Date/Time: 1992-01-01T00:00:00 * Location: Alaska, United States of America * Campaign: WCRP/GEWEX * Device: Monitoring station * Comment: BSRN station no: 22; Surface type: tundra; Topography type: flat, rural

Other version: <ftp://ftp.bsrn.awi.de/bar/bar1201.dat.gz>

Parameter(s):

Parameter	Short Name	Unit	Principal Investigator	Method	Comment
DATE/TIME	Date/Time				Geocode
HEIGHT above ground	Height	m			Geocode
LATITUDE	Latitude				Geocode
LONGITUDE	Longitude				Geocode
Diffuse radiation	DIF	W/m ²	Dutton, Ellsworth	Pyranometer, Eppley, 8-48, SN 32870, WRMC No. 22009	
Long-wave downward radiation	LWD	W/m ²	Dutton, Ellsworth	Pyrgeometer, Eppley, PIR, SN 27454, WRMC No. 22008	



What offers PANGAEA?

PANGAEA presents well defined metadata for any dataset (no login)

Long-wave downward radiation, standard deviation	LWD std dev	W/m ²	Dutton, Ellsworth	Pyrgeometer, Eppley, PIR, SN 27454, WRMC No. 22008
Long-wave upward radiation	LWU	W/m ²	Dutton, Ellsworth	Pyrgeometer, Eppley, PIR, SN 27455, WRMC No. 23002
Long-wave upward radiation, standard deviation	LWU std dev	W/m ²	Dutton, Ellsworth	Pyrgeometer, Eppley, PIR, SN 27455, WRMC No. 23002
Station pressure	PoPoPoPo	hPa	Dutton, Ellsworth	Barometer
Humidity, relative	RH	%	Dutton, Ellsworth	Hygrometer
Short-wave downward (GLOBAL) radiation	SWD	W/m ²	Dutton, Ellsworth	Pyranometer, Eppley, PSP, SN 12263, WRMC No. 22002
Short-wave upward (REFLEX) radiation	SWU	W/m ²	Dutton, Ellsworth	Pyranometer, Eppley, PSP, SN 12618, WRMC No. 22005
Air temperature in 2 m height	T2	deg C	Dutton, Ellsworth	Thermometer

Size: 430013 data points

Download Data (login required)

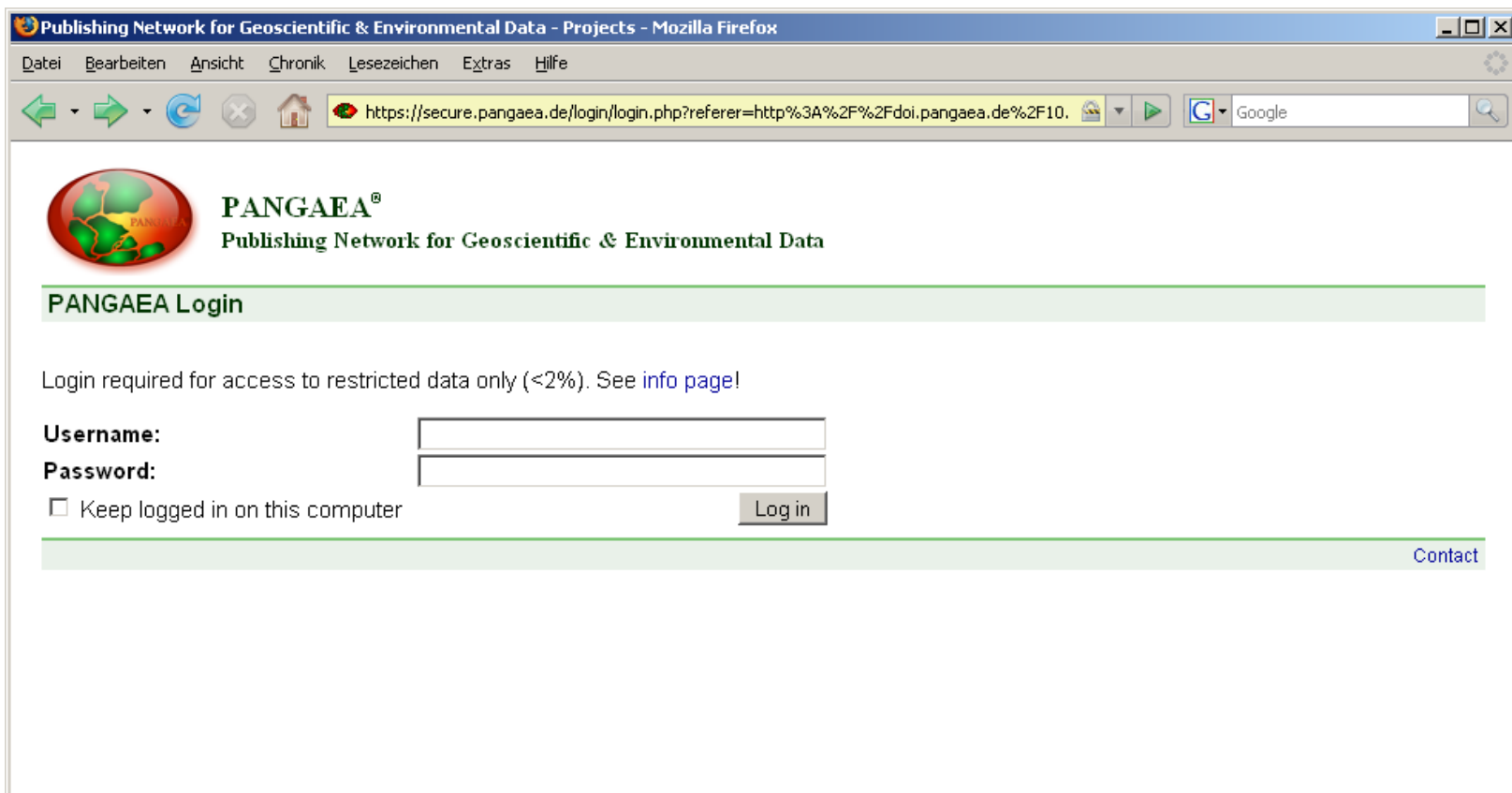
Download dataset as [tab-delimited text](#) (use the following character encoding:)

[View dataset as HTML](#) (Warning: Dataset is very large - your browser may have viewing problems)



What offers PANGAEA?

PANGAEA offers access restrictions

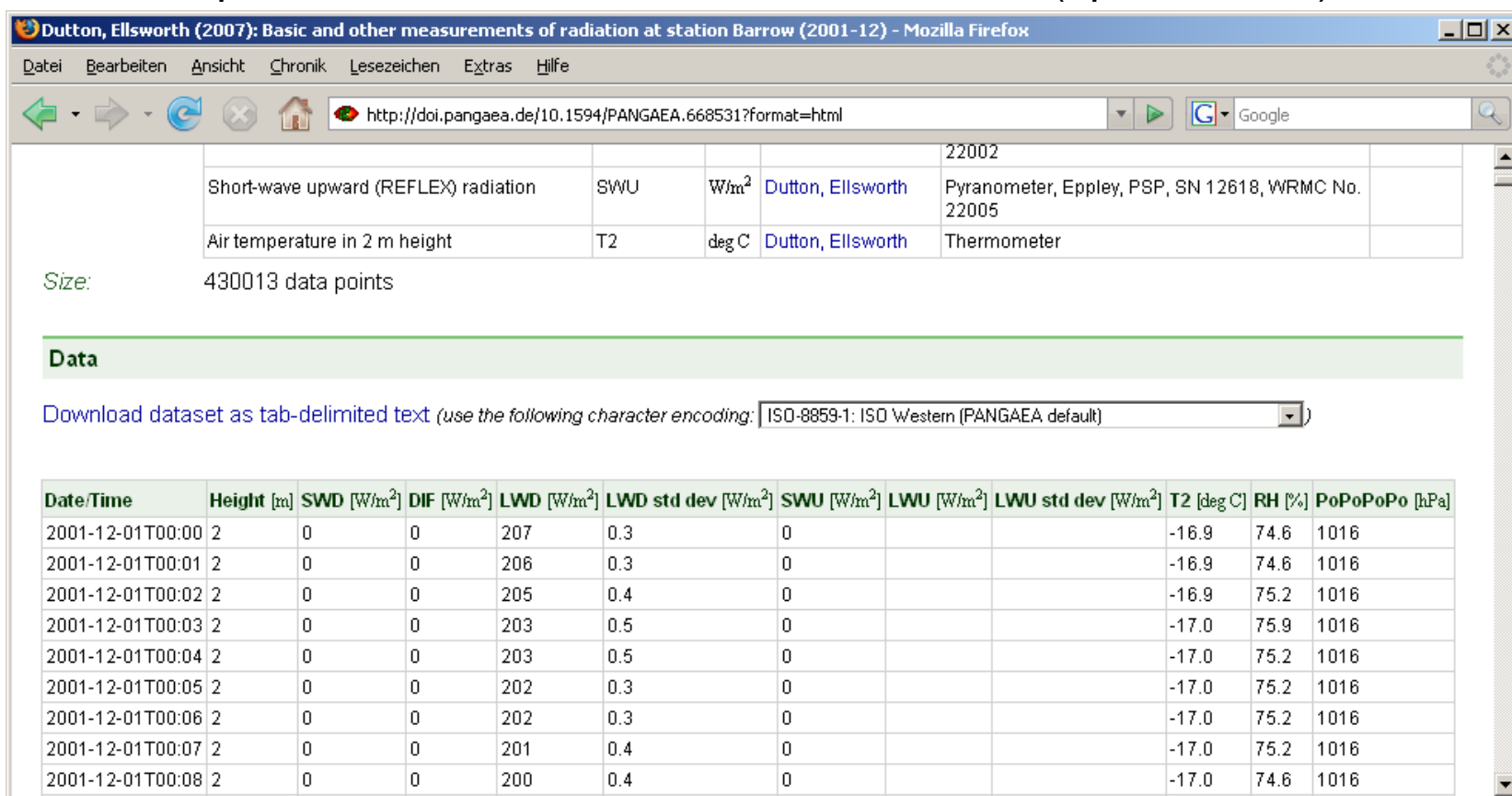


The screenshot shows a Mozilla Firefox browser window with the title "Publishing Network for Geoscientific & Environmental Data - Projects". The address bar shows the URL "https://secure.pangaea.de/login/login.php?referer=http%3A%2F%2Fdoi.pangaea.de%2F10.". The page content includes the PANGAEA logo, the text "PANGAEA® Publishing Network for Geoscientific & Environmental Data", and a "PANGAEA Login" section. Below this, there is a message: "Login required for access to restricted data only (<2%). See [info page!](#)". There are two input fields for "Username:" and "Password:", a checkbox for "Keep logged in on this computer", and a "Log in" button. A "Contact" link is visible in the bottom right corner of the page content.



What offers PANGAEA?

PANGAEA presents the data itself in different formats (ftp, text, html)



Dutton, Ellsworth (2007): Basic and other measurements of radiation at station Barrow (2001-12) - Mozilla Firefox

http://doi.pangaea.de/10.1594/PANGAEA.668531?format=html

Short-wave upward (REFLEX) radiation	SWU	W/m ²	Dutton, Ellsworth	22002 Pyranometer, Eppley, PSP, SN 12618, WRMC No. 22005
Air temperature in 2 m height	T2	deg C	Dutton, Ellsworth	Thermometer

Size: 430013 data points

Data

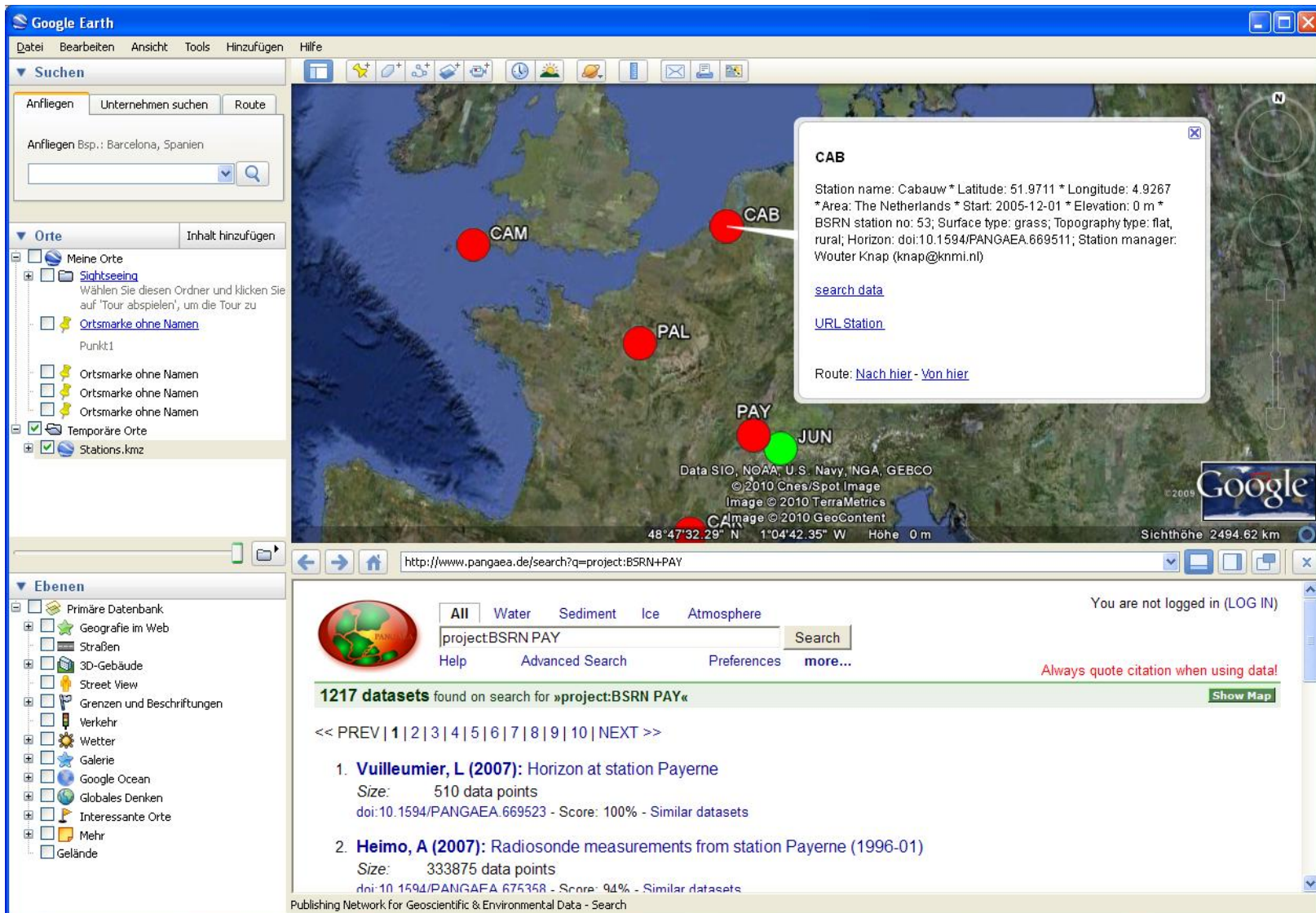
Download dataset as tab-delimited text (use the following character encoding:)

Date/Time	Height [m]	SWD [W/m ²]	DIF [W/m ²]	LWD [W/m ²]	LWD std dev [W/m ²]	SWU [W/m ²]	LWU [W/m ²]	LWU std dev [W/m ²]	T2 [deg C]	RH [%]	PoPoPoPo [hPa]
2001-12-01T00:00	2	0	0	207	0.3	0			-16.9	74.6	1016
2001-12-01T00:01	2	0	0	206	0.3	0			-16.9	74.6	1016
2001-12-01T00:02	2	0	0	205	0.4	0			-16.9	75.2	1016
2001-12-01T00:03	2	0	0	203	0.5	0			-17.0	75.9	1016
2001-12-01T00:04	2	0	0	203	0.5	0			-17.0	75.2	1016
2001-12-01T00:05	2	0	0	202	0.3	0			-17.0	75.2	1016
2001-12-01T00:06	2	0	0	202	0.3	0			-17.0	75.2	1016
2001-12-01T00:07	2	0	0	201	0.4	0			-17.0	75.2	1016
2001-12-01T00:08	2	0	0	200	0.4	0			-17.0	74.6	1016



Google Earth Overlay





Google Earth

Suchen: Anfliegen, Unternehmen suchen, Route

Anfliegen Bsp.: Barcelona, Spanien

Orte: Inhalt hinzufügen

- Meine Orte
 - Sichtseeing
 - Ortsmarke ohne Namen
 - Temporäre Orte
 - Stations.kmz

Ebenen: Primäre Datenbank, Geografie im Web, Straßen, 3D-Gebäude, Street View, Grenzen und Beschriftungen, Verkehr, Wetter, Galerie, Google Ocean, Globales Denken, Interessante Orte, Mehr, Gelände

CAB

Station name: Cabauw * Latitude: 51.9711 * Longitude: 4.9267
 *Area: The Netherlands * Start: 2005-12-01 * Elevation: 0 m *
 BSRN station no: 53; Surface type: grass; Topography type: flat, rural; Horizon: doi:10.1594/PANGAEA.669511; Station manager: Wouter Knap (knap@knmi.nl)

[search data](#)

[URL Station](#)

Route: [Nach hier](#) - [Von hier](#)

project:BSRN PAY

1217 datasets found on search for »project:BSRN PAY«

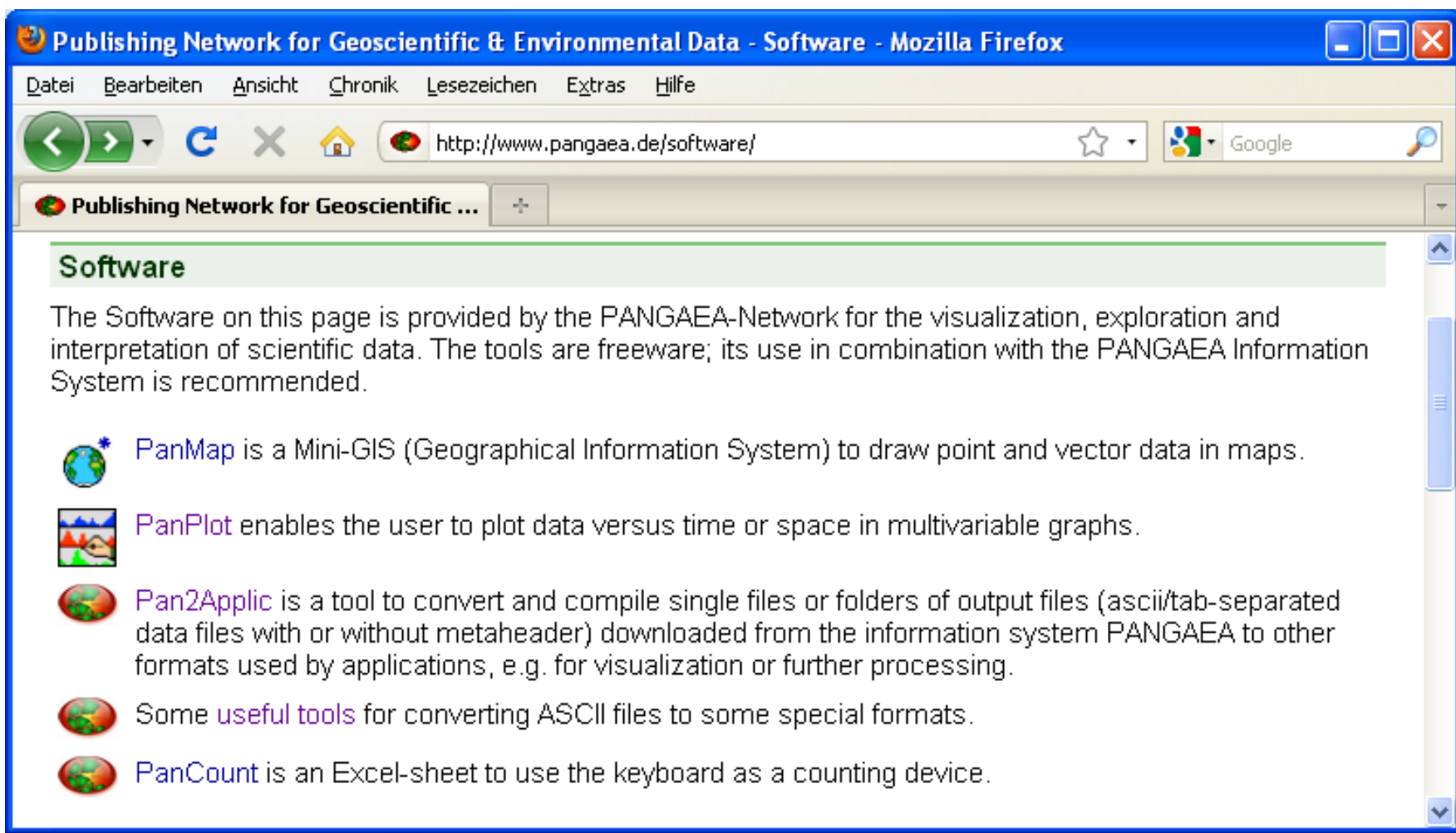
<< PREV | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NEXT >>

- Vuilleumier, L (2007):** Horizon at station Payerne
 Size: 510 data points
 doi:10.1594/PANGAEA.669523 - Score: 100% - Similar datasets
- Heimo, A (2007):** Radiosonde measurements from station Payerne (1996-01)
 Size: 333875 data points
 doi:10.1594/PANGAEA.675358 - Score: 94% - Similar datasets

Publishing Network for Geoscientific & Environmental Data - Search






What offers PANGAEA?

Software



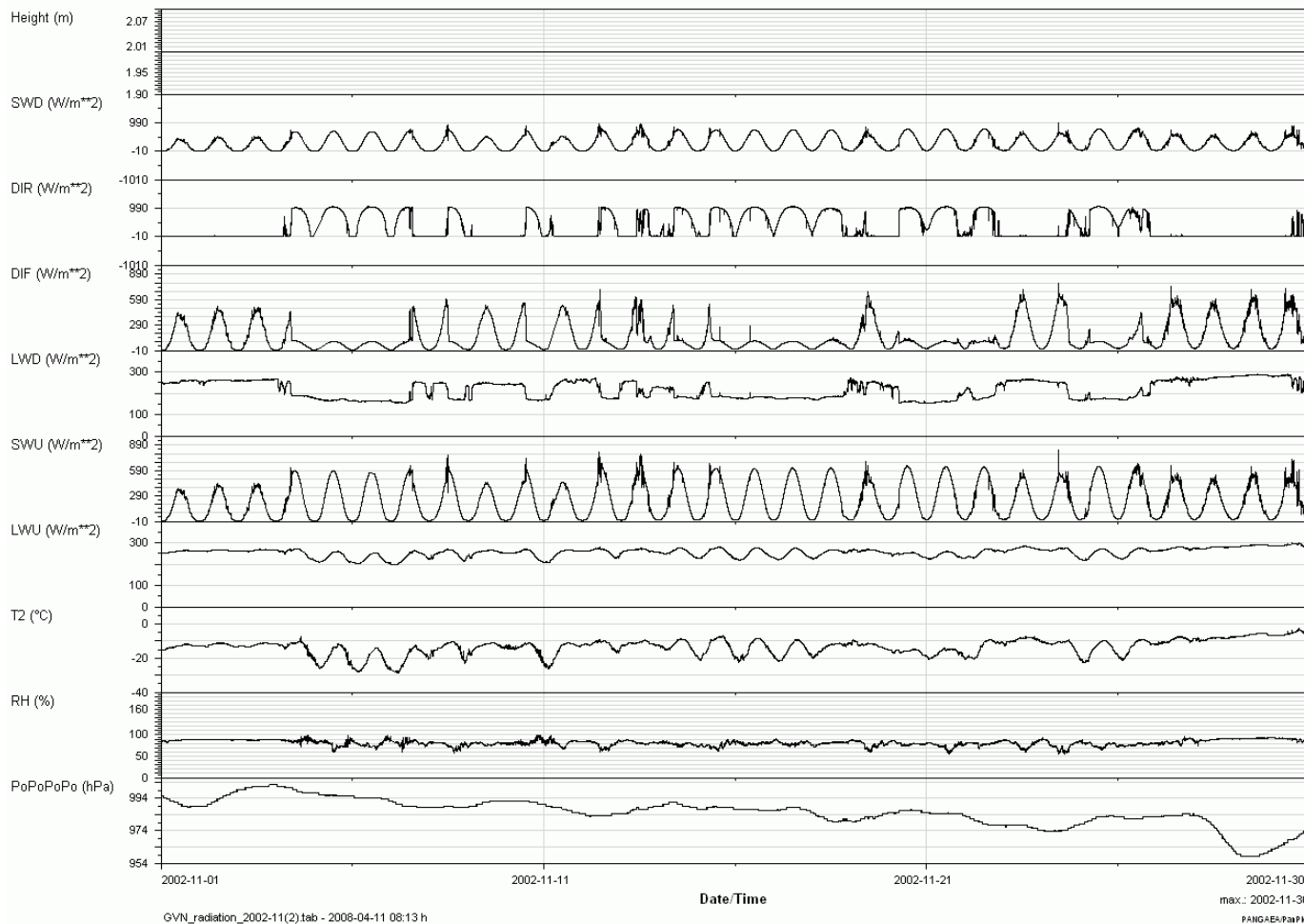
Software

The Software on this page is provided by the PANGAEA-Network for the visualization, exploration and interpretation of scientific data. The tools are freeware; its use in combination with the PANGAEA Information System is recommended.

-  **PanMap** is a Mini-GIS (Geographical Information System) to draw point and vector data in maps.
-  **PanPlot** enables the user to plot data versus time or space in multivariable graphs.
-  **Pan2Applic** is a tool to convert and compile single files or folders of output files (ascii/tab-separated data files with or without metaheader) downloaded from the information system PANGAEA to other formats used by applications, e.g. for visualization or further processing.
-  Some **useful tools** for converting ASCII files to some special formats.
-  **PanCount** is an Excel-sheet to use the keyboard as a counting device.

What offers PANGAEA?

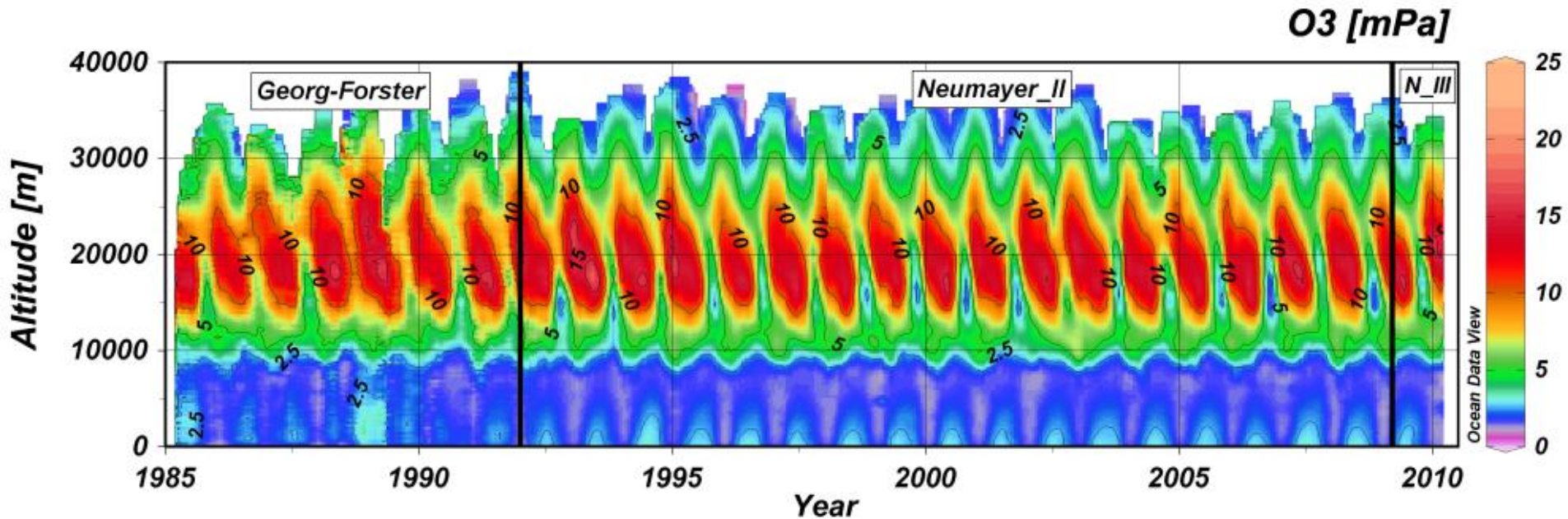
Quicklook with PanPlot





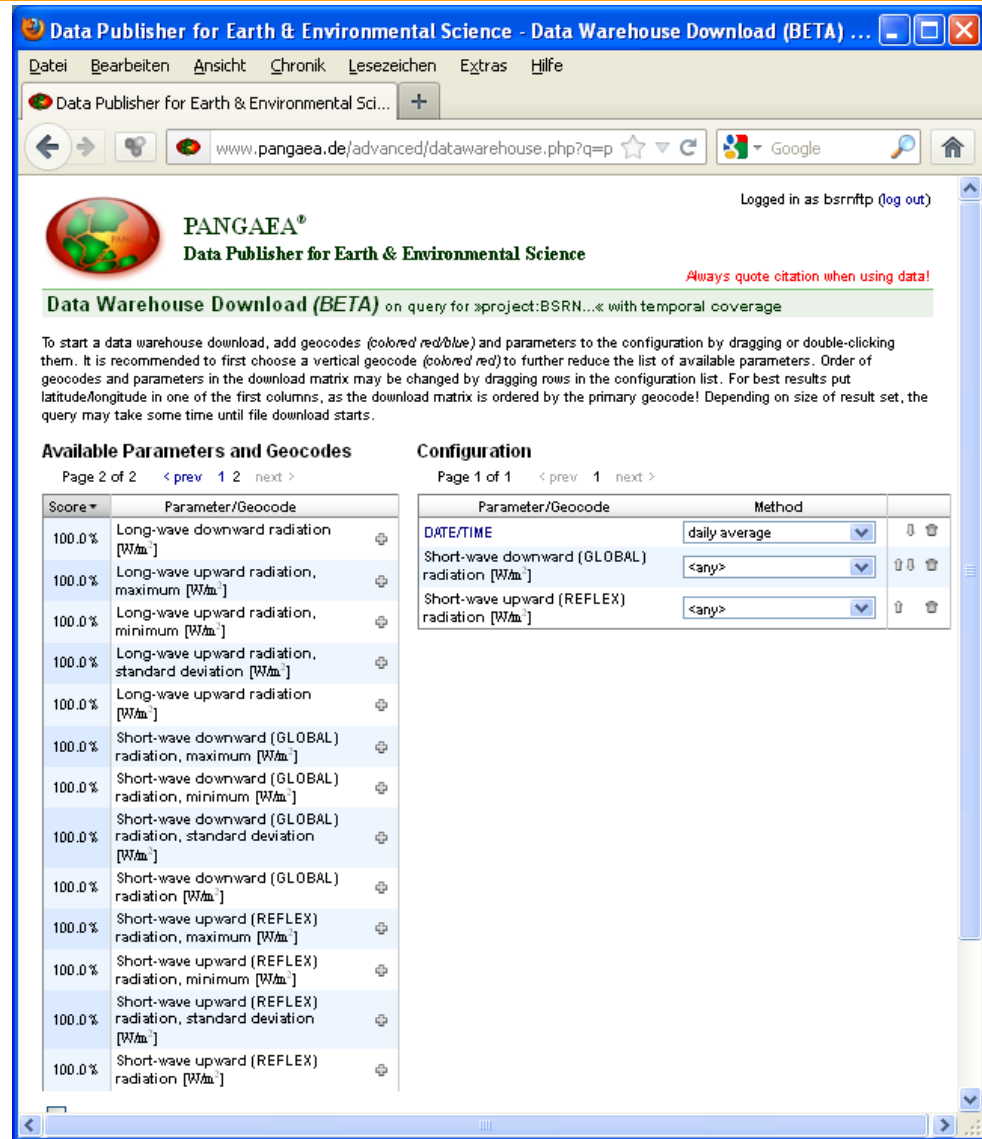
What offers PANGAEA?

Ocean Data View example:



Infrastructure

1. Homepage:
<http://www.bsrn.awi.de>.
2. Ftp access:
<ftp://ftp.bsrn.awi.de/>
3. PANGAEA access:
<http://www.pangaea.de/search?q=project:BSRN>
4. DataWarehouse:



Data Publisher for Earth & Environmental Science
Data Warehouse Download (BETA) on query for »project:BSRN...« with temporal coverage

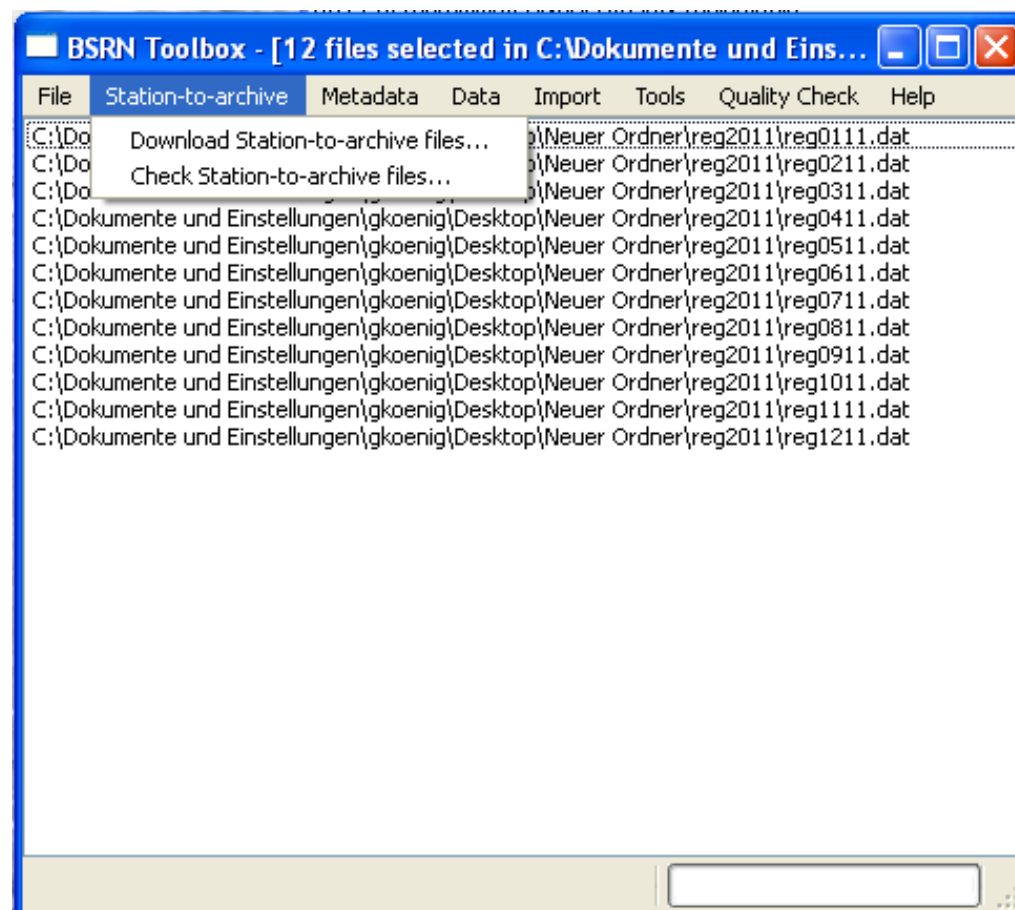
To start a data warehouse download, add geocodes (colored red/blue) and parameters to the configuration by dragging or double-clicking them. It is recommended to first choose a vertical geocode (colored red) to further reduce the list of available parameters. Order of geocodes and parameters in the download matrix may be changed by dragging rows in the configuration list. For best results put latitude/longitude in one of the first columns, as the download matrix is ordered by the primary geocode! Depending on size of result set, the query may take some time until file download starts.

Score	Parameter/Geocode
100.0%	Long-wave downward radiation [Wm ⁻²]
100.0%	Long-wave upward radiation, maximum [Wm ⁻²]
100.0%	Long-wave upward radiation, minimum [Wm ⁻²]
100.0%	Long-wave upward radiation, standard deviation [Wm ⁻²]
100.0%	Long-wave upward radiation [Wm ⁻²]
100.0%	Short-wave downward (GLOBAL) radiation, maximum [Wm ⁻²]
100.0%	Short-wave downward (GLOBAL) radiation, minimum [Wm ⁻²]
100.0%	Short-wave downward (GLOBAL) radiation, standard deviation [Wm ⁻²]
100.0%	Short-wave downward (GLOBAL) radiation [Wm ⁻²]
100.0%	Short-wave upward (REFLEX) radiation, maximum [Wm ⁻²]
100.0%	Short-wave upward (REFLEX) radiation, minimum [Wm ⁻²]
100.0%	Short-wave upward (REFLEX) radiation, standard deviation [Wm ⁻²]
100.0%	Short-wave upward (REFLEX) radiation [Wm ⁻²]

Parameter/Geocode	Method
DATE/TIME	daily average
Short-wave downward (GLOBAL) radiation [Wm ⁻²]	<any>
Short-wave upward (REFLEX) radiation [Wm ⁻²]	<any>

Infrastructure

1. Homepage:
<http://www.bsrn.awi.de>.
2. Ftp access:
<ftp://ftp.bsrn.awi.de/>
3. PANGAEA access:
<http://www.pangaea.de/search?q=project:BSRN>
4. DataWarehouse:
5. Software (BSRN-Toolbox, etc.)
http://wiki.pangaea.de/wiki/BSRN_Toolbox



Infrastructure

1. Homepage:
<http://www.bsrn.awi.de>.
2. Ftp access:
<ftp://ftp.bsrn.awi.de/>
3. PANGAEA access:
<http://www.pangaea.de/search?q=project:BSRN>
4. DataWarehouse:
5. Software (BSRN-Toolbox, etc.)
http://wiki.pangaea.de/wiki/BSRN_Toolbox
6. PangaWiki:
<http://wiki.pangaea.de/wiki/WRMC>



The screenshot shows a Mozilla Firefox browser window displaying the WRMC page on PangaWiki. The browser title is "WRMC - PangaWiki - Mozilla Firefox". The address bar shows the URL "wiki.pangaea.de/wiki/WRMC". The page content includes a logo of a globe with "PANGAEA" written on it, a navigation menu with links like "PangaWiki Home" and "Technical Docs", a search box, and a toolbox with links like "What links here" and "Permanent link". The main content area has a heading "WRMC" and a paragraph describing the center's history and data sources. Below the text is a "Web links" section with several links to the WRMC at AWI, including the homepage, data status, and retrieval methods.

WRMC

The World Radiation Monitoring Center (WRMC) is the central archive of all Baseline Surface Radiation Network (BSRN) measurements. In 1992 the WRMC was founded at ETH Zurich. Since 2008-07-01 the WRMC is hosted by the [Alfred Wegener Institute](#). Data were transferred to AWI from the original ftp-site at ETH Zurich until about 2008-03-01. More recent data were submitted directly to AWI were all data are archived in the ftp-server <ftp://ftp.bsrn.awi.de/>. Additionally, all data are available via the PANGAEA - Data Publisher for Earth & Environmental Science [1]. For more information see: <http://www.bsrn.awi.de/>.

The data within the WRMC are read account restricted. Only persons who follow the [BSRN data release guidelines](#) are allowed to use the data. Read accounts for both - PANGAEA and ftp access - can be obtained from Dr. [Gert König-Langlo](#).

Web links

- The WRMC at AWI:
 - Homepage: <http://www.bsrn.awi.de>
 - Data status: http://www.pangaea.de/PHP/BSRN_Status.php
 - Data retrieval via PANGAEA: http://www.bsrn.awi.de/en/data/data_retrieval_via_pangaea/
 - Data retrieval via ftp: http://www.bsrn.awi.de/en/data/data_retrieval_via_ftp/
- Tools
 - BSRN Toolbox description: http://wiki.pangaea.de/wiki/BSRN_Toolbox
 - PanPlot description: <http://wiki.pangaea.de/wiki/PanPlot>



Present State of the WRMC:

6965 station-months available

Station	Short name	Station manager currently in charge	pre BSRN	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	All	
Alert	ALE	David Halliwell (David.Halliwell@ec.gc.ca)																							X	
Alice Springs	ASP	Bruce Forgan (B.Forgan@bom.gov.au)					12	12	12	12	12	12	11	12	12	12	12	12								X
Barrow	BAR	Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)		12	12	12	12	12	12	12	12	12	12	12	12	12	12	12								X
Bermuda	BER	Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)		12	12	12	12	12	12	12	12	12	12	12	10											X
Billings	BIL	Charles Long (chuck.long@prl.gov)			4	12	12	12	12	12	12	12	11									7	12	4		X
Bondville	BON	John Augustine (John.A.Augustine@noaa.gov)					12	12	12	12	12	12							12	6						X
Boulder, SURFRAD	BOS	John Augustine (John.A.Augustine@noaa.gov)					5	12	12	12									12	12	6					X
Boulder	BOU	Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)		12	12	12	12	12									12	12	12	12	12	2				X
Brasilia	BRB	Enio Bueno Pereira (eniobp@cptec.inpe.br)															8	10	4	9	12	12	5			X
Cabauw	CAB	Wouter Knap (knap@knmi.nl)															11	12	12	12	12	12	4			X
Camborne	CAM	Patrick Fishwick (patrick.fishwick@metoffice.com)										12	12	12	12	12	12	6								X
Carpentras	CAR	Jean-Philippe Morel (jean-philippe.morel@meteo.fr)							12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	5		X
Chesapeake Light	CLH	Fred M. Denn (Frederick.M.Denn@nasa.gov)										8	12	11	12	12	12	12	12	12	12	12	12	6		X
Serra																										
Solar Village	SOV	Naif Al-Abbad							3	12	12	12	12													X
South Pole	SPO	Ellsworth Dutton		12	12	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	2				X
Syowa	SYO	Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)				12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11			X
Sioux Falls		John Augustine (John.A.Augustine@noaa.gov)													7	12	12	12	12	12	6					X
Tamanrasset		Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)									10	12	12	12	12	12	12	12	12	12	12	12	12	4		X
Tatenokawa		Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)						11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	4		X
Tiksi		Vasilii Kustov (kustov@aari.ru)																			7	9				X
Toravere		Ain Kallis (kallis@aai.ee)									12	12	12	12	12	12	12	12	12	12	12	12	12	5		X
Xianghe	XIA	Xiangao Xia (xiangaoxia2000@yahoo.com)															12	12	12	8						X
Historical station	Eismitte		1																							X
	All			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		pre BSRN		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	All	

~ 580 years of radiation measurements