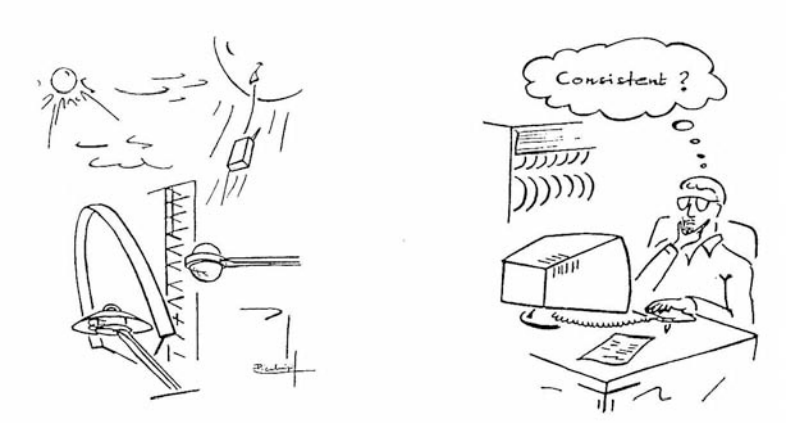
Status of the

World Radiation Monitoring Center



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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.

WRMC-BSRN

World Radiation Monitoring Center- Baseline Surface Radiation Network

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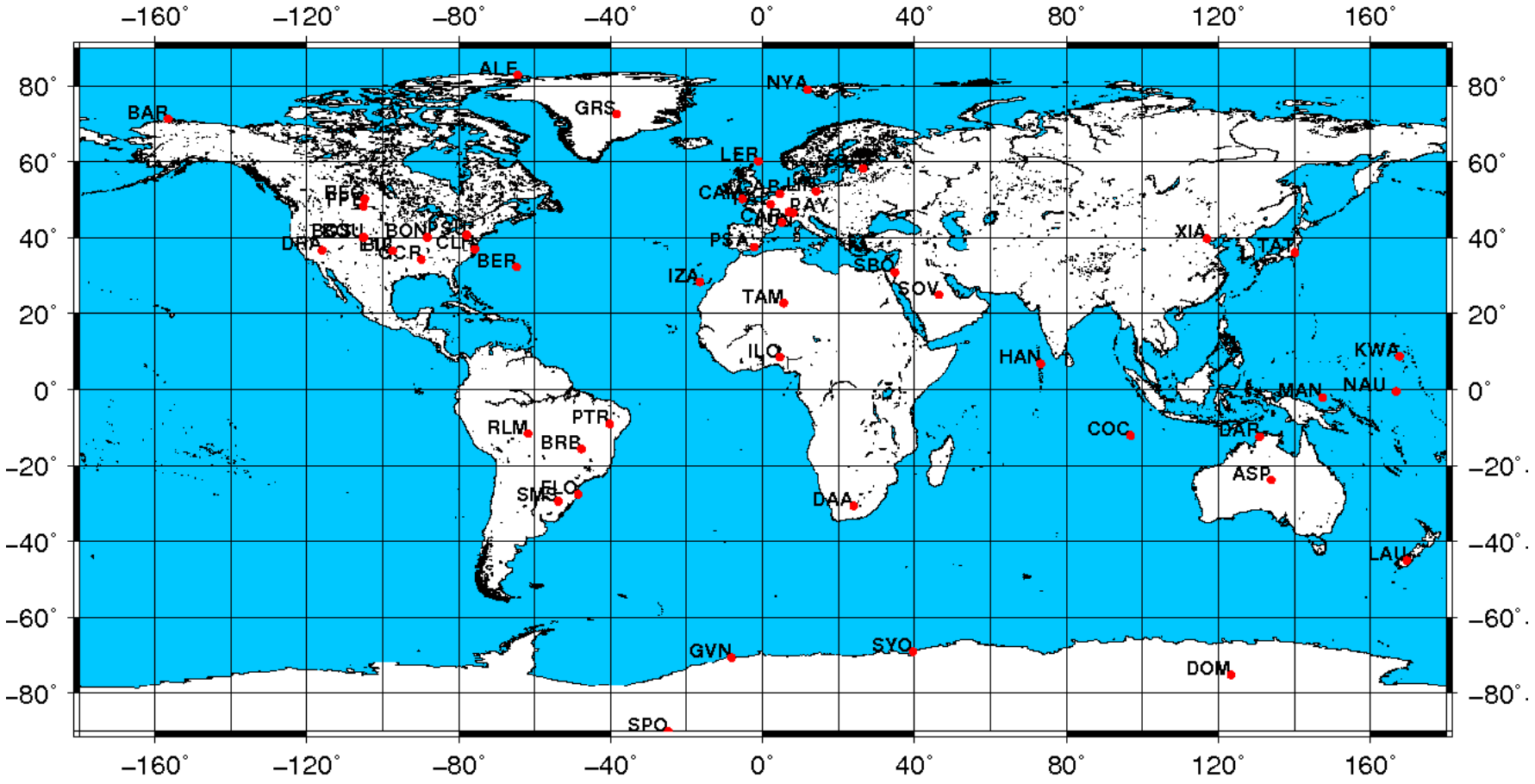
Present State of the WRMC: 47 stations providing data



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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)	47 stations
2.	LR 0200: (Long-wave spectral down)	0 stations
3.	LR 0300: (Reflex, Long-wave up)	9 stations
4.	LR 0500: (UV)	12 stations
5.	LR 1000: (Synops)	8 stations
6.	LR 1100: (Upper air soundings)	25 stations
7.	LR 1200: (Total ozone)	8 stations
8.	LR 1300: (Aerosol optical depths) (under construction)	(14) stations
9.	LR 1300: (Ceilometer data)	3 stations
10.	LR 30x0: (Radiation measurements from tower)	11 stations

WRMC-BSRN

World Radiation Monitoring Center- Baseline Surface Radiation Network

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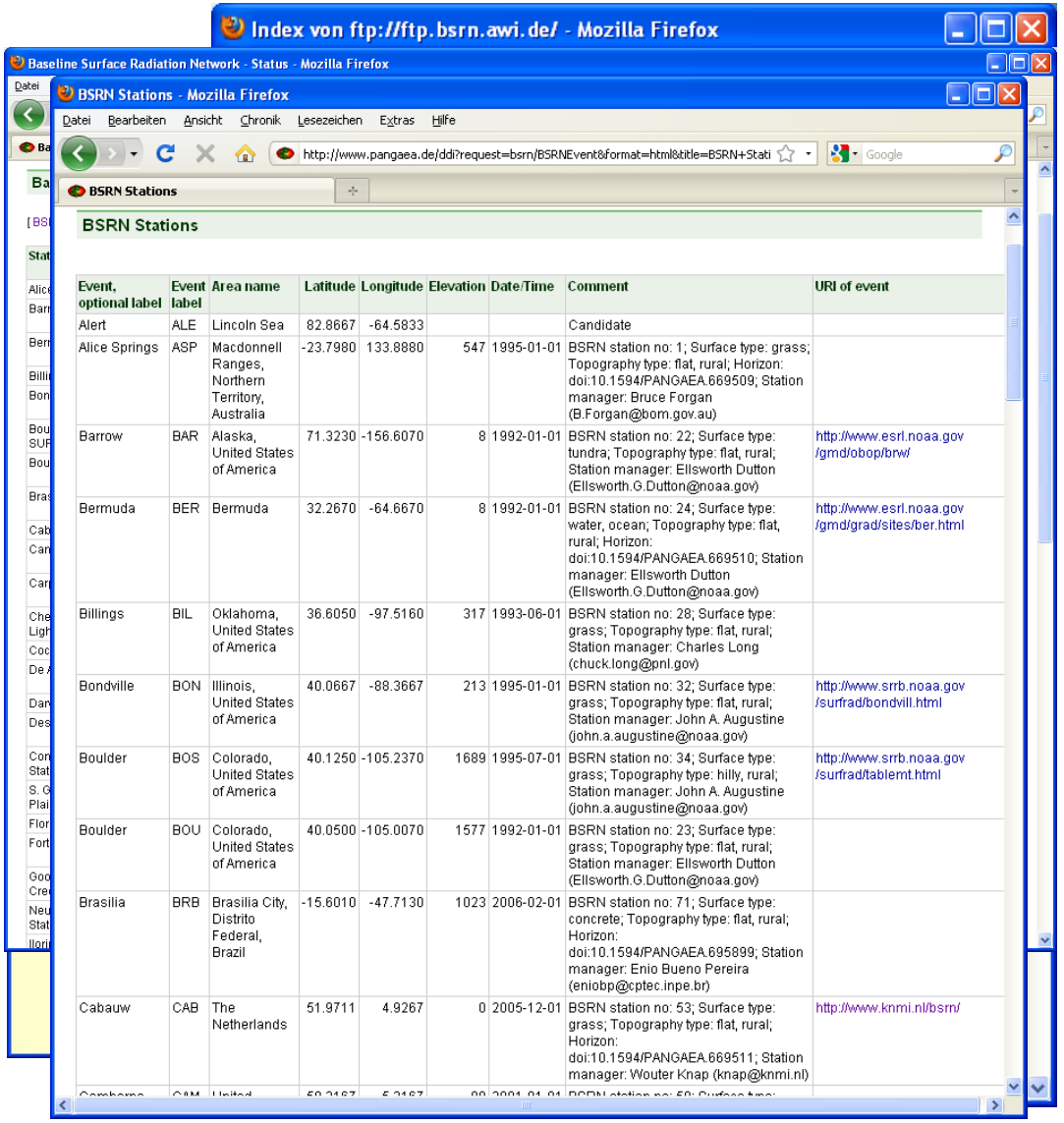
Homepage

1. The web-address is: http://www.bsrn.awi.de. The old homepage http://bsrn.ethz.ch does not exist any more.
2. The web pages at AWI base on the content management system Typo3. It offers a web-based editing throughout the word.
3. Access to ftp://ftp.bsrn.awi.de/
4. Link-tables offer easy access to any dataset.
5. Additional, station information, parameters, software, literature etc. are offered.



Event, optional label	Event label	Area name	Latitude	Longitude	Elevation	Date/Time	Comment	URI of event
Alert	ALE	Lincoln Sea	82.8667	-64.5833			Candidate	
Alice Springs	ASP	Macdonnell Ranges, Northern Territory, Australia	-23.7980	133.8880	547	1995-01-01	BSRN station no: 1; Surface type: grass; Topography type: flat, rural; Horizon: doi:10.1594/PANGAEA.669509; Station manager: Bruce Forgan (B.Forgan@bom.gov.au)	
Barrow	BAR	Alaska, United States of America	71.3230	-156.6070	8	1992-01-01	BSRN station no: 22; Surface type: tundra; Topography type: flat, rural; Station manager: Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)	http://www.esrl.noaa.gov/gmd/obop/brw/
Bermuda	BER	Bermuda	32.2670	-64.6670	8	1992-01-01	BSRN station no: 24; Surface type: water, ocean; Topography type: flat, rural; Horizon: doi:10.1594/PANGAEA.669510; Station manager: Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)	http://www.esrl.noaa.gov/gmd/grad/sites/ber.html
Billings	BIL	Oklahoma, United States of America	36.6050	-97.5160	317	1993-06-01	BSRN station no: 28; Surface type: grass; Topography type: flat, rural; Station manager: Charles Long (chuck.long@pnl.gov)	
Bondville	BON	Illinois, United States of America	40.0667	-88.3667	213	1995-01-01	BSRN station no: 32; Surface type: grass; Topography type: flat, rural; Station manager: John A. Augustine (john.a.augustine@noaa.gov)	http://www.srrb.noaa.gov/surfrad/bondvill.html
Boulder	BOS	Colorado, United States of America	40.1250	-105.2370	1689	1995-07-01	BSRN station no: 34; Surface type: grass; Topography type: hilly, rural; Station manager: John A. Augustine (john.a.augustine@noaa.gov)	http://www.srrb.noaa.gov/surfrad/tablemt.html
Boulder	BOU	Colorado, United States of America	40.0500	-105.0070	1577	1992-01-01	BSRN station no: 23; Surface type: grass; Topography type: flat, rural; Station manager: Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)	
Brasilia	BRB	Brasilia City, Distrito Federal, Brazil	-15.6010	-47.7130	1023	2006-02-01	BSRN station no: 71; Surface type: concrete; Topography type: flat, rural; Horizon: doi:10.1594/PANGAEA.695899; Station manager: Enio Bueno Pereira (eniobp@cptec.inpe.br)	
Cabauw	CAB	The Netherlands	51.9711	4.9267	0	2005-12-01	BSRN station no: 53; Surface type: grass; Topography type: flat, rural; Horizon: doi:10.1594/PANGAEA.669511; Station manager: Wouter Knap (knap@knmi.nl)	http://www.knmi.nl/bsrn/

Workflow at AWI:

Incoming Data

1. Each station scientist produces one station-to-archive file per month and station.
2. Files get copied from the station scientists to ftp.bsrn.awi.de/incoming/station.
3. Accepted files (formal check, visual inspection) get copied from the WRMC to ftp.bsrn.awi.de/station where they are public available.
4. Accepted files get additionally imported into the publishing network for geoscientific & environmental data "PANGAEA".

Outgoing Data

1. AWI provides ftp-access (ftp.bsrn.awi.de/station) to any station-to-archive file.
2. Additionally, AWI provides the full "PANGAEA" service with respect to any single dataset (logical record, station, month) (http://www.bsrn.awi.de).
3. For longer time series and averages the "Data Warehouse" service is available.

WRMC-BSRN
World Radiation Monitoring Center- Baseline Surface Radiation Network

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Present State of the WRMC: 5622station-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	All
Alice Springs	ASP	Bruce Forgan (B.Forgan@bom.gov.au)					12	12	12	12	12	12	11	12	12	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	12	12	6		X
Bermuda	BER	Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)		12	12	12	12	12	12	12	12	12	12	12	10	12	12	12	12	12	6		X
Billings	BIL	Charles Long (chuck.long@pnl.gov)			4	12	12	12	12	12	12	12	11	12	12	12	12	12	12	12	6		X
Bondville	BON	John Augustine (John.A.Augustine@noaa.gov)					12	12	12	12	12	12	12	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	12	12	12	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	12	12	12	12	12	12	12	6		X
Brasilia	BRB	Enio Bueno Pereira																8	10				X

.....

Tamanrasset	TAM	Mohamed Mimouni (m_mimouni_dz@yahoo.fr)										10	12	12	12	12	12	12	12	12	12		X
Tateno	TAT	Nozomu Ohkawara (ohkawara@met.kishou.go.jp)						11	12	12	12	12	12	11	11	12	12	12	12	12	12		X
Toravere	TOR	Ain Kallis (kallis@aai.ee)									12	12	12	12	12	12	12	12	12	12	12	1	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
			pre BSRN	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**All**

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WRMC-BSRN
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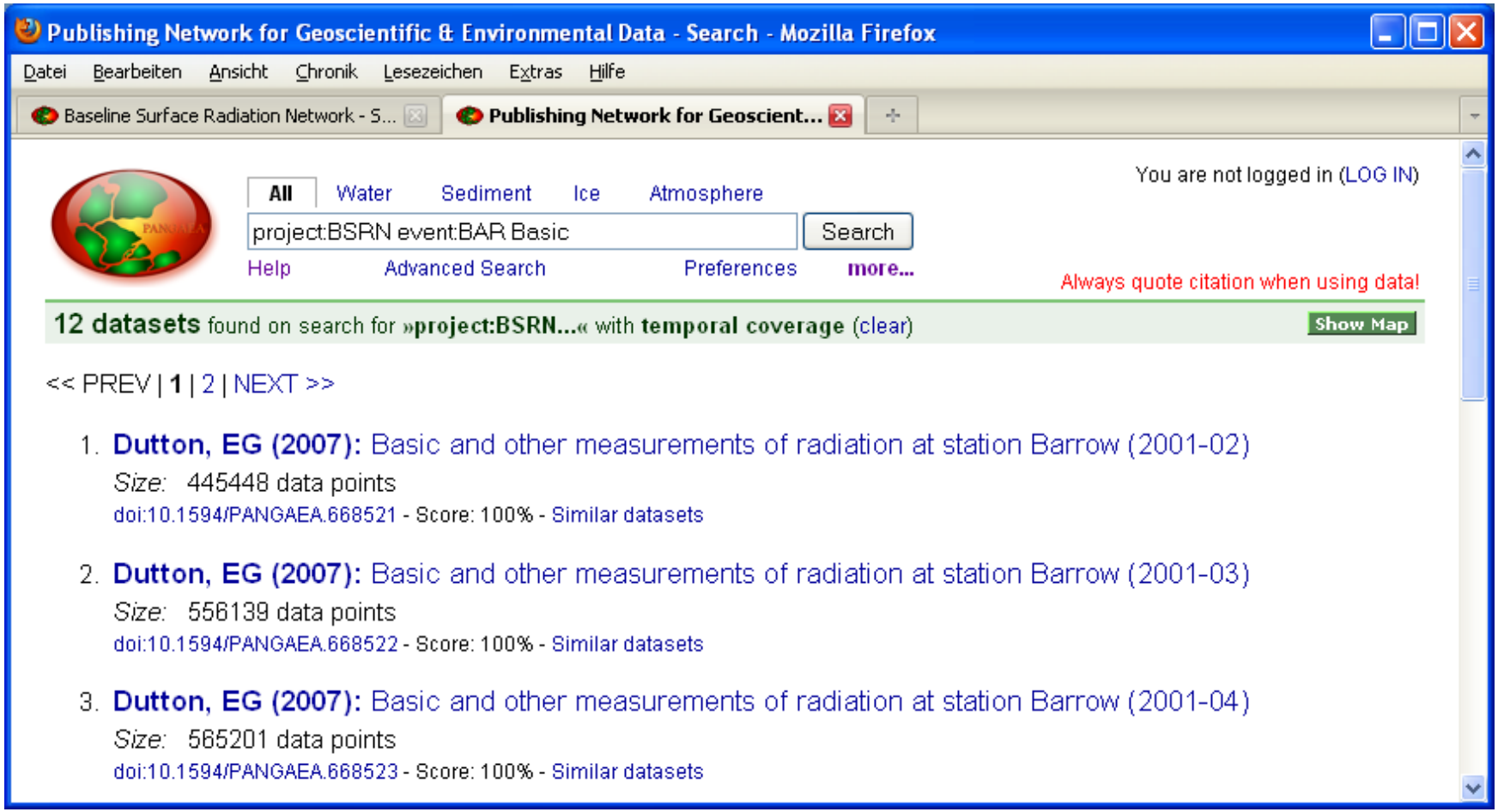
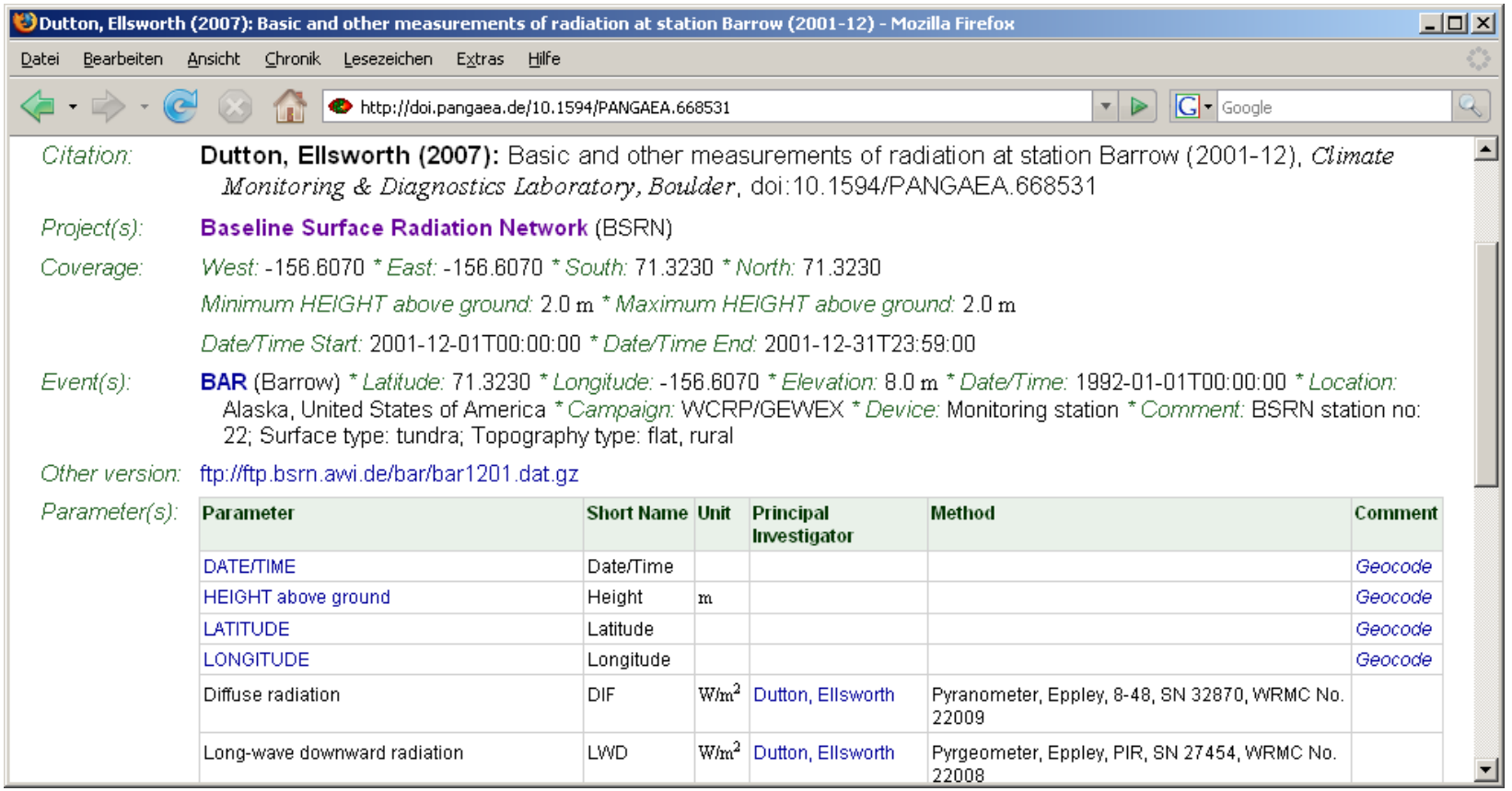
What offers PANGAEA?



What offers PANGAEA?

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



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

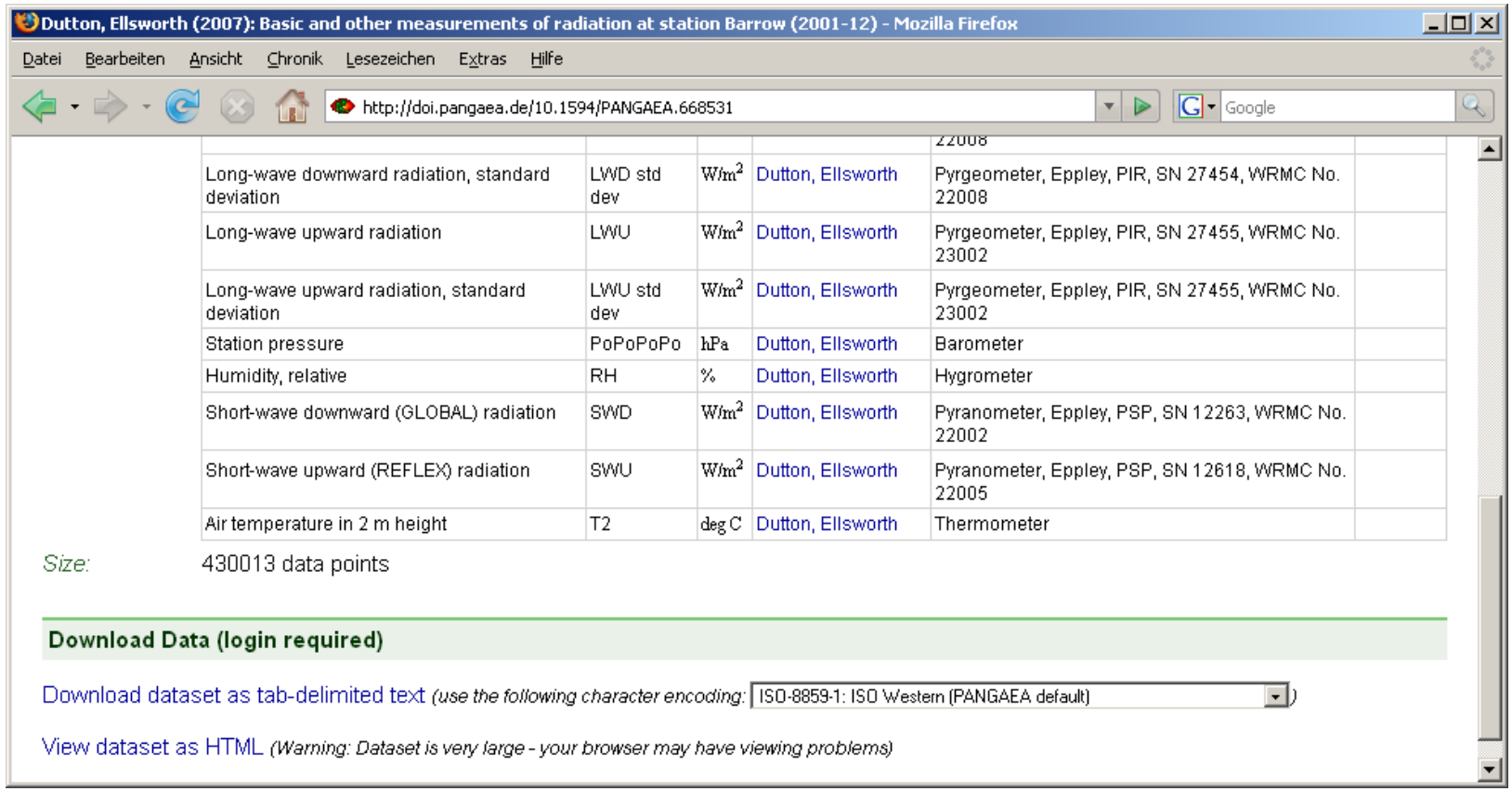
Other version: ftp://ftp.bsrn.awi.de/bar/bar1201.dat.gz

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/m²	Dutton, Ellsworth	Pyrgeometer, Eppley, PIR, SN 27454, WRMC No. 22008
Long-wave upward radiation	LWU	W/m²	Dutton, Ellsworth	Pyrgeometer, Eppley, PIR, SN 27455, WRMC No. 23002
Long-wave upward radiation, standard deviation	LWU std dev	W/m²	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/m²	Dutton, Ellsworth	Pyranometer, Eppley, PSP, SN 12263, WRMC No. 22002
Short-wave upward (REFLEX) radiation	SWU	W/m²	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

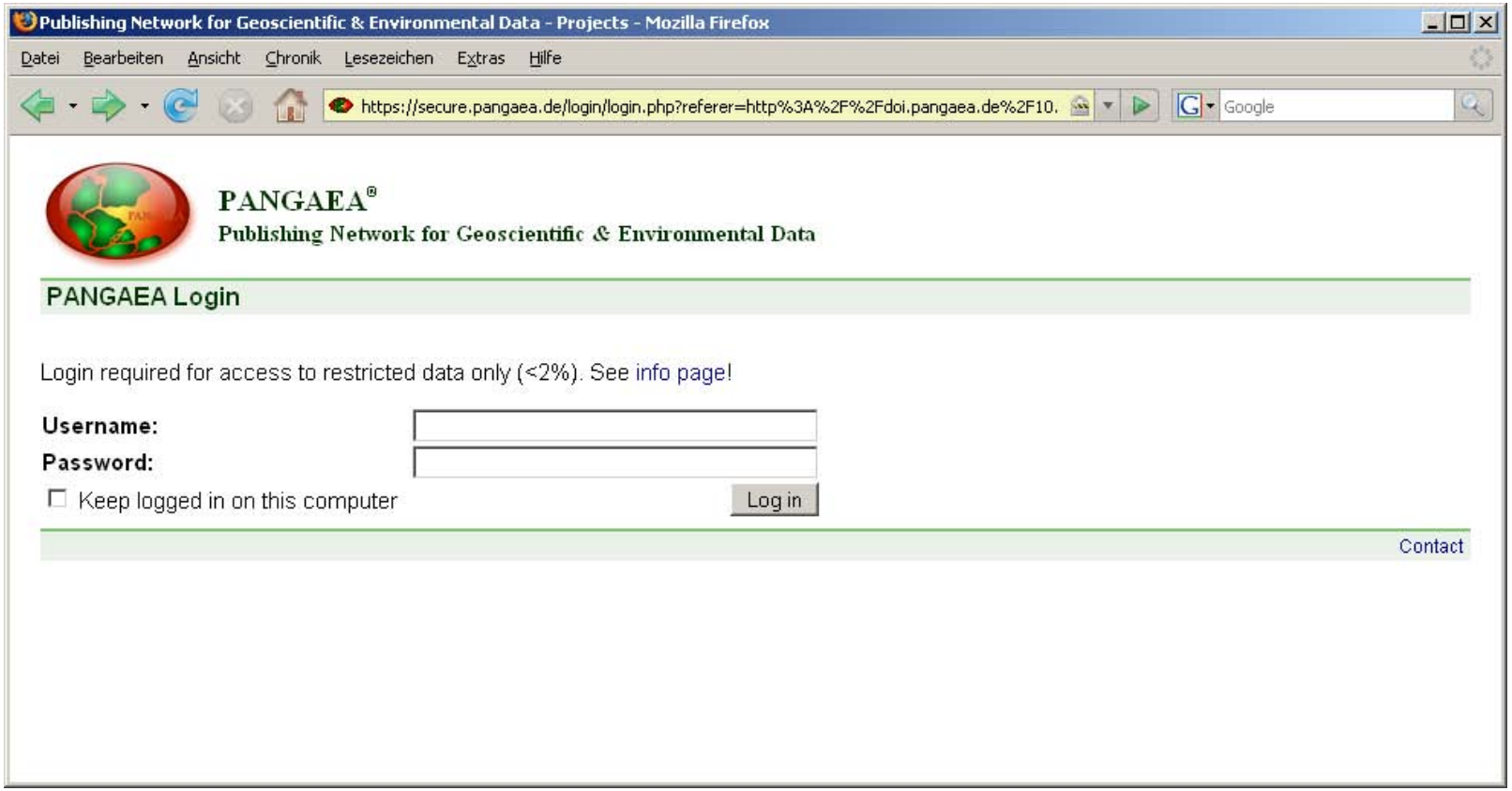
Download Data (login required)

Download dataset as tab-delimited text *(use the following character encoding:* ISO-8859-1: ISO Western (PANGAEA default) *)*

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

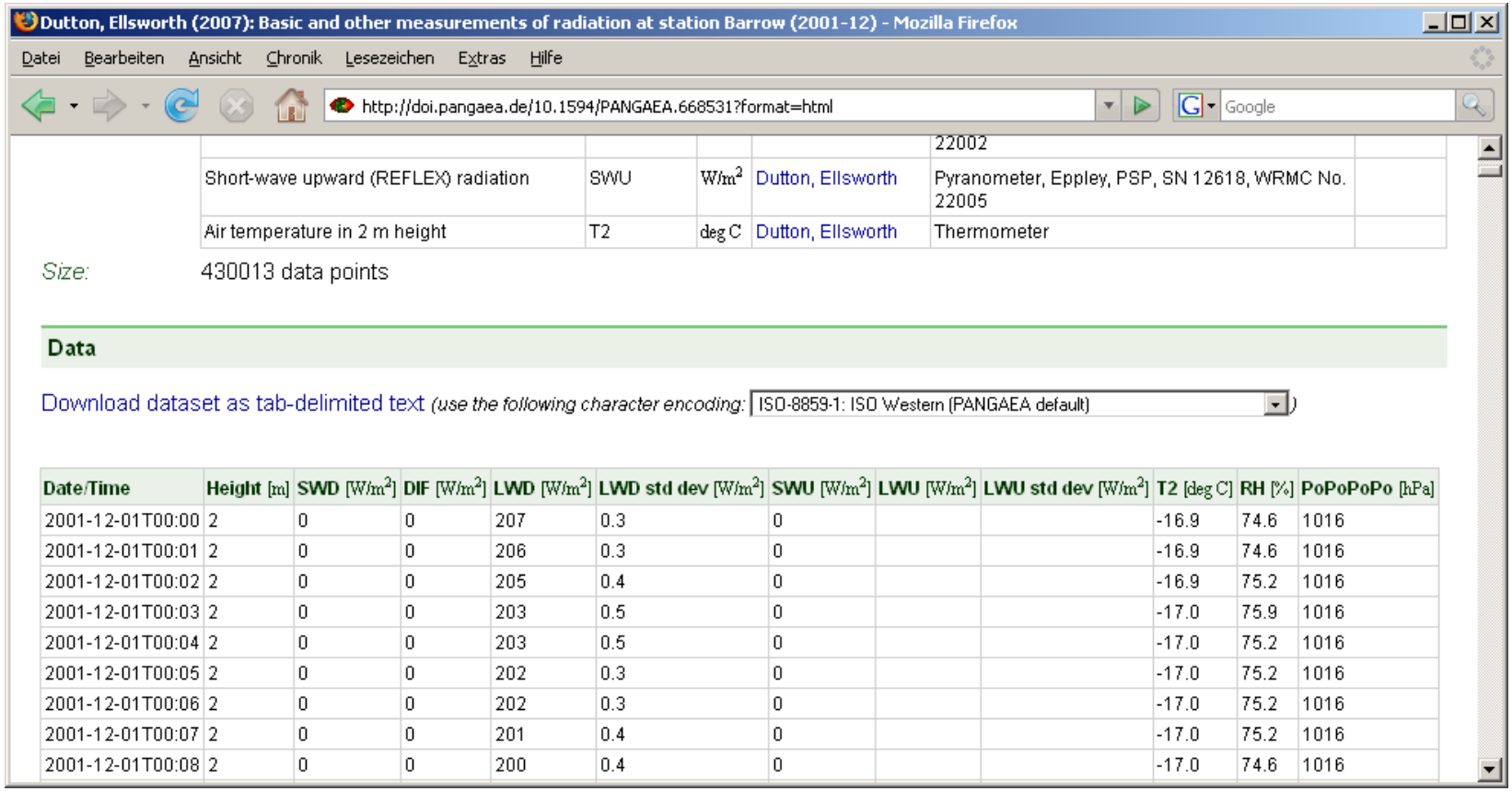
What offers PANGAEA?

PANGAEA offers access restrictions



What offers PANGAEA?

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



					22002
	Short-wave upward (REFLEX) radiation	SWU	W/m²	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

Data

Download dataset as tab-delimited text *(use the following character encoding:* ISO-8859-1: ISO Western (PANGAEA default) *)*

Date/Time	Height [m]	SWD [W/m²]	DIF [W/m²]	LWD [W/m²]	LWD std dev [W/m²]	SWU [W/m²]	LWU [W/m²]	LWU std dev [W/m²]	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

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Google Earth Overlay

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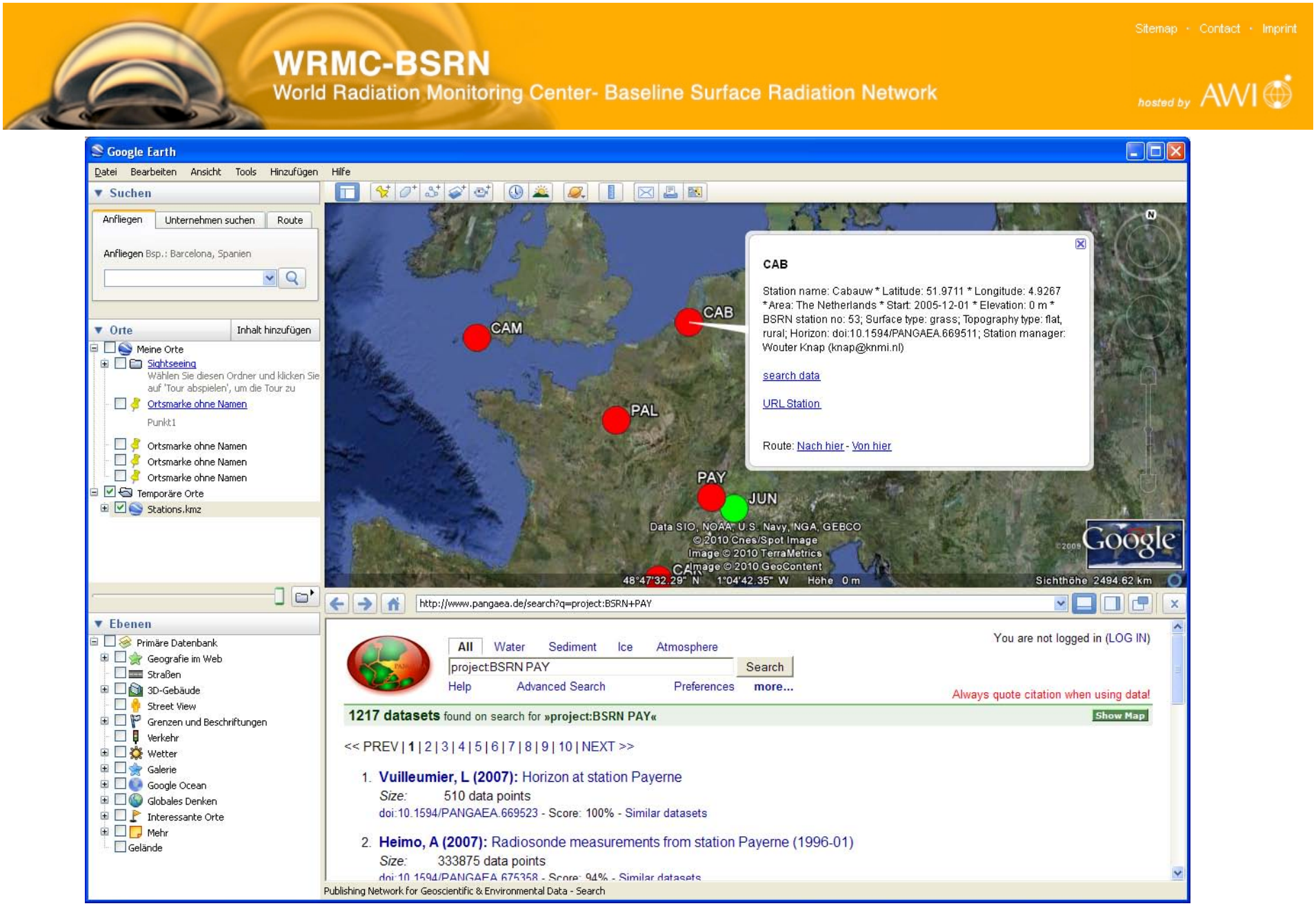

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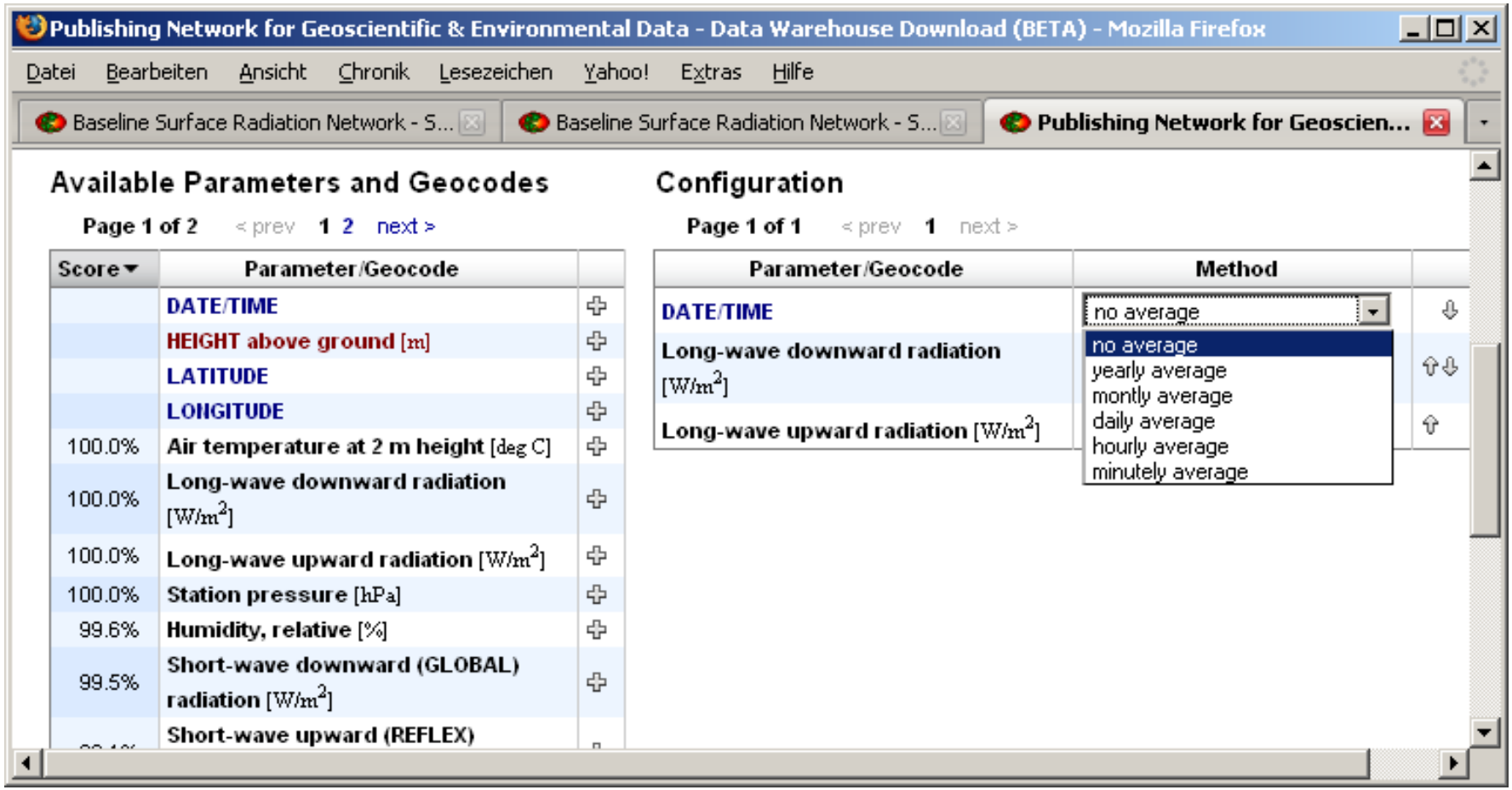
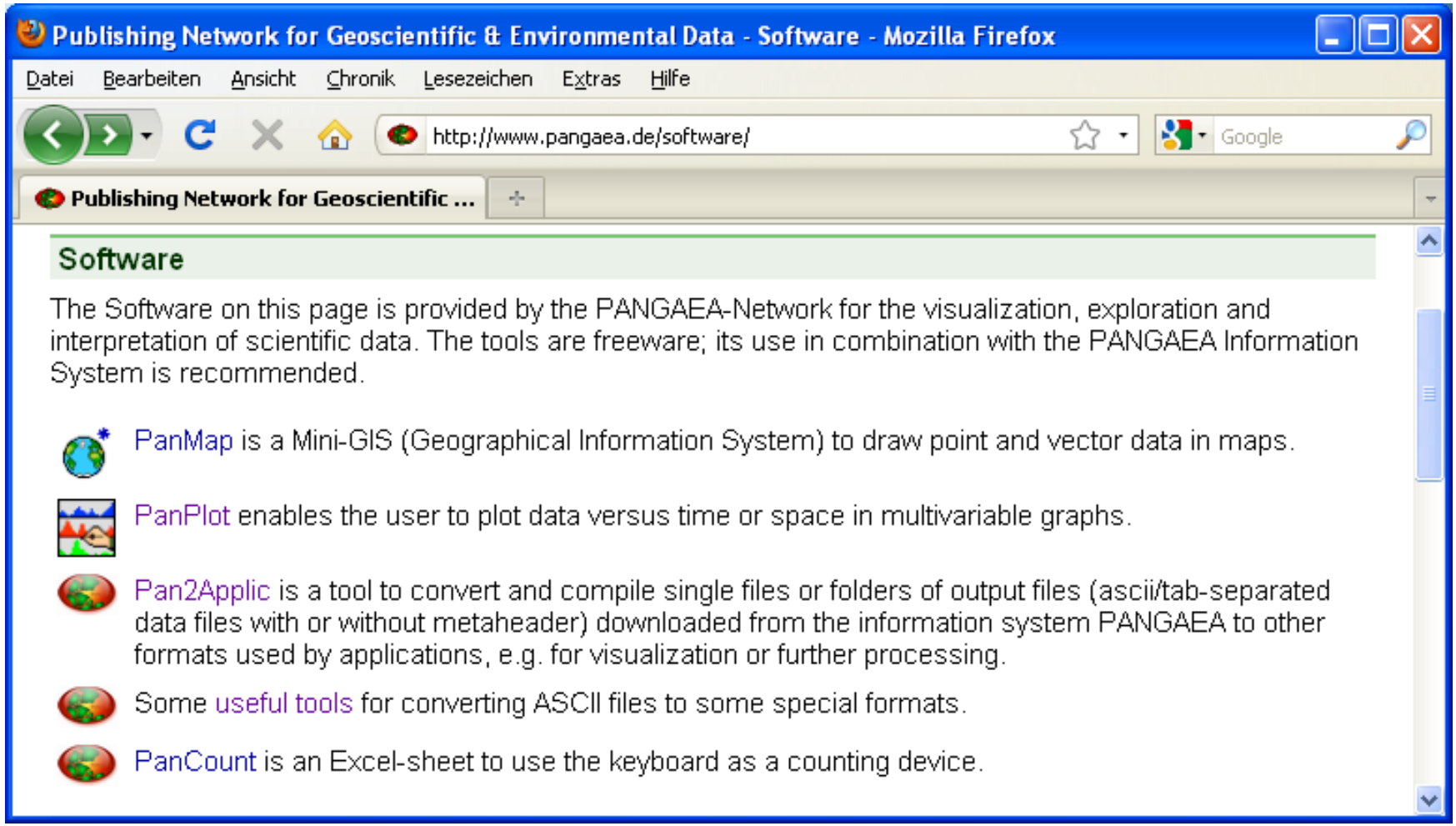
What offers PANGAEA?

PANGAEA Data Warehouse offers averaging of long time series



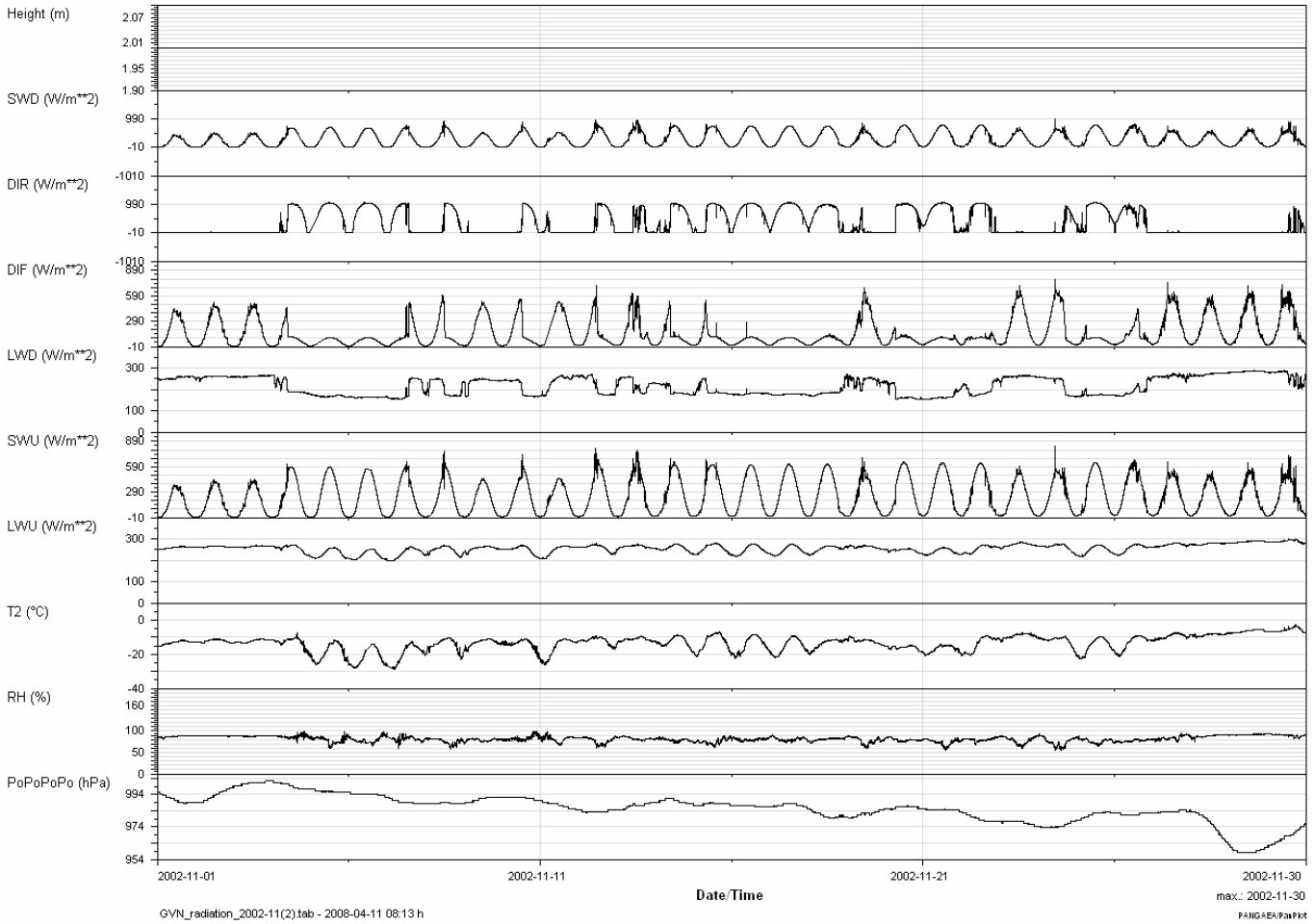
What offers PANGAEA?

Software



What offers PANGAEA?

Quicklook with PanPlot



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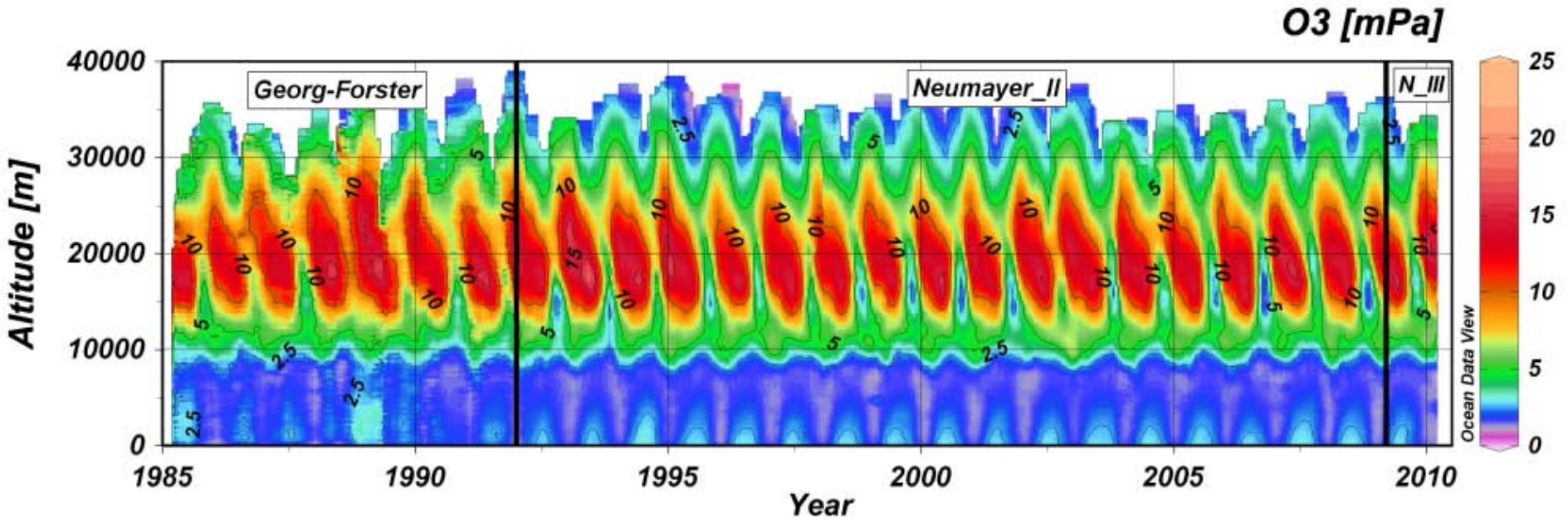
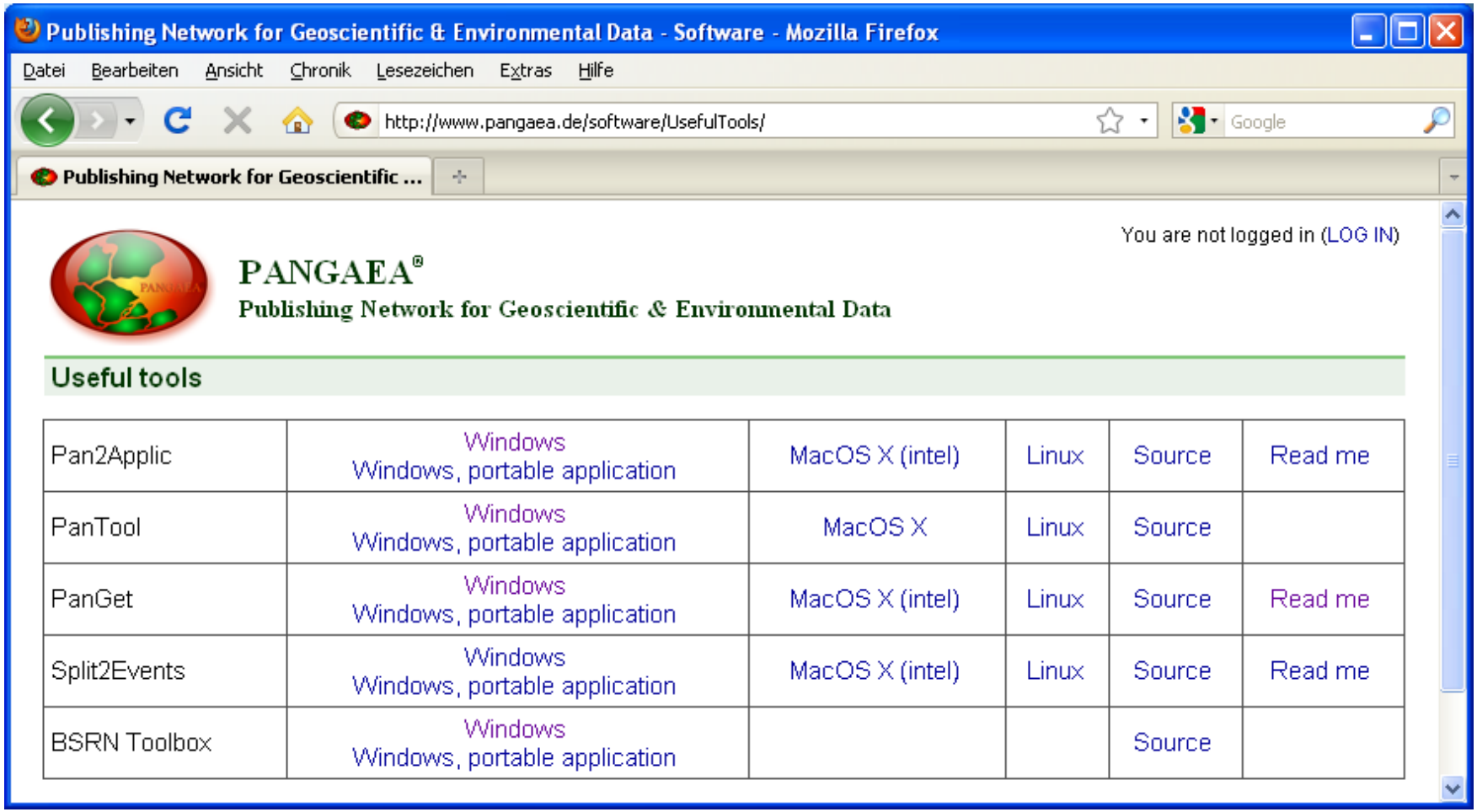
What offers PANGAEA?

Ocean Data View example:



What offers PANGAEA?

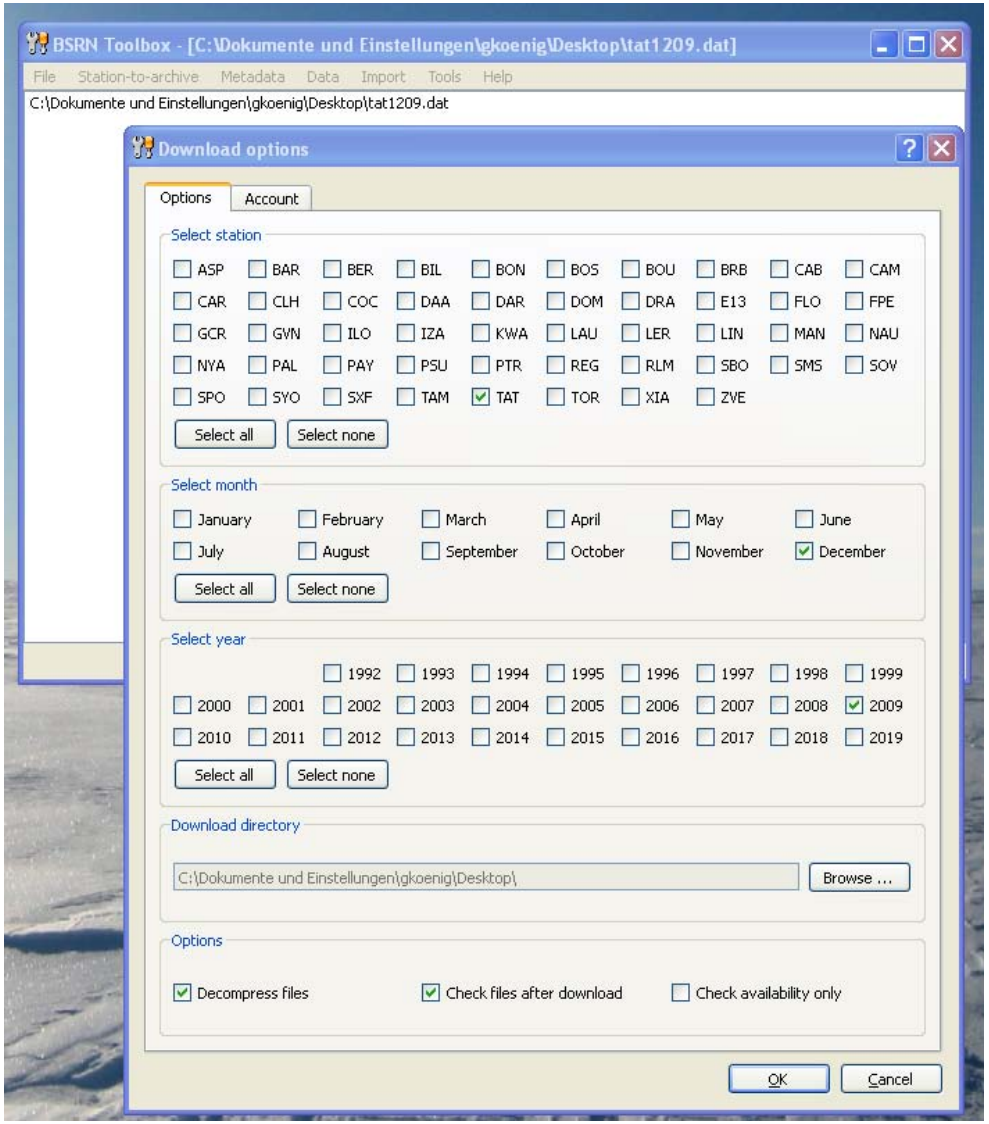
Software



Pan2Applic	Windows Windows, portable application	MacOS X (intel)	Linux	Source	Read me
PanTool	Windows Windows, portable application	MacOS X	Linux	Source	
PanGet	Windows Windows, portable application	MacOS X (intel)	Linux	Source	Read me
Split2Events	Windows Windows, portable application	MacOS X (intel)	Linux	Source	Read me
BSRN Toolbox	Windows Windows, portable application			Source	

BSRN Toolbox:

1. Downloading files from the public ftp account.
2. Decompressing files.
3. Formal check of the files.
4. Extract metadata.
5. Create files for PanPlot etc.



Future plans:

1. Publication of an updated „Technical Plan for BSRN Data Management". A draft is already available.
2. Data handling of the "spectral aerosol optical depths" (AODs) must be redefined since AODs cannot be included in the station-to-archive files as originally planed. This work is in process (Bruce Forgan). As soon as AOD data are available they will be offered in PANGAEA.
3. A central quality management will be established from Dr. Xiuping Yan, who started to work at AWI in February 2010. The main tool of the new quality management system will be a program which adds quality flags to Pangaea derived datasets.
4. The program for data quality flagging will get offered public domain as e.g. the BSRN-Toolbox. It can be used from any customer from the WRMC. It is planned to keep the error limits flexible to allow more specific error analysis depending of the applied instrument, the station environment and the demands of the users.