

# The World Radiation Monitoring Center at the Alfred Wegener Institute



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Gert König-Langlo, Rainer Sieger, Kuratorentreffen 2010



## **Main WRMC Objectives:**

Collecting uniform and consistent measurements throughout the Baseline Surface Radiation Network (BSRN) to:

1. monitor the surface short-wave and long-wave radiative components and their changes with the best methods currently available,
2. provide data for the validation of satellite-based estimates of the surface radiative fluxes and
3. produce high quality observational data for comparison to climate models.

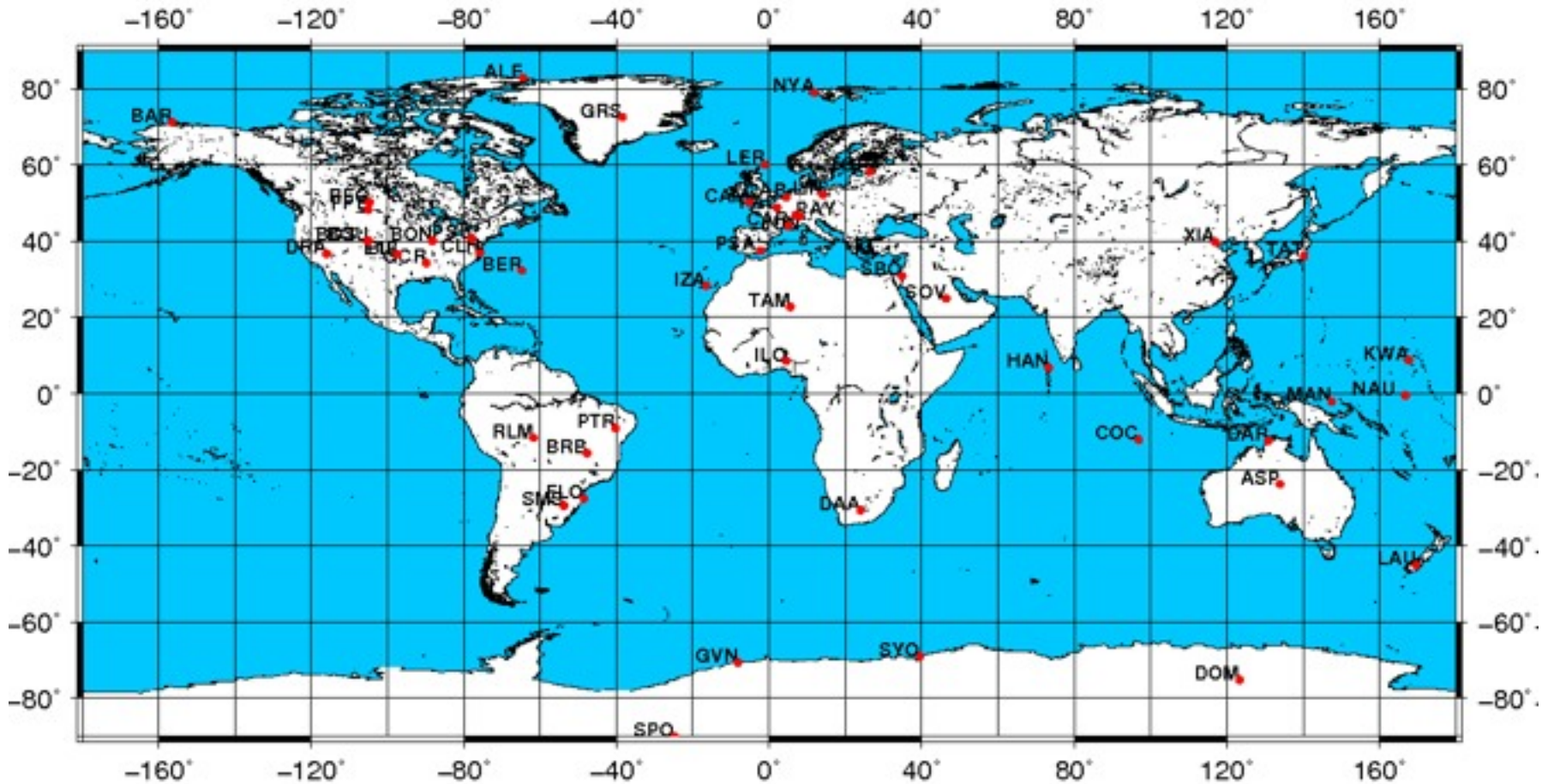


## **Brief BSRN History:**

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.



# 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)	7 stations
6. LR 1100: (Upper air soundings)	25 stations
7. LR 1200: (Total ozone)	8 stations
8. LR 1300: (Aerosol optical depths)	0 stations
9. LR 1300: (Ceilometer data)	2 stations
10. LR 30x0: (Radiation measurements from tower)	11 stations

## 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](ftp://ftp.bsrn.awi.de/incoming/station).
3. Accepted files get copied from the WRMC to [ftp.bsrn.awi.de/station](ftp://ftp.bsrn.awi.de/station) where they are public available.
4. Accepted files get additionally imported into PANGAEA.

### Outgoing Data

1. AWI provides ftp-access ([ftp.bsrn.awi.de/station](ftp://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.

## Station-to-Archive File:

```

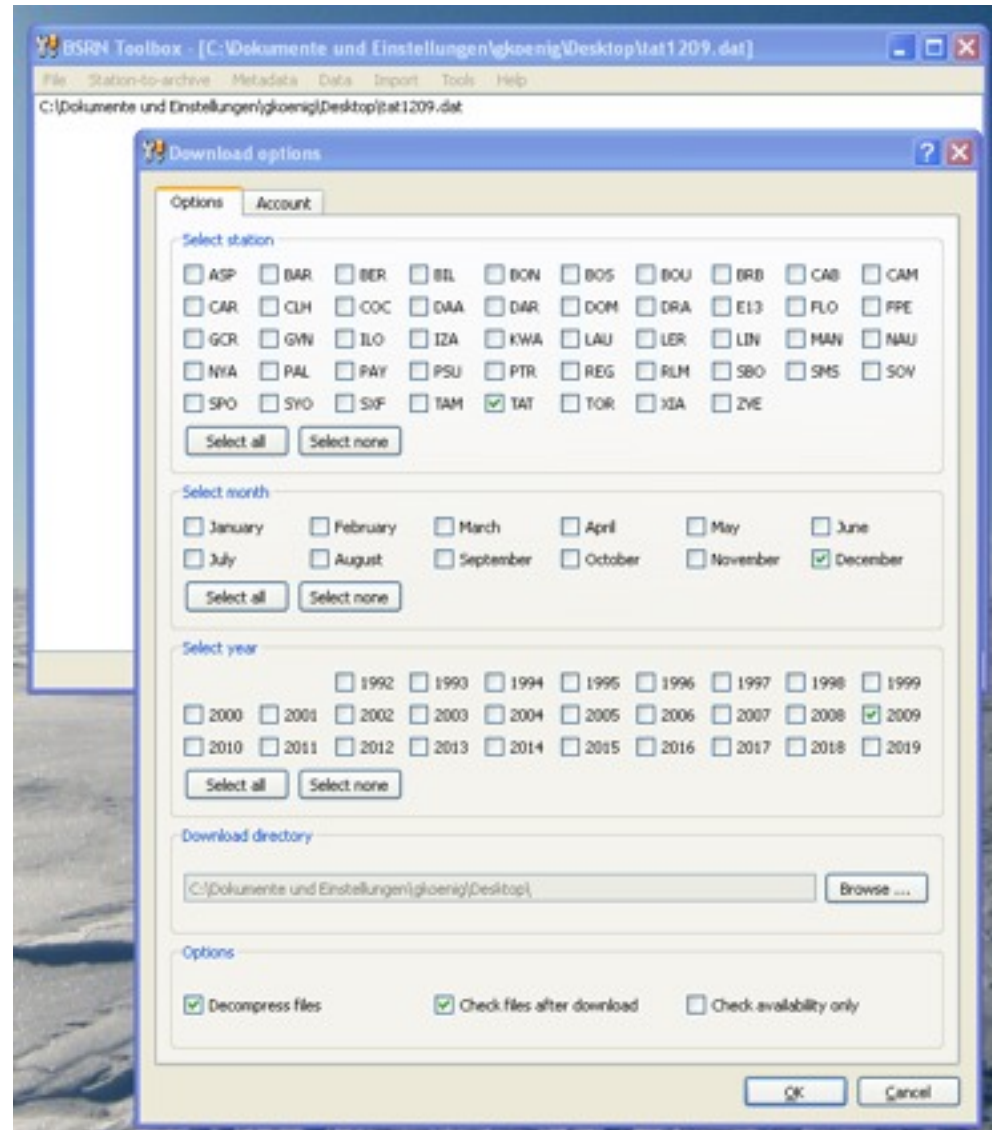
XXX      XXX      -1      -1.0000      -1.0000
Comparison to reference SL501A SN 1904
Ratio between instruments at 300 DU and SZA 40 deg
-1 -1 -1 Y
Solar Light Co          SL501A          3549          12/01/97 21053
XXX
-1 -1 -1.000 -1.000 -1.000 -1.000 -1.000 -1.000 71 23
MeteoSwiss, Payerne, CH          Dr. L. Vuilleumier
06/23/06 07/13/06 1          1.0700          -1.0000
XXX      XXX      -1      -1.0000      -1.0000
XXX      XXX      -1      -1.0000      -1.0000
Comparison to reference SL501A 1904
Ratio between instruments at 300 DU and SZA 40 deg
*U0009
-1 -1 -1          2 21005 -1
-1 -1 -1          131 21006 -1
-1 -1 -1          124 21052 -1
-1 -1 -1          125 21053 -1
*U0100
1      0      -2      0.1      -2      -1      -999 -99.9 -999 -999
          -1      0.0      -1      -1      255      0.5      254      256          0.2      99.7      955
1      1      -2      0.1      -2      -1      -999 -99.9 -999 -999
          -1      0.0      -1      -1      255      0.5      255      256          0.2      99.7      955
1      2      -2      0.1      -2      -1      -999 -99.9 -999 -999

```

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## BSRN Toolbox:

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



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# Present State of the WRMC: 5622station-months available

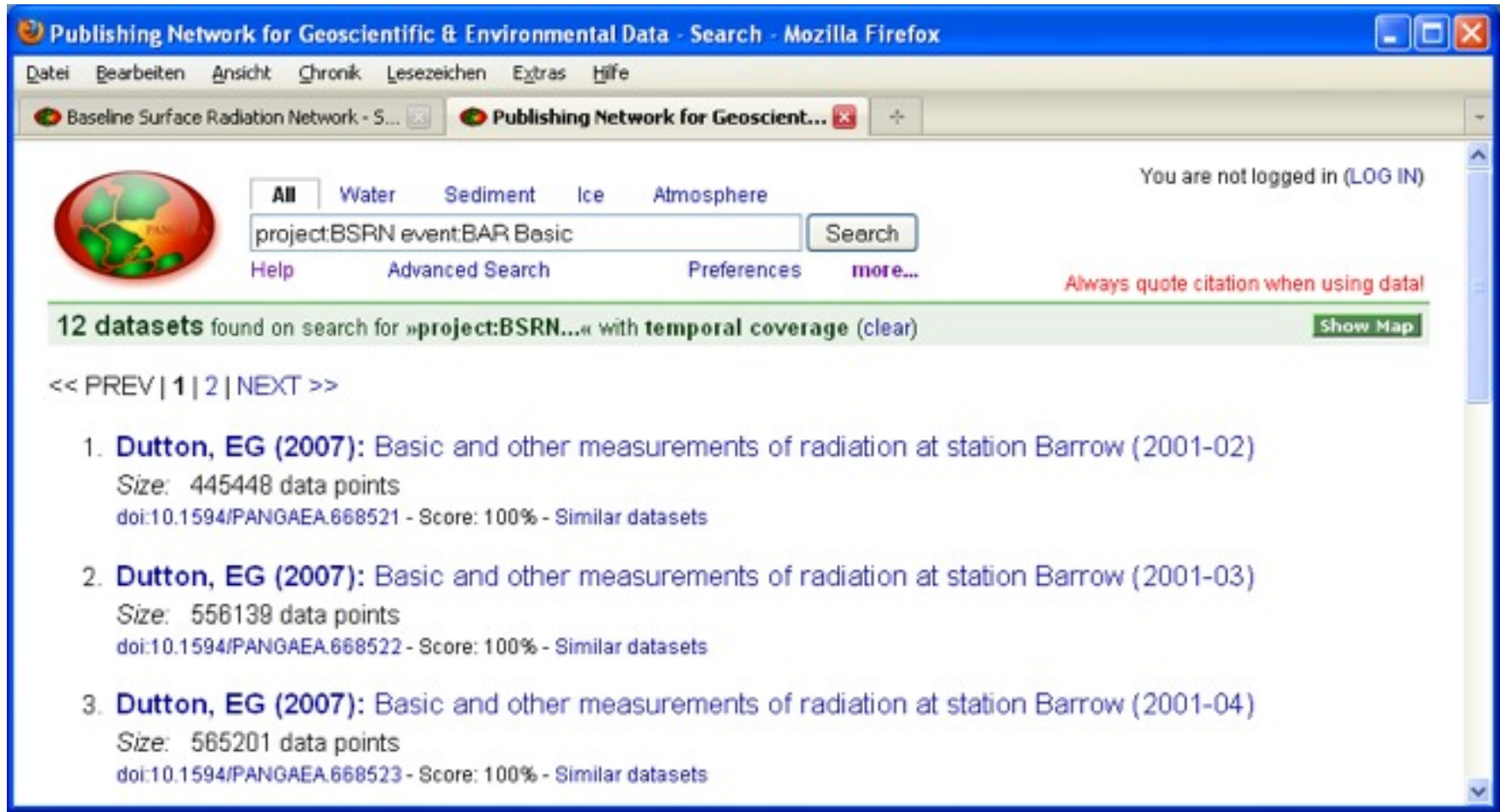
Station	Short name	Station manager currently in charge	pre BSRN	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	All
Alice Springs	ASP	Bruce Forgan (B.Forgan@bom.gov.au)					12	12	12	12	12	12	11	12	12	12	12	12	12				X
Barrow	BAR	Ellsworth Dutton (Ellsworth.G.Dutton@noaa.gov)		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
	<b>All</b>			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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# What offers PANGAEA?



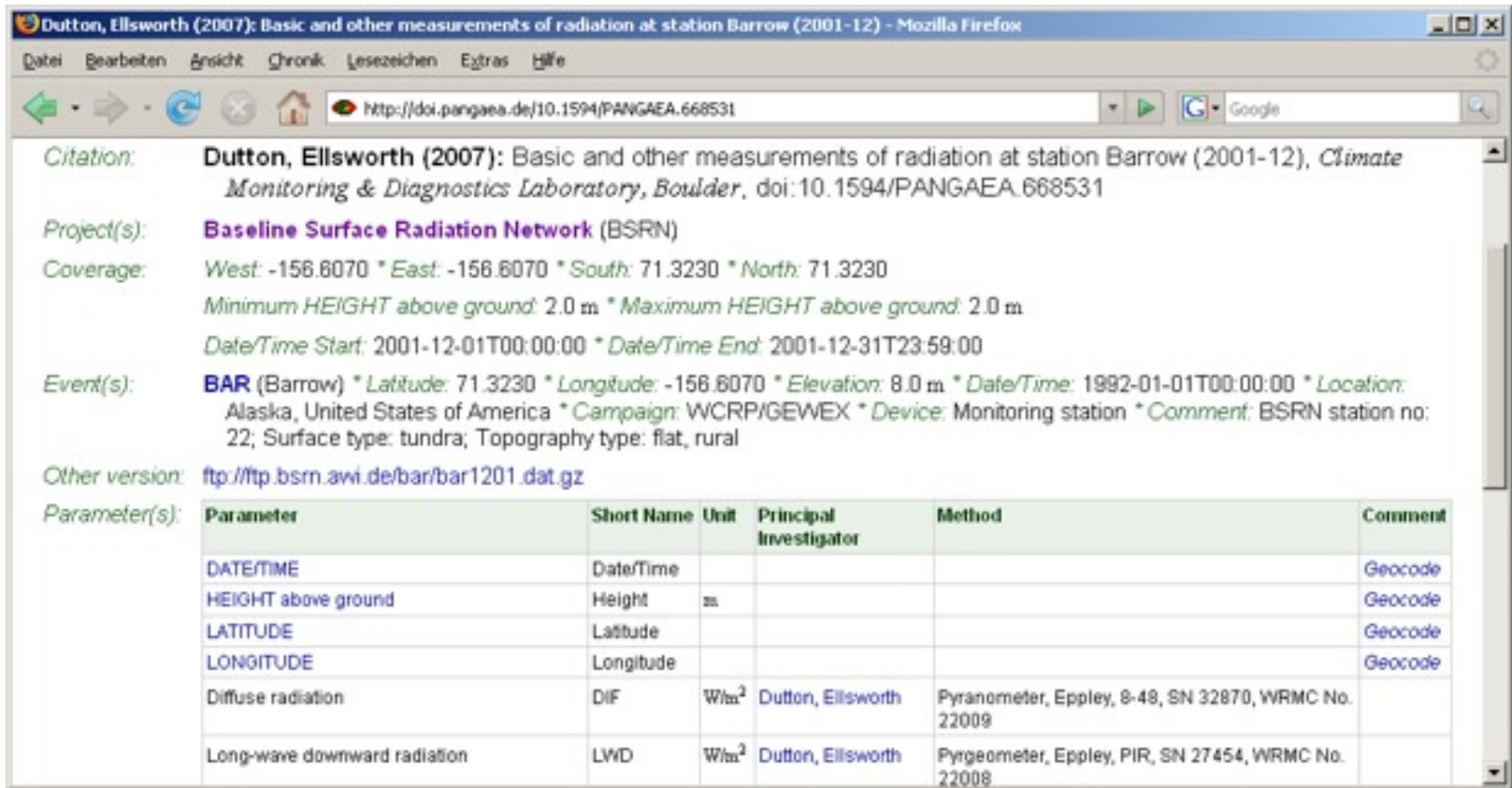
The screenshot shows a Mozilla Firefox browser window displaying the PANGAEA website search results. The browser title is "Publishing Network for Geoscientific & Environmental Data - Search - Mozilla Firefox". The address bar shows the URL "Baseline Surface Radiation Network - S...". The search bar contains the query "project:BSRN event:BAR Basic" and the search button is labeled "Search". The results show 12 datasets found on search for "project:BSRN..." with temporal coverage. The first three results are listed below:

- 1. **Dutton, EG (2007):** Basic and other measurements of radiation at station Barrow (2001-02)  
Size: 445448 data points  
doi:10.1594/PANGAEA.668521 - Score: 100% - Similar datasets
- 2. **Dutton, EG (2007):** Basic and other measurements of radiation at station Barrow (2001-03)  
Size: 556139 data points  
doi:10.1594/PANGAEA.668522 - Score: 100% - Similar datasets
- 3. **Dutton, EG (2007):** Basic and other measurements of radiation at station Barrow (2001-04)  
Size: 565201 data points  
doi:10.1594/PANGAEA.668523 - Score: 100% - Similar datasets

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# 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.bsm.awi.de/bar/bar1201.dat.gz>

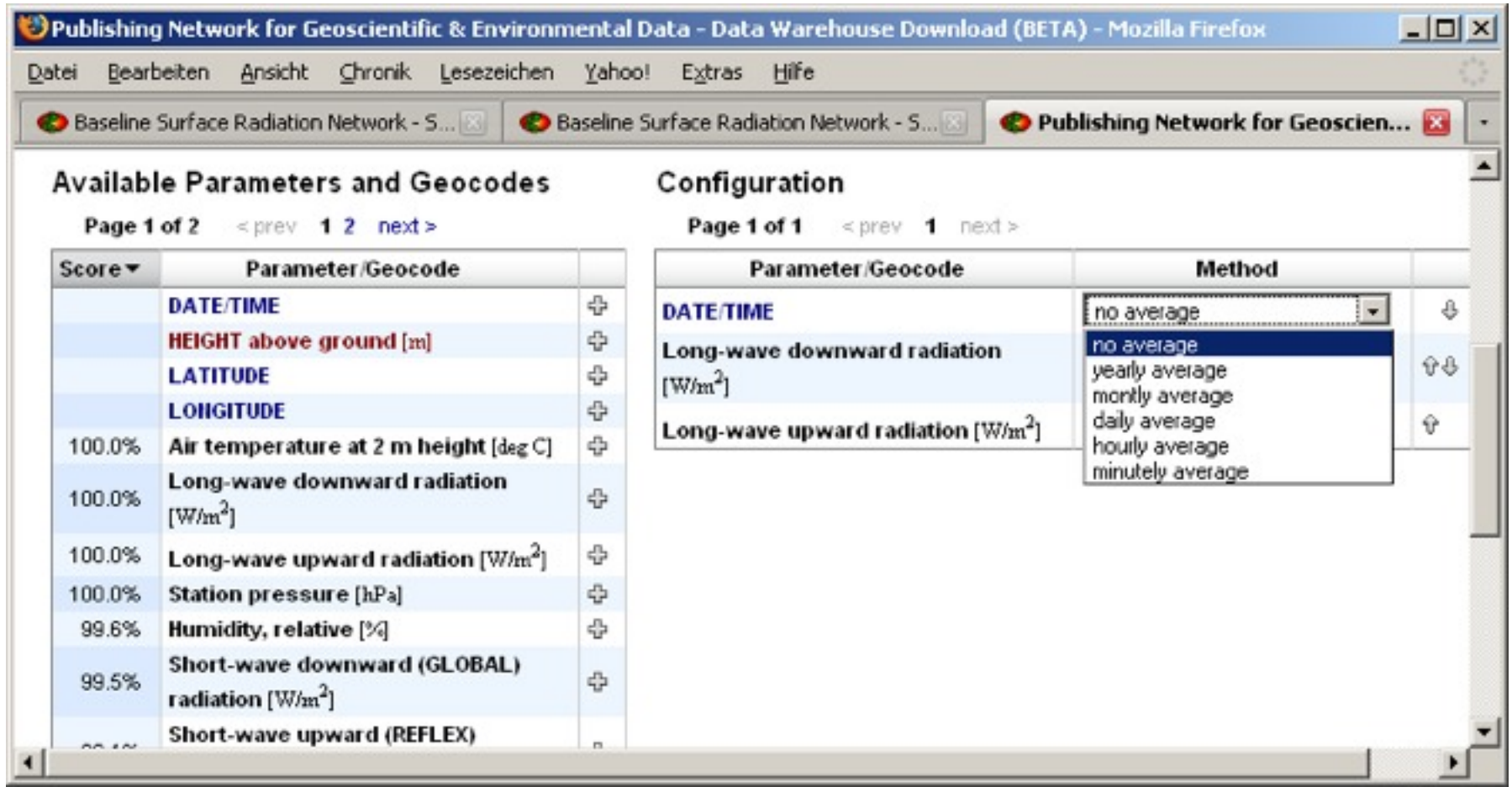
**Parameter(s):**

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	Whm <sup>2</sup>	Dutton, Ellsworth	Pyranometer, Eppley, 8-48, SN 32870, WRMC No. 22009	
Long-wave downward radiation	LWD	Whm <sup>2</sup>	Dutton, Ellsworth	Pyrgeometer, Eppley, PIR, SN 27454, WRMC No. 22008	

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# What offers PANGAEA?

PANGAEA Data Warehouse offers averaging of long time series



**Available Parameters and Geocodes**  
Page 1 of 2 < prev 1 2 next >

Score	Parameter/Geocode	
	DATE/TIME	+
	HEIGHT above ground [m]	+
	LATITUDE	+
	LONGITUDE	+
100.0%	Air temperature at 2 m height [deg C]	+
100.0%	Long-wave downward radiation [W/m <sup>2</sup> ]	+
100.0%	Long-wave upward radiation [W/m <sup>2</sup> ]	+
100.0%	Station pressure [hPa]	+
99.6%	Humidity, relative [%]	+
99.5%	Short-wave downward (GLOBAL) radiation [W/m <sup>2</sup> ]	+
99.5%	Short-wave upward (REFLEX)	+

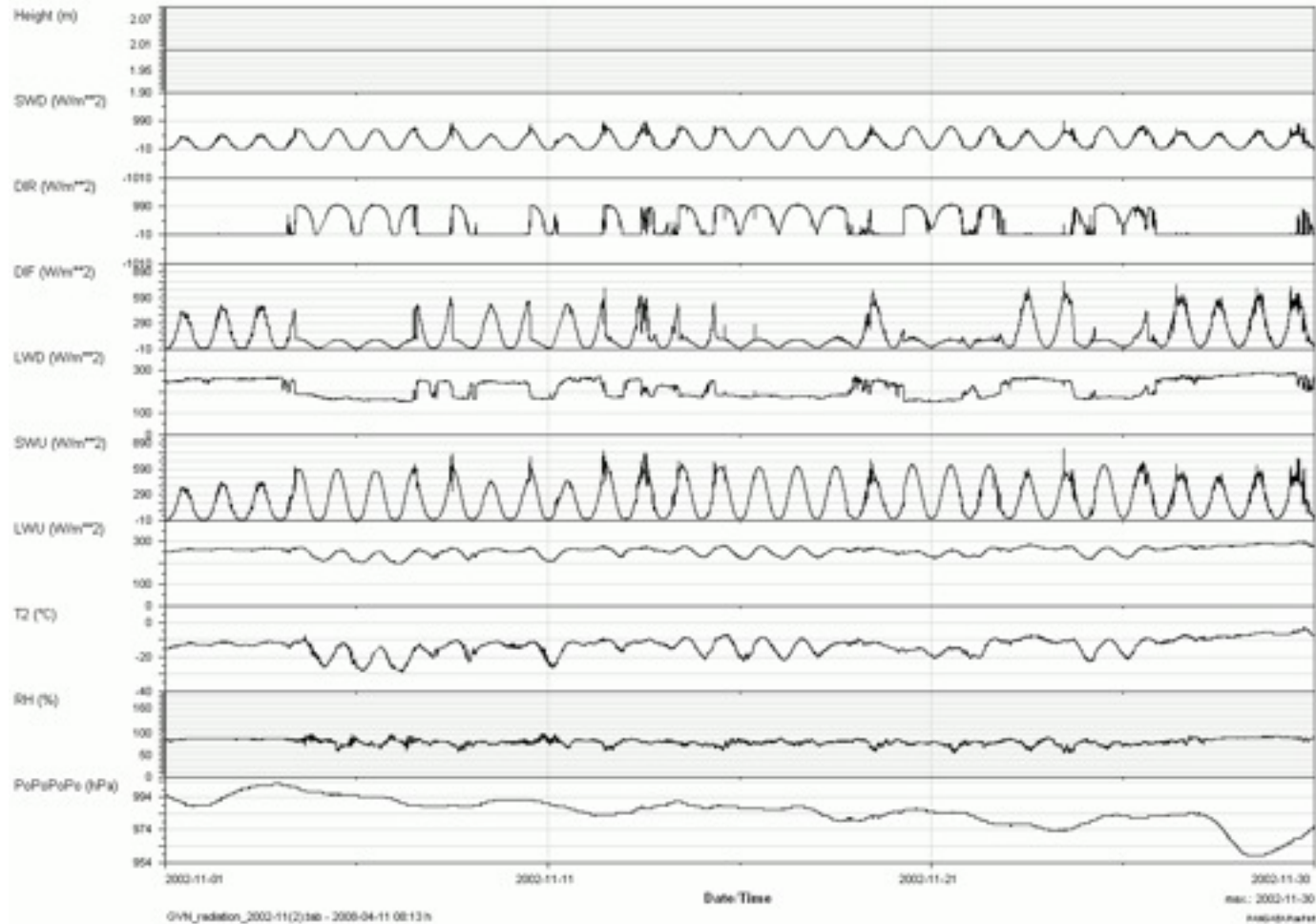
**Configuration**  
Page 1 of 1 < prev 1 next >

Parameter/Geocode	Method	
DATE/TIME	no average	↓
Long-wave downward radiation [W/m <sup>2</sup> ]	no average	↑↓
Long-wave upward radiation [W/m <sup>2</sup> ]	yearly average	↑↓
	monthly average	↑↓
	daily average	↑↓
	hourly average	↑↓
	minutely average	↑

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# What offers PANGAEA?

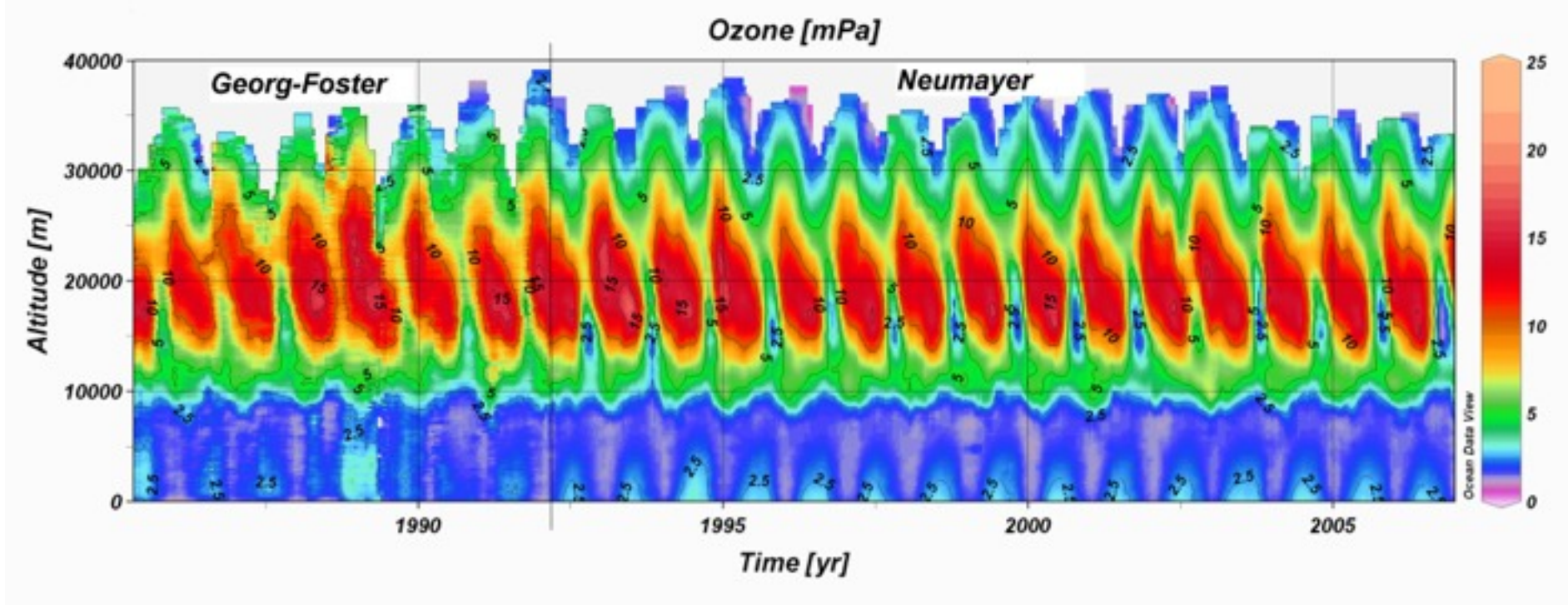
PanPlot example



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# What offers PANGAEA?

Ocean Data View example:



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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.

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

Baseline Surface Radiation Network - Status - Mozilla Firefox

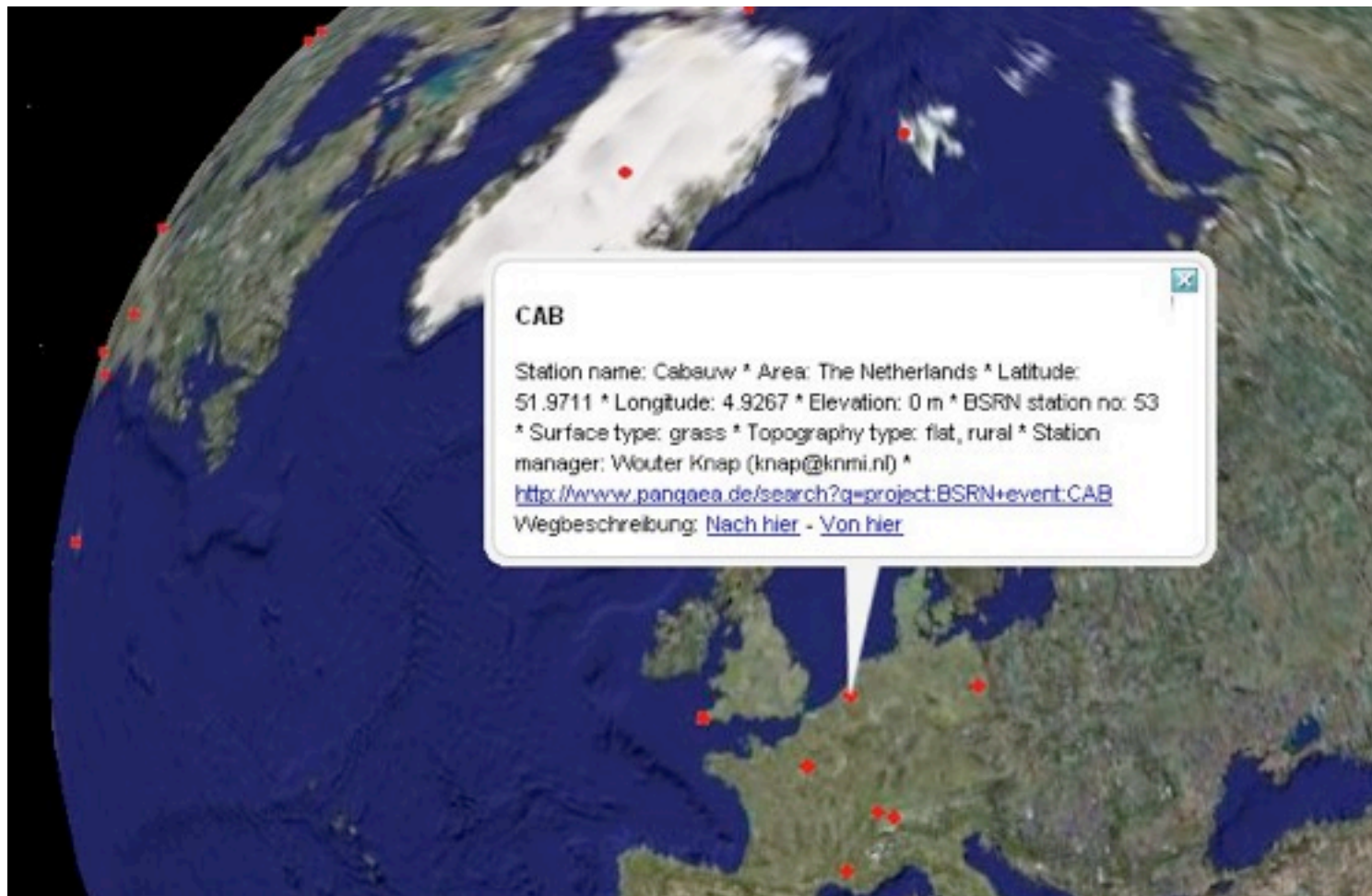
BSRN Stations

Event, optional label	Event label	Area name	Latitude	Longitude	Elevation	Date/Time	Comment	URL of event
Alert	ALE	Lincoln Sea	82.8667	-64.5933			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	0	1992-01-01	BSRN station no: 22; Surface type: tundra; Topography type: flat, rural; Station manager: Ellsworth Dutton (Ellsworth.O.Dutton@noaa.gov)	<a href="http://www.esrl.noaa.gov/igmd/bsrn/">http://www.esrl.noaa.gov/igmd/bsrn/</a>
Bermuda	BER	Bermuda	32.2670	-64.6670	0	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.O.Dutton@noaa.gov)	<a href="http://www.esrl.noaa.gov/igmd/grad/sites/ber.html">http://www.esrl.noaa.gov/igmd/grad/sites/ber.html</a>
Billings	BL	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@pri.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)	<a href="http://www.srb.noaa.gov/rutherford/bondvill.html">http://www.srb.noaa.gov/rutherford/bondvill.html</a>
Boulder	BOS	Colorado, United States of America	40.1290	-105.2370	1699	1995-07-01	BSRN station no: 34; Surface type: grass; Topography type: hilly, rural; Station manager: John A. Augustine (john.a.augustine@noaa.gov)	<a href="http://www.srb.noaa.gov/rutherford/boulder.html">http://www.srb.noaa.gov/rutherford/boulder.html</a>
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.O.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.669509; Station manager: Erico Bueno Pereira (ericobp@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 Knip (wknip@knmi.nl)	<a href="http://www.knmi.nl/bsrn/">http://www.knmi.nl/bsrn/</a>

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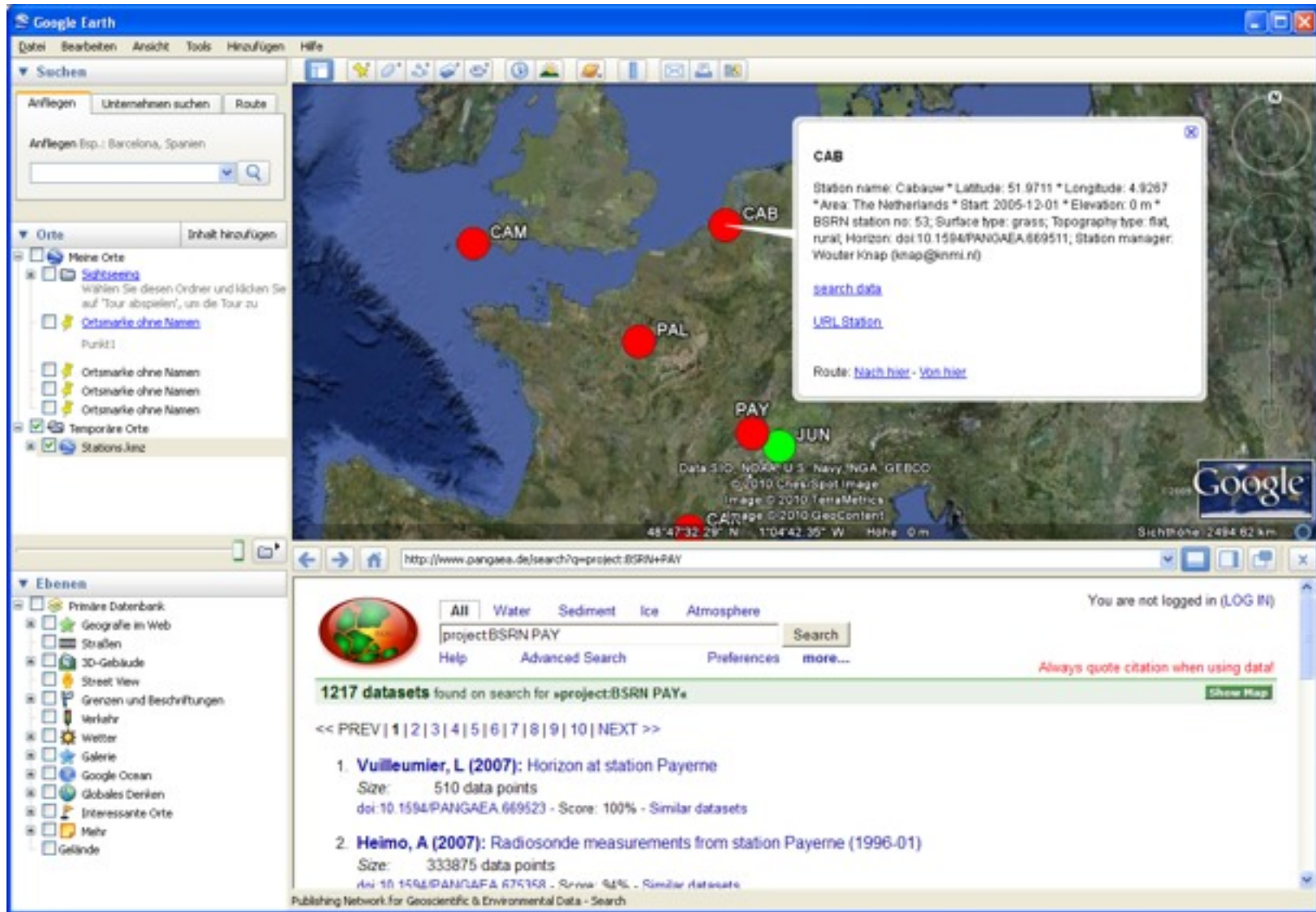


## Google Earth overlay



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**Google Earth**

Suchen

Anliegen Unternehmen suchen Route

Anliegen Esp.: Barcelona, Spanien

Orte Inhalt hinzufügen

Meine Orte

- Suchreisen
- Ortsmarke ohne Namen
- Ortsmarke ohne Namen
- Ortsmarke ohne Namen
- 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: [Nah](#) [hier](#) - [Von](#) [hier](#)

project:BSRN PAY

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

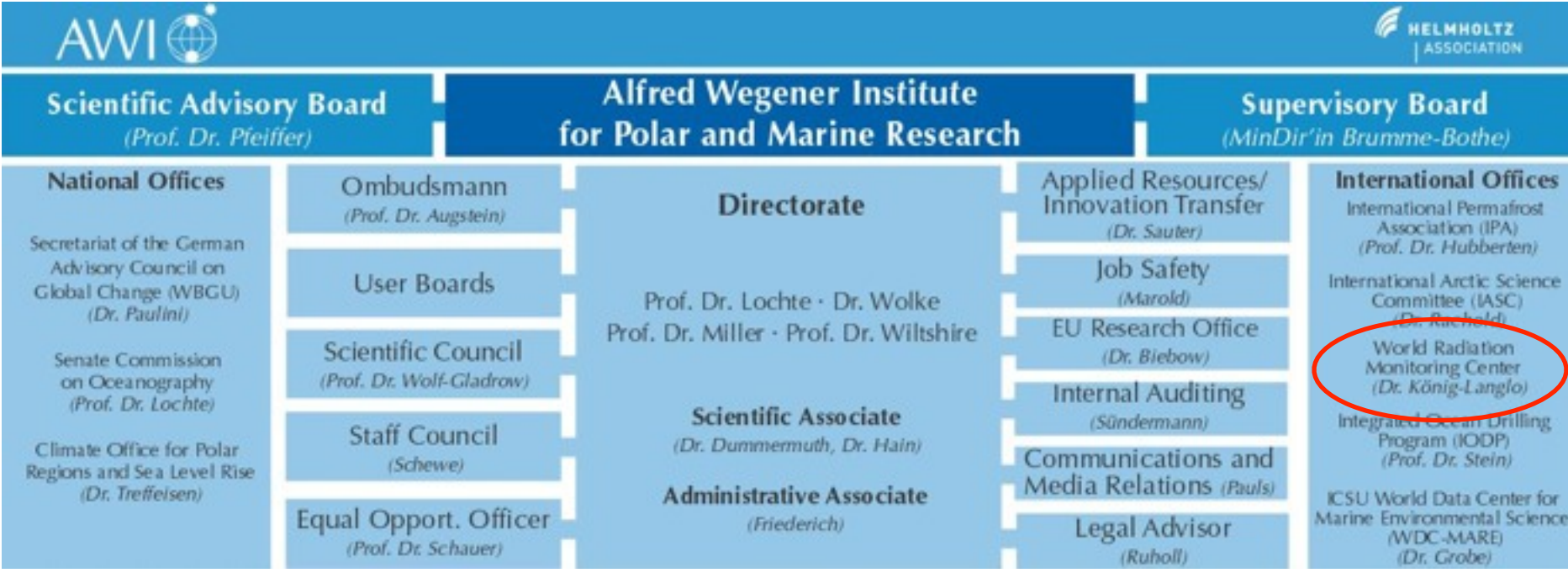
<< PREV | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | NEXT >>

- 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.675148 - Score: 94% - Similar datasets

AWI 10.1594/PANGAEA.675148 - Score: 94% - Similar datasets  
 Publishing Network for Geoscientific & Environmental Data - Search

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