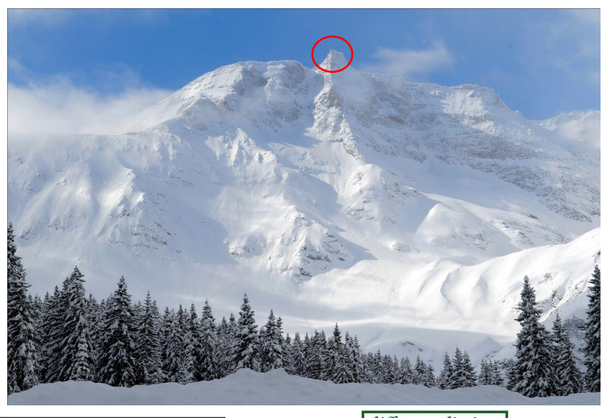
ZAMG
Zentralanstalt für Meteorologie und Geodynamik

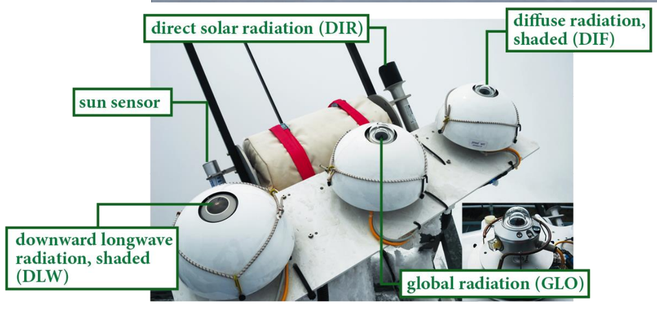
Status update of BSRN station Sonnblick (SON) – (Apr 2016)

- 5 years of quality controlled irradiance data since 2011 (data in BSRN archive starting Jan 2013)
- On average 84 % of good data after automated and manual data quality control
- Special configurations are needed in order to cope with cold climate issues at this exposed high alpine site

1. Station setup and data quality

BSRN Station SON located at summit of Mount Sonnblick, 3109 m a.s.l. (Austrian Alps). View on steep north face.





Tab.1: Metadata of BSRN Station SON. Mean annual air temperatures (Temp) and precipitation sums (Precip) are given for the climatological period 1981-2010.

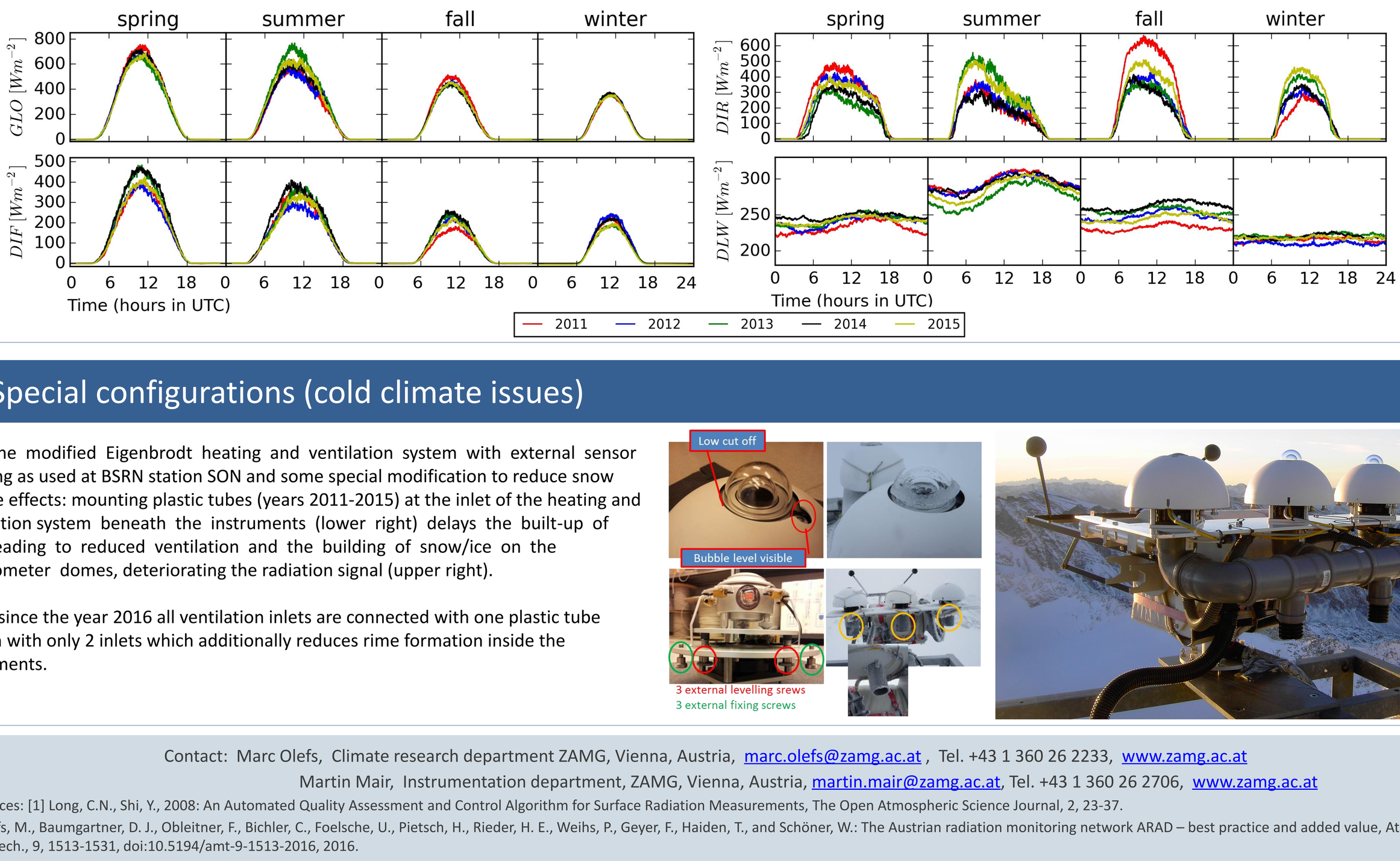
	Sonnblick (SON)				
Lat [°]	47,05	**topo type**	Mountain top/Rural	**heating/vent device**	Eigenbrodt
Lon [°]	12,96				
Alt [m]	3109	**suntr. device**	Kipp&Zonen 2 AP	**operated by**	ZAMG
temp [°C]	-5,1	**rad. Instr.**	2xCMP21, 1xDR02, 1xCGR4	**monitoring start**	01.01.2011
precip [mm]	2263				

Tab.2: Summary of the quality flag statistics (years 2011-2015) for the measured parameters GLO, DIF, DIR, DLW using a combined daily automated and manual QC ([1], [2]) including e.g. maintenance times. The last row ("Perfect") indicates the percentage of timestamps when all 4 parameters are simultaneously flagged as "Good".

	2011				2012				2013				2014				2015			
	GLO	DIF	DIR	DLW	GLO	DIF	DIR	DLW	GLO	DIF	DIR	DLW	GLO	DIF	DIR	DLW	GLO	DIF	DIR	DLW
Good	86	84	89	91	79	71	81	86	87	79	87	86	75	70	85	80	87	84	95	91
Wrong	8	7	9	2	19	27	16	7	9	18	9	7	21	26	12	13	11	14	3	4
Dubious	5	7	1	6	1	1	1	5	1	0	1	4	0	0	0	4	0	0	0	3
Missing	1	1	1	2	1	1	1	1	3	3	3	3	3	3	3	3	2	2	2	2
"Perfect"	76				64				71				64				76			

2. Preliminary data analysis

Seasonal mean daily courses for the years 2011 to 2015 based on 10-minute averages of the recorded and quality controlled 1-minute average values for all measured irradiance quantities at station SON.



3. Special configurations (cold climate issues)

Left: The modified Eigenbrodt heating and ventilation system with external sensor levelling as used at BSRN station SON and some special modification to reduce snow and ice effects: mounting plastic tubes (years 2011-2015) at the inlet of the heating and ventilation system beneath the instruments (lower right) delays the built-up of rime leading to reduced ventilation and the building of snow/ice on the pyranometer domes, deteriorating the radiation signal (upper right).

Right: since the year 2016 all ventilation inlets are connected with one plastic tube system with only 2 inlets which additionally reduces rime formation inside the instruments.

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References: [1] Long, C.N., Shi, Y., 2008: An Automated Quality Assessment and Control Algorithm for Surface Radiation Measurements, The Open Atmospheric Science Journal, 2, 23-37.
[2] Olefs, M., Baumgartner, D. J., Obleitner, F., Bichler, C., Foelsche, U., Pietsch, H., Rieder, H. E., Weihs, P., Geyer, F., Haiden, T., and Schöner, W.: The Austrian radiation monitoring network ARAD – best practice and added value, Atmos. Meas. Tech., 9, 1513-1531, doi:10.5194/amt-9-1513-2016, 2016.