

UNIVERSITY OF BAYREUTH

Micrometeorology

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WOBLS  
Wind Observation of the atmospheric Boundary Layer  
at the Schneeberg 2016  
Field Report

Elena Loos  
Sarah Holden  
Christoph Thomas

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Universität Bayreuth, Mikrometeorologie  
D-95440 Bayreuth

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# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Station 1: Scintec SFAS Minisodar</b>	<b>1</b>
2.1	Location . . . . .	1
2.2	Experimental setup Station 1 . . . . .	2
2.2.1	Technical drawing . . . . .	2
2.2.2	Technical settings . . . . .	2
2.3	Weather station . . . . .	2
<b>3</b>	<b>Station 2: Metek SODAR RASS</b>	<b>5</b>
3.1	Location . . . . .	5
3.2	Experimental setup Station 2 . . . . .	5
3.2.1	Technical drawing . . . . .	5
3.2.2	Technical settings . . . . .	7

## List of Figures

2.1	Location of Experimental site of Station 1 . . . . .	1
2.2	Technical drawing of roof of Station 1 . . . . .	2
2.3	Weather station at Station 1 . . . . .	3
3.1	Location of Experimental site Station 2 . . . . .	5
3.2	Technical drawing of Experimental site Station 2 . . . . .	6

## List of Tables

2.1	Technical settings for the Scintec Minisodar . . . . .	4
3.1	Volumes in the series “University of Bayreuth, Micrometeorology, Arbeitsergebnisse” . . . . .	9

# 1 Introduction

The experiment Wind Observation of the atmospheric Boundary Layer at the Schneeberg (WOBLS) was conducted on two sites. The first station was on top of the Schneeberg in the district Wunsiedel and the second station was on a field near Voitsumra.

For the experiment two acoustic remote sensing instruments were installed. The data was collected starting from the 30th of June to 10th of August. The Scintec SFAS Minisodar was used at the first station and the Metek SODAR RASS at the second station. This documentation presents the location and layout of these experimental sites.

## 2 Station 1: Scintec SFAS Minisodar

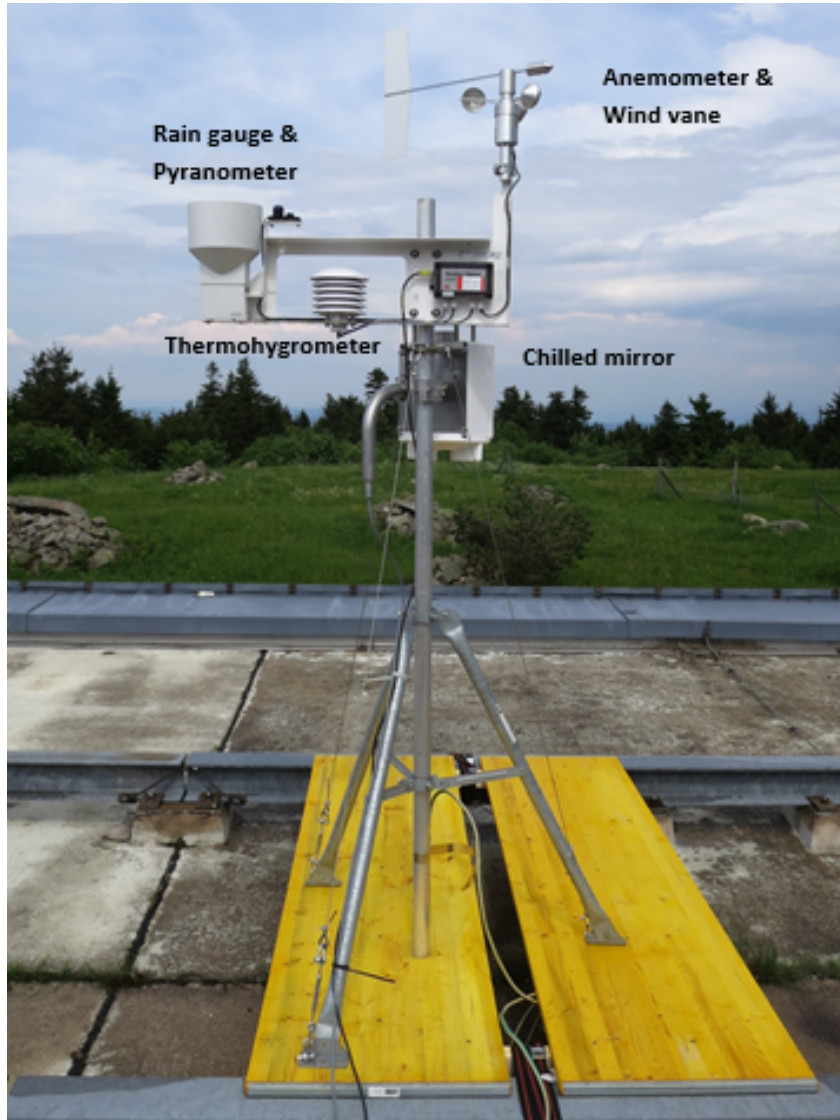
### 2.1 Location

Station 1 was located on the Schneeberg and more specifically the rooftop of a building next to the tower. Figure 2.1 shows a map of the Schneeberg and the roof on which the instruments were installed, is indicated . The exact description of the instrument is Scintec Flat Array Sodar SFAS with the serial number A-F-0033.



**Figure 2.1** Location of Experimental site of Station 1





**Figure 2.3** Weather station at Station 1



**Table 2.1** Technical settings for the Scintec Minisodar

<b>Height above sea level</b>	1064 m	<b>Average Environment Parameters</b>		
<b>Number of antennas</b>	64		Temperature	15 °C
<b>Minimum height</b>	5 m		Pressure	900 hPa
<b>Maximum height</b>	495 m	Relative Humidity	50 %	
<b>Height resolution</b>	5 m	<b>Antenna Azimuth</b>	20 °	
<b>Directions</b>	5			
	E (East) W (West) V (Vertical) N (North) S (South)			
<b>Interval time</b>	15 min			
<b>Frequencies</b>	5			
	2548.9 Hz 2803.8 Hz 3058.7 Hz 3313.6 Hz 3568.5 Hz			
<b>Beam tilts</b>	2			
	13.2 ° - 7.9 °			
<b>Pulse repetition</b>	5			

## 3 Station 2: Metek SODAR RASS

### 3.1 Location

Station 2 was located on a field near Voitsumra. Figure 3.1 shows the surrounding of the site. The exact position where the instruments were installed, is indicated. The site lies 585 m above sea level. The exact description of the instrument is Doppler-SODAR DSDPA.90/64 with 1290 MHz RASS-Extension, both from Meteorologische Messtechnik GmbH (Metek).

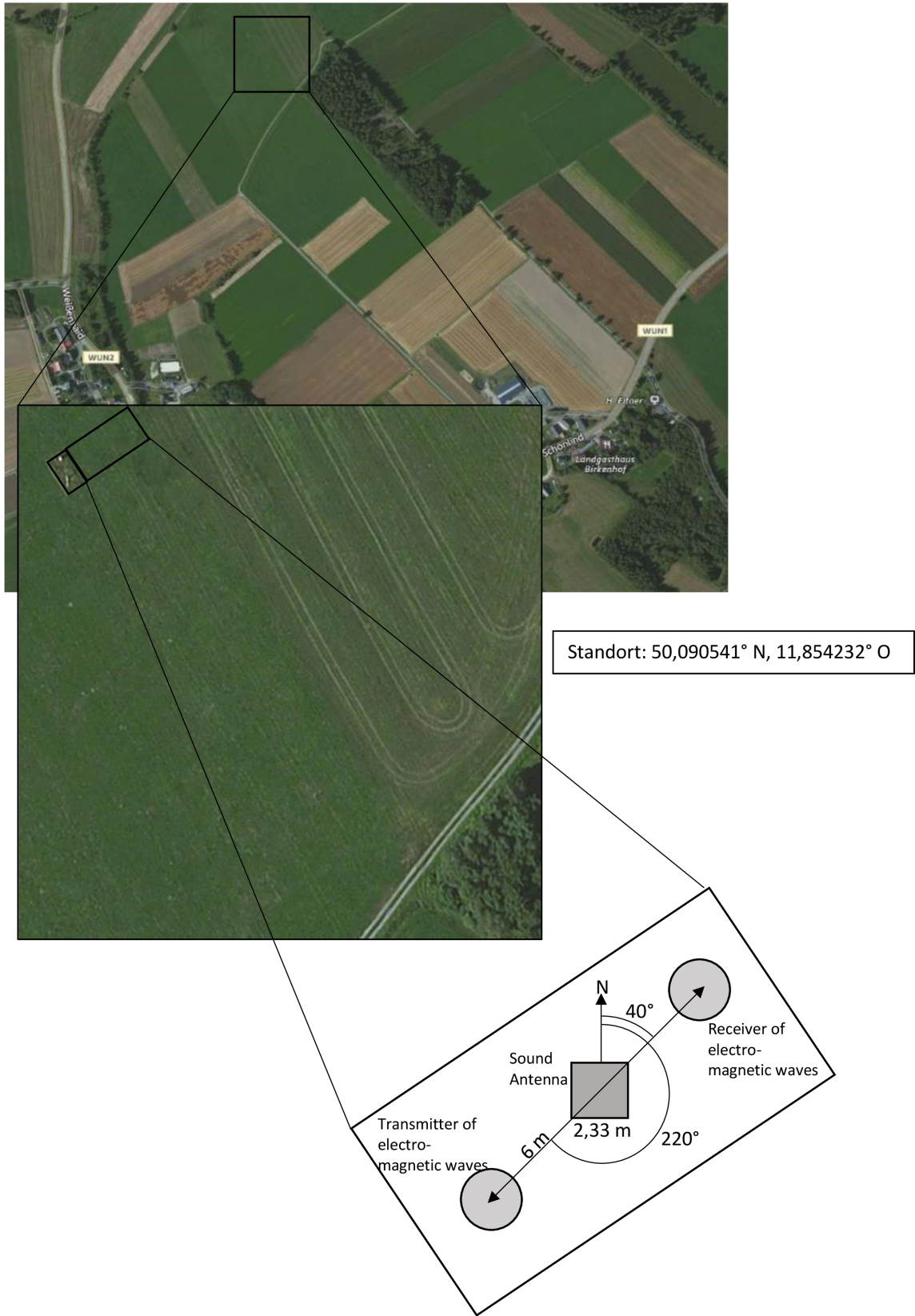


**Figure 3.1** Location of Experimental site Station 2

### 3.2 Experimental setup Station 2

#### 3.2.1 Technical drawing

Figure 3.2 shows the field near Voitsumra where the Metek SODAR RASS was installed. It includes the arrangement of the instruments. The antennas of the SODAR RASS were placed with orientation to the North.



**Figure 3.2** Technical drawing of Experimental site Station 2

### 3.2.2 Technical settings

Name of the parameter settings: **WOBLS\_Voit\_2000\_600s\_12345R**

Used from: 30.06.2016 17:59:23

Until: 14.07.2016 09:40:00

- Ausgabeparameter (output parameter)
  - Allgemein (in general): Hoehe (height), Geschwindigkeit (velocity), Richtung (direction), Geschwindigkeit vektoriell (vectorial velocity): U, V, W, Phi sigma, Diffusion, Temperatur (temperature)
  - Je Antenne (per antenna) (for antennas 1, 2, 3, 4, 5 and R): Spektren (spectra), Reflektivitt (reflectivity), Radial (radial), Sigma, Plausibilitaet (plausibility), S/R-Verhlttnis (signal-to-noise ratio)
  - Gertekennung (device identification): SDR
  - Messhoehen [m] (measuring heights [m]): 40 to 780 in 20 m steps, 795, 910, 930
  - Zeitzone (time zone): MEZ
  - Momentanwerte (instantaneous values) (for antennas 1, 2, 3, 4, 5 and R): Hhe (height), Spektren (spectra), Reflektivitaet (reflectivity), Radial (radial), Plausibilitaet (plausibility), S/R-Verhaeltnis (signal-to-noise ratio)
- Geraeteparameter (device parameter)
  - Messzeit (measuring time): 600 s
  - Sendefrequenz (transmission frequency): 2000 Hz
  - Diffusionsklassen-Tabelle (table of stability classes): t7306
  - Hoehenbereich (height range):
    - \* Rauschhoehe (noise height): 900 m
    - \* Maximale Hoehe (maximum height): 800 m
    - \* Stufung (spacing): 20 m
    - \* Minimale Hoehe (minimum height): 30 m
    - \* Festechounterdrueckung bis (suppression of fixed echo until): 0 m
- Dienste (sevices):
  - Sodar mit PC-Zeit synchronisieren (synchronize sodar with pc-time): ja/yes
  - Zeitstempel durch PC-Zeit ersetzen (replace time stamp with pc time): nein/no
  - Zeitstempel auf ganze Minuten runden (round time stamp to full minutes): ja/yes

## Name of the parameter settings: WOBLS\_Voit\_1600\_600s\_123R

Used from: 14.07.2016 09:50:00

Until: 10.08.2016 16:20:00

- Ausgabeparameter (output parameter)
  - Allgemein (in general): Hoehe (height), Geschwindigkeit (velocity), Richtung (direction), Geschwindigkeit vektoriell (vectorial velocity): U, V, W, Phi sigma, Diffusion, Temperatur (temperature)
  - Je Antenne (per antenna) (for antennas 1, 2, 3 and R): Spektren (spectra), Reflektivitt (reflectivity), Radial (radial), Sigma, Plausibilitaet (plausibility), S/R-Verhlttnis (signal-to-noise ratio)
  - Gertekennung (device identification): SDR
  - Messhoehen [m] (measuring heights [m]): 40 to 580 in 20 m steps, 595, 710, 730
  - Zeitzone (time zone): MEZ
  - Momentanwerte (instantaneous values) (for antennas 1, 2, 3, 4, 5 and R): Hhe (height), Spektren (spectra), Reflektivitaet (reflectivity), Radial (radial), Plausibilitaet (plausibility), S/R-Verhaeltnis (signal-to-noise ratio)
- Geraeteparameter (device parameter)
  - Messzeit (measuring time): 600 s
  - Sendefrequenz (transmission frequency): 1600 Hz
  - Diffusionsklassen-Tabelle (table of stability classes): t7306
  - Hoehenbereich (height range):
    - \* Rauschhoehe (noise height): 700 m
    - \* Maximale Hoehe (maximum height): 600 m
    - \* Stufung (spacing): 20 m
    - \* Minimale Hoehe (minimum height): 30 m
    - \* Festechounterdrueckung bis (suppression of fixed echo until): 0 m
- Dienste (seVICES):
  - Sodar mit PC-Zeit synchronisieren (synchronize sodar with pc-time): ja/yes
  - Zeitstempel durch PC-Zeit ersetzen (replace time stamp with pc time): nein/no
  - Zeitstempel auf ganze Minuten runden (round time stamp to full minutes): ja/yes

**Table 3.1** Volumes in the series “University of Bayreuth, Micrometeorology, Arbeitsergebnisse”

Nr	Author(s)	Title	Year
1	Foken	Der Bayreuther Turbulenzknecht	01/1999
2	Foken	Methode zur Bestimmung der trockenen Deposition von Bor	02/1999
3	Liu	Error analysis of the modified Bowen ratio method	02/1999
4	Foken et al.	Nachfrostgefährdung des ÖBG	03/1999
5	Hierteis	Dokumentation des Experimentes Dlouhá Louka	03/1999
6	Mangold	Dokumentation des Experimentes am Standort Weidenbrunnen, Juli/August 1998	07/1999
7	Heinz et al.	Strukturanalyse der atmosphärischen Turbulenz mittels Wavelet-Verfahren zur Bestimmung von Austauschprozessen über dem antarktischen Schelfeis	07/1999
8	Foken	Comparison of the sonic anemometer Young Model 81000 during VOITEX-99	10/1999
9	Foken et al.	Lufthygienisch-bioklimatische Kennzeichnung des oberen Egertales, Zwischenbericht 1999	11/1999
10	Sodemann	Stationsdatenbank zum BStMLU-Projekt Lufthygienisch-bioklimatische Kennzeichnung des oberen Egertales	03/2000
11	Neuner	Dokumentation zur Erstellung der meteorologischen Eingabedaten für das Modell BEKLIMA	10/2000
12	Foken et al.	Dokumentation des Experimentes VOITEX-99	10/2000
13	Bruckmeier et al.	Documentation of the experiment EBEX-2000, July 20 to August 24, 2000	01/2001
14	Foken et al.	Lufthygienisch-bioklimatische Kennzeichnung des oberen Egertales	02/2001
15	Göckede	Die Verwendung des Footprint-Modells nach Schmid (1997) zur stabilitätsabhängigen Bestimmung der Rauheitslänge	03/2001
16	Neuner	Berechnung der Evaporation im ÖBG (Universität Bayreuth) mit dem SVAT-Modell BEKLIMA	05/2001
17	Sodemann	Dokumentation der Software zur Bearbeitung der FINTUREX-Daten	08/2002
18	Göckede et al.	Dokumentation des Experiments STINHO-1	08/2002
19	Göckede et al.	Dokumentation des Experiments STINHO-2	12/2002
20	Göckede et al.	Characterisation of a complex measuring site for flux measurements	12/2002
21	Liebenthal	Strahlungsmessgerätevergleich während des Experiments STINHO-1	01/2003
22	Mauder et al.	Dokumentation des Experiments EVA_GRIPS	03/2003
23	Mauder et al.	Dokumentation des Experimentes LITFASS-2003, Dokumentation des Experimentes GRASATEM-2003	12/2003

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<b>Nr</b>	<b>Author(s)</b>	<b>Title</b>	<b>Year</b>
24	Thomas et al.	Documentation of the WALDATEM-2003 Experiment	05/2004
25	Göckede et al.	Qualitätsbegutachtung komplexer mikrometeorologischer Messstationen im Rahmen des VERTIKO-Projekts	11/2004
26	Mauder Foken	Documentation and instruction manual of the eddy covariance software package TK2	12/2004
27	Herold et al.	The OP-2 open path infrared gas analyser for CO <sub>2</sub> and H <sub>2</sub> O	01/2005
28	Ruppert	ATEM software for atmospheric turbulent exchange measurements using eddy covariance and relaxed eddy accumulation systems and Bayreuth whole-air REA system setup	04/2005
29	Foken (Ed.)	Klimatologische und mikrometeorologische Forschungen im Rahmen des Bayreuther Institutes für Terrestrische Ökosystemforschung (BITÖK), 1989-2004	06/2005
30	Siebicke & Serafimovich	Ultraschallanemometer-berprfung im Windkanal der TU Dresden 2007	04/2007
31	Lüers & Bareiss	The Arctic Turbulence Experiment 2006 PART 1: Technical documentation of the ARCTEX 2006 campaign, May, 2nd to May, 20th 2006	07/2007
32	Lüers & Bareiss	The Arctic Turbulence Experiment 2006 PART 2: Visualization of near surface measurements during the ARCTEX 2006 campaign, May, 2nd to May, 20th 2006	07/2007
33	Bareiss & Lüers	The Arctic Turbulence Experiment 2006 PART 3: Aerological measurements during the ARCTEX 2006 campaign, May, 2nd to May, 20th 2006	07/2007
34	Metzger & Foken et al.	COPS experiment, Convective and orographically induced precipitation study, 01 June 2007 – 31 August 2007, Documentation	09/2007
35	Staudt & Foken	Documentation of reference data for the experimental areas of the Bayreuth Centre for Ecology and Environmental Research (BayCEER) at the Waldstein site	11/2007
36	Serafimovich et al.	ExchanGE processes in mountainous Regions (EGER): Documentation of the Intensive Observation Period (IOP1) September, 6 <sup>th</sup> to October, 7 <sup>th</sup> 2007	01/2008
37	Serafimovich et al.	ExchanGE processes in mountainous Regions (EGER): Documentation of the Intensive Observation Period (IOP2) June, 1 <sup>st</sup> to July, 15 <sup>th</sup> 2008	09/2008
38	Siebicke	Footprint synthesis for the FLUXNET site Waldstein/Weidenbrunnen (DE-Bay) during the EGER experiment	12/2008
39	Lüers & Foken	Jahresbericht 2008 zum Förderprojekt 01879- Untersuchung der Vernderung der Konzentration von Luftbeimengungen und Treibhausgasen im hohen Fichtelgebirge 2007 – 2013	01/2009

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<b>Nr</b>	<b>Author(s)</b>	<b>Title</b>	<b>Year</b>
40	Lüers & Foken (Ed.)	Proceedings of the International Conference of “Atmospheric Transport and Chemistry in Forest Ecosystems” Castle of Thurnau, Germany, Oct 5 to Oct 8, 2009	10/2009
41	Biermann et al.	Mesoscale circulations and Energy and gas exchange Over the Tibetan Plateau – Documentation of the Micrometeorological Experiment, Nam Tso, Tibet 25 <sup>th</sup> of June – 08 <sup>th</sup> of August 2009	11/2009
42	Foken & Falke	Documentation and Instruction Manual for the Krypton Hygrometer Calibration Instrument	01/2010 Update 12/2011
43	Lüers & Foken	Jahresbericht 2009 zum Förderprojekt 01879 – Untersuchung der Veränderung der Konzentration von Luftbeimengungen und Treibhausgasen im hohen Fichtelgebirge 2007 – 2013	07/2010
44	Biermann et al.	Tibet Plateau Atmosphere-Ecology-Glaciology Cluster Joint Kobresia Ecosystem Experiment: Documentation of the first Intensive Observation Period (IOP 1) summer 2010 in Kema, Tibet	01/2011
45	Zhao et al.	Complex TERRain and ECOlogical Heterogeneity (TERRECO);WP 1-02: Spatial assessment of atmosphere-ecosystem exchanges via micrometeorological measurements, footprint modeling and mesoscale simulations; Documentation of the Observation Period May 12 <sup>th</sup> to Nov. 8 <sup>th</sup> , 2010, Haean, South Korea	03/2011
46	Mauder & Foken	Documentation and Instruction Manual of the Eddy-Covariance Software Package TK3	05/2011
47	Serafimovich et al.	ExchanGE processes in mountainous Regions (EGER)- Documentation of the Intensive Observation Period (IOP3) June, 13 <sup>th</sup> to July, 26 <sup>th</sup> 2011	11/2011
48	Hübner et al.	Documentation and Instruction Manual for the Horizontal Mobile Measuring System (HMMS)	12/2011
49	Lüers et al.	The Arctic Turbulence Experiment 2009 - additional laser Scintillometer measurement campaign 2009 at the Bayelva catchment on Svalbard: Technical documentation and visualization of the near surface measurements during the ARCTEX-2009 campaign, August, 10 <sup>th</sup> to August, 20 <sup>th</sup> 2009	02/2012
50	Foken	Klimawanderweg auf der Landesgartenschau in Bamberg 2012	04/2012
51	Ruppert et al.	Whole-air relaxed eddy accumulation for the measurement of isotope and trace-gas fluxes	05/2012

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<b>Nr</b>	<b>Author(s)</b>	<b>Title</b>	<b>Year</b>
52	Foken	Jahresbericht 2010-11 zum Förderprojekt 01879 - Untersuchung der Veränderung der Konzentration von Luftbeimengungen und Treibhausgasen im hohen Fichtelgebirge 2007 – 2013	12/2012
53	Gerken et al.	Documentation of the Atmospheric Boundary Layer Experiment, Nam Tso, Tibet, 08 <sup>th</sup> of July – 08 <sup>th</sup> of August 2012	03/2013
54	Biermann (Ed.)	Tibet Plateau Atmosphere-Ecology-Glaciology Cluster Joint Kobresia Ecosystem Experiment: Documentation of the 2nd Intensive Observation Period (IOP 2) summer 2012 in KEMA, Tibet	05/2013
55	Babel et al.	Documentation of the EVENT-HMMS Experiment 2012 – Microclimatological effects of rain-out shelters within EVENT II	06/2013
56	Lüers et al.	160 Jahre Bayreuther Klimazeitreihe – Homogenisierung der Bayreuther Lufttemperatur- und Niederschlagsdaten	06/2014
57	Babel	An R routine for the simplified application of a footprint-based characterisation of a complex measuring site for flux measurements	06/2014
58	Lüers et al.	Application of a multi-step error filter for postprocessing of atmospheric flux and meteorological basic data	06/2014
59	Zhao et al.	GaFiR: a gap-filling package for ecosystem-atmosphere carbon dioxide flux and evapotranspiration data	06/2014
60	Foken et al.	Meteorologisches Instrumentenpraktikum an der Universität Bayreuth	08/2014
61	Foken & Lüers	Abschlussbericht zum Förderprojekt 01879 Untersuchung der Veränderung der Konzentration von Luftbeimengungen und Treibhausgasen im hohen Fichtelgebirge : 2007 2014	12/2014
62	Mauder & Foken	Documentation and Instruction Manual of the Eddy-Covariance Software Package TK3 (update)	07/2015
63	Pfister et al.	CADEX - Cold Air Drainage Experiment 2015 in the Ecological Botanical Gardens of the University of Bayreuth - Field Report	07/2015