BULGARIAN ATMOSPHERIC DEPOSITIONS DATA
ACCOMPANYING REPORT

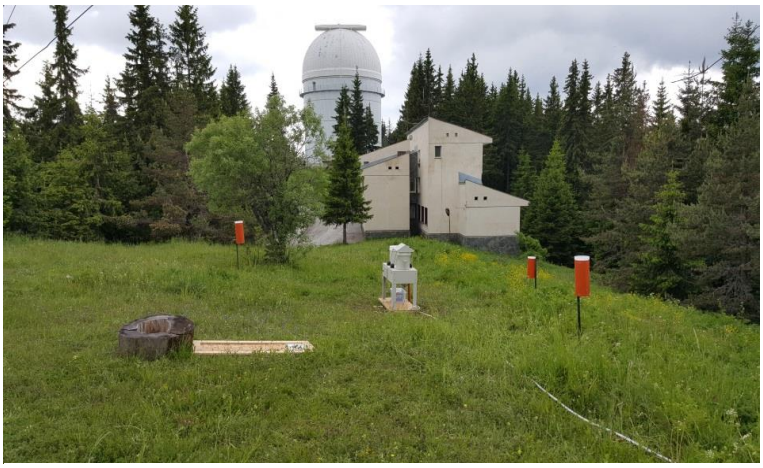
In 2016, the atmospheric deposition monitoring was made on all level 2 SPs, incl. the Rojen Complex Background Monitoring Station (CBMS Rojen). The deposition monitoring activities include sampling (every 2 weeks, continuously), measurements and analysis of throughfall, wet and bulk depositions, preparation and validation of deposition data, transmission to the national data base and evaluation of the results. On the SP Vitinia (beech stand) measurements and estimations of stemflow were made also. All Level 2 SPs, incl. CBMS Rojen are equipped with installations collecting above-mentioned atmospheric depositions.

The number of collectors for throughfall sampling in the stations is:
Vitinia and Staro Oriahovo – 9 units, in Yundola and Rojen– 10 units.

The throughfall collectors are placed in the sample area, so as not prevent the other measurements. Collectors are located at the intersection of a square grid of 10x10 m, at 1,35m height above the ground. They are isolated by the action of sunlight through protective PVC cylinders. For the collection of throughfall depositions are used funnel-shaped type collectors, which are mounted on a tank with a screw cap. The surface (area) of the throughfall collectors and of the open air collectors is 0.0314 m^2. Within one period, if there are sufficient quantities depositions are taken 2 individual samples and 1 mixed.

Field equipment on SP0001 Vitinia

For each station, there are 3 collectors for bulk depositions sampling. Equipment for collecting of wet only depositions is installed in the stations. An installation for collecting of stemflow is installed in the beech stand of Vitinia station, where five sample trees were selected for stemflow sampling equipping. For the collection of samples from wet-only depositions is used equipment for separate collection of deposits, which is triggered by an electronic sensor. The surface (area) of the wet-only depositions sampler is



Field equipment on SP0005 CBMS Rojen

0.0637 m^2. For the collection of snow samples from the slope and from outdoors is used a cylindrical collector, with surface (area) of 0.0616 m^2. The frequency of collection and analytical methods are adopted according to the Manual. In winter the collectors for mixed depositions are replaced by snow collectors, depending on the data for the weather conditions in the area. The most crucial factor for the transition from summer mode of operation to winter mode is the reduction of the temperatures below 0ºC. The period for this transition may vary for the different regions. The change from the winter to summer mode of operation in 2016 was made as follows: In SP Vitinia on 20.04.2016, in SP Staro Oriahovo on 05.04.2016, in SP Yundola on 21.04.2016 and in CBMS Rojen on 24.03.2016. The transition from the summer to winter mode was done on: 31.10.2016 in SP Vitinia, 18.10.2016 in SP Staro Oriahovo, 01.11.2016 in SP Yundola and on 25.10.2016 in CBMS Rojen.

The samples of depositions were analyzed for all mandatory and some of optimal parameters, according the Manual. The type of samples, sampling frequency, sampling number and analyzed parameters are presented in the following table:

Type of samples	**Sampling frequency**	**Parameters**
Wet only	2 per month	pH, Conductivity, S-SO_4, N-NO_3, N-NO_2, Cl, N-NH_4, Na, K, Mg, Ca, Alkalinity, total N, N (Kelldal), Cu, Zn, Pb, Cd, Fe, K, Na,P-PO_4, Al
Open field bulk	2 per month	
Throughfall (2 individual samples and 1 mixed per period)	2 per month	
Throughfall in additional sample plots (1 mixed	2 per month	

sample per period)		
Steamflow	2 per month	

The analytical methods, units and limits of detection for the elements are given as follows:

Sequence number	Parameter	Units	Standardized/ internal methods for analysis	Detection limit
1	pH		БДС EN ISO 10523:2012	
2	Conductivity	µS/cm	БДС EN 27888:2000	0.5
3	Alcalinity	µeqv/dm^3	БДС EN ISO 9963-1:2003	22
4	Cl^-	mg/dm^3	БДС EN ISO 10304-1:2009	0.003
5	S-SO_4	mg/dm^3	БДС EN ISO 10304-1:2009	0.003
6	Ca	mg/dm^3	БДС EN ISO 14911:2002	0.008
7	Mg	mg/dm^3	БДС EN ISO 14911:2002	0.008
8	N-NH_4	mg/dm^3	БДС ISO 7150-1:2002	0.002
9	N-NO_2	v	БДС EN 26777:1997	0.001
10	N-NO_3	mg/dm^3	БДС EN ISO 10304-1:2009	0.002
11	N(total)	mg/dm^3	БДС EN 12260:2004	0.025
12	Cu	µg/dm3	БДС EN ISO 17294-2:2005	0.0005
13	Zn	µg/dm3	БДС EN ISO 17294-2:2005	0.001
14	Pb	µg/dm3	БДС EN ISO 17294-2:2005	0.001
15	Cd	µg/dm3	БДС EN ISO 17294-2:2005	0.00002
16	P_PO_4	mg/dm^3	БДС EN ISO 6878:2005	0.002
17	Fe	µg/dm3	БДС ISO 6332:2002	5
18	K	mg/dm^3	БДС EN ISO 14911:2002	0.03
19	Na	mg/dm^3	БДС EN ISO 14911:2002	0.03
20	DOC	mg/dm^3	БДС EN 1484:2001	0.2
21	Mn	µg/dm3	БДС EN ISO 17294-2:2005	0.0005
22	Al	µg/dm3	БДС EN ISO 17294-2:2005	5

The results of the chemical analysis are processed and uploaded to a specially designed information system. The obtained data are used to fill

the forms necessary for ICP Forests data base uploading and for calculations of the critical loads and their exceedances.