

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 3, Czech Hydrometeorological Institute, Praha (Czech Republic)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.349	1.319	1.342	0.081	0.082	S
G2		0.87	0.856	0.876	0.103	-0.057	S
G3		2.151	2.08	2.108	0.113	0.383	S
G4		2.264	2.2	2.231	0.151	0.217	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.21	0.241	0.241	0.016	-1.899	S
G2		0.186	0.16	0.161	0.015	1.676	Q
G3		0.45	0.401	0.404	0.023	1.989	S
G4		0.595	0.535	0.537	0.029	2.02	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.548	0.546	0.544	0.019	0.19	S
G2		0.365	0.364	0.363	0.015	0.147	S
G3		0.918	0.911	0.918	0.027	-0.014	S
G4		0.949	0.942	0.938	0.084	0.13	S
G1	Na <sup>+</sup> mg/l	0.547	0.548	0.527	0.026	0.744	S
G2		0.364	0.365	0.355	0.025	0.348	S
G3		0.912	0.913	0.893	0.042	0.464	S
G4		0.73	0.73	0.713	0.033	0.516	S
G1	Mg <sup>2+</sup> mg/l	0.155	0.155	0.153	0.007	0.348	S
G2		0.093	0.093	0.09	0.005	0.5	S
G3		0.206	0.206	0.205	0.009	0.069	S
G4		0.207	0.206	0.206	0.01	0.073	S
G1	Cl <sup>-</sup> mg/l	0.347	0.347	0.337	0.018	0.541	S
G2		0.227	0.232	0.231	0.022	-0.192	S
G3		0.566	0.579	0.57	0.028	-0.136	S
G4		0.452	0.463	0.457	0.03	-0.174	S
G1	Ca <sup>2+</sup> mg/l	0.192	0.192	0.191	0.039	0.015	S
G2		0.091	0.115	0.116	0.034	-0.725	Q
G3		0.239	0.255	0.254	0.03	-0.501	S
G4		0.236	0.255	0.252	0.02	-0.812	S
G1	K <sup>+</sup> mg/l	0.303	0.306	0.294	0.02	0.45	S
G2		0.2	0.204	0.198	0.018	0.092	S
G3		0.508	0.509	0.501	0.032	0.219	S
G4		0.398	0.407	0.399	0.023	-0.063	S
G1	pH pH units	4.229	4.22	4.283	0.096	-0.568	S
G2		4.381	4.4	4.431	0.078	-0.65	S
G3		4.015	4	4.035	0.06	-0.339	S
G4		3.977	4	3.999	0.062	-0.361	S
G1	Cond µS/cm	35.65	35.3	34.442	1.716	0.704	S
G2		23.83	23.4	23.141	0.851	0.809	S
G3		58.1	57.9	56.924	2.088	0.563	S
G4		61.48	57.9	59.644	2.643	0.695	S

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If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 4, Aarhus University, Department of Environmental Science (Denmark)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.28	1.319	1.342	0.081	-0.766	S
G2		0.823	0.856	0.876	0.103	-0.513	S
G3		2.049	2.08	2.108	0.113	-0.517	S
G4		2.163	2.2	2.231	0.151	-0.454	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.245	0.241	0.241	0.016	0.237	S
G2		0.161	0.16	0.161	0.015	-0.011	S
G3		0.402	0.401	0.404	0.023	-0.075	S
G4		0.532	0.535	0.537	0.029	-0.186	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.512	0.546	0.544	0.019	-1.703	S
G2		0.342	0.364	0.363	0.015	-1.438	S
G3		0.885	0.911	0.918	0.027	-1.216	S
G4		0.914	0.942	0.938	0.084	-0.288	S
G1	Na <sup>+</sup> mg/l	0.535	0.548	0.527	0.026	0.29	S
G2		0.354	0.365	0.355	0.025	-0.046	S
G3		0.908	0.913	0.893	0.042	0.368	S
G4		0.719	0.73	0.713	0.033	0.178	S
G1	Mg <sup>2+</sup> mg/l	0.138	0.155	0.153	0.007	-2.121	S
G2		0.083	0.093	0.09	0.005	-1.366	S
G3		0.188	0.206	0.205	0.009	-1.934	S
G4		0.188	0.206	0.206	0.01	-1.755	S
G1	Cl <sup>-</sup> mg/l	0.324	0.347	0.337	0.018	-0.731	S
G2		0.219	0.232	0.231	0.022	-0.559	S
G3		0.544	0.579	0.57	0.028	-0.909	S
G4		0.438	0.463	0.457	0.03	-0.634	S
G1	Ca <sup>2+</sup> mg/l	0.172	0.192	0.191	0.039	-0.495	S
G2		0.105	0.115	0.116	0.034	-0.316	S
G3		0.231	0.255	0.254	0.03	-0.765	S
G4		0.231	0.255	0.252	0.02	-1.06	S
G1	K <sup>+</sup> mg/l	0.261	0.306	0.294	0.02	-1.622	S
G2		0.174	0.204	0.198	0.018	-1.359	S
G3		0.445	0.509	0.501	0.032	-1.753	S
G4		0.357	0.407	0.399	0.023	-1.845	S
G1	pH pH units	4.24	4.22	4.283	0.096	-0.453	S
G2		4.42	4.4	4.431	0.078	-0.147	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		-999	57.9	56.924	2.088		B
G4		-999	57.9	59.644	2.643		B

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\* Z score is unitless

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 5, Finnish Meteorological Institute. Air Quality Department (Finland)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.326	1.319	1.342	0.081	-0.201	S
G2		0.859	0.856	0.876	0.103	-0.166	S
G3		2.086	2.08	2.108	0.113	-0.19	S
G4		2.193	2.2	2.231	0.151	-0.256	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.247	0.241	0.241	0.016	0.369	S
G2		0.163	0.16	0.161	0.015	0.147	S
G3		0.415	0.401	0.404	0.023	0.502	S
G4		0.53	0.535	0.537	0.029	-0.26	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.547	0.546	0.544	0.019	0.114	S
G2		0.366	0.364	0.363	0.015	0.194	S
G3		0.936	0.911	0.918	0.027	0.655	S
G4		0.956	0.942	0.938	0.084	0.208	S
G1	Na <sup>+</sup> mg/l	0.561	0.548	0.527	0.026	1.278	S
G2		0.373	0.365	0.355	0.025	0.722	S
G3		0.94	0.913	0.893	0.042	1.136	S
G4		0.736	0.73	0.713	0.033	0.692	S
G1	Mg <sup>2+</sup> mg/l	0.157	0.155	0.153	0.007	0.592	S
G2		0.092	0.093	0.09	0.005	0.317	S
G3		0.21	0.206	0.205	0.009	0.484	S
G4		0.21	0.206	0.206	0.01	0.368	S
G1	Cl <sup>-</sup> mg/l	0.348	0.347	0.337	0.018	0.588	S
G2		0.236	0.232	0.231	0.022	0.227	S
G3		0.585	0.579	0.57	0.028	0.518	S
G4		0.47	0.463	0.457	0.03	0.416	S
G1	Ca <sup>2+</sup> mg/l	0.191	0.192	0.191	0.039	-0.016	S
G2		0.114	0.115	0.116	0.034	-0.054	S
G3		0.257	0.255	0.254	0.03	0.088	S
G4		0.258	0.255	0.252	0.02	0.261	S
G1	K <sup>+</sup> mg/l	0.323	0.306	0.294	0.02	1.438	S
G2		0.213	0.204	0.198	0.018	0.837	S
G3		0.554	0.509	0.501	0.032	1.653	S
G4		0.431	0.407	0.399	0.023	1.377	S
G1	pH pH units	4.23	4.22	4.283	0.096	-0.557	S
G2		4.39	4.4	4.431	0.078	-0.534	S
G3		4.01	4	4.035	0.06	-0.423	S
G4		3.98	4	3.999	0.062	-0.312	S
G1	Cond µS/cm	35.3	35.3	34.442	1.716	0.5	S
G2		23.5	23.4	23.141	0.851	0.421	S
G3		57.3	57.9	56.924	2.088	0.18	S
G4		60.3	57.9	59.644	2.643	0.248	S

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B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 7, synlab Umweltinstitut GmbH, Niederlassung Leipzig (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.335	1.319	1.342	0.081	-0.09	S
G2		0.866	0.856	0.876	0.103	-0.1	S
G3		2.106	2.08	2.108	0.113	-0.014	S
G4		2.208	2.2	2.231	0.151	-0.152	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.24	0.241	0.241	0.016	-0.093	S
G2		0.151	0.16	0.161	0.015	-0.666	S
G3		0.45	0.401	0.404	0.023	2.007	S
G4		0.59	0.535	0.537	0.029	1.855	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.546	0.546	0.544	0.019	0.095	S
G2		0.364	0.364	0.363	0.015	0.092	S
G3		0.92	0.911	0.918	0.027	0.077	S
G4		0.948	0.942	0.938	0.084	0.112	S
G1	Na <sup>+</sup> mg/l	0.552	0.548	0.527	0.026	0.918	S
G2		0.372	0.365	0.355	0.025	0.671	S
G3		0.928	0.913	0.893	0.042	0.852	S
G4		0.745	0.73	0.713	0.033	0.971	S
G1	Mg <sup>2+</sup> mg/l	0.145	0.155	0.153	0.007	-1.075	S
G2		0.082	0.093	0.09	0.005	-1.553	S
G3		0.196	0.206	0.205	0.009	-1.077	S
G4		0.196	0.206	0.206	0.01	-0.985	S
G1	Cl <sup>-</sup> mg/l	0.339	0.347	0.337	0.018	0.116	S
G2		0.224	0.232	0.231	0.022	-0.343	S
G3		0.578	0.579	0.57	0.028	0.279	S
G4		0.46	0.463	0.457	0.03	0.073	S
G1	Ca <sup>2+</sup> mg/l	0.177	0.192	0.191	0.039	-0.378	S
G2		0.095	0.115	0.116	0.034	-0.603	Q
G3		0.237	0.255	0.254	0.03	-0.567	S
G4		0.241	0.255	0.252	0.02	-0.54	S
G1	K <sup>+</sup> mg/l	0.303	0.306	0.294	0.02	0.475	S
G2		0.201	0.204	0.198	0.018	0.164	S
G3		0.512	0.509	0.501	0.032	0.341	S
G4		0.407	0.407	0.399	0.023	0.324	S
G1	pH pH units	4.27	4.22	4.283	0.096	-0.14	S
G2		4.39	4.4	4.431	0.078	-0.534	S
G3		3.98	4	4.035	0.06	-0.925	S
G4		3.95	4	3.999	0.062	-0.799	S
G1	Cond µS/cm	35.98	35.3	34.442	1.716	0.896	S
G2		23.95	23.4	23.141	0.851	0.95	S
G3		55.2	57.9	56.924	2.088	-0.826	S
G4		60.4	57.9	59.644	2.643	0.286	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>



## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 8, Umweltbundesamt, Langen (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.306	1.319	1.342	0.081	-0.446	S
G2		0.839	0.856	0.876	0.103	-0.357	S
G3		2.085	2.08	2.108	0.113	-0.2	S
G4		2.191	2.2	2.231	0.151	-0.268	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.228	0.241	0.241	0.016	-0.801	S
G2		0.146	0.16	0.161	0.015	-1.024	S
G3		0.396	0.401	0.404	0.023	-0.333	S
G4		0.525	0.535	0.537	0.029	-0.431	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.521	0.546	0.544	0.019	-1.23	S
G2		0.373	0.364	0.363	0.015	0.699	S
G3		0.897	0.911	0.918	0.027	-0.779	S
G4		0.927	0.942	0.938	0.084	-0.133	S
G1	Na <sup>+</sup> mg/l	0.539	0.548	0.527	0.026	0.441	S
G2		0.355	0.365	0.355	0.025	-0.007	S
G3		0.91	0.913	0.893	0.042	0.416	S
G4		0.723	0.73	0.713	0.033	0.301	S
G1	Mg <sup>2+</sup> mg/l	0.15	0.155	0.153	0.007	-0.378	S
G2		0.086	0.093	0.09	0.005	-0.806	S
G3		0.203	0.206	0.205	0.009	-0.265	S
G4		0.204	0.206	0.206	0.01	-0.216	S
G1	Cl <sup>-</sup> mg/l	0.348	0.347	0.337	0.018	0.597	S
G2		0.23	0.232	0.231	0.022	-0.054	S
G3		0.595	0.579	0.57	0.028	0.883	S
G4		0.472	0.463	0.457	0.03	0.484	S
G1	Ca <sup>2+</sup> mg/l	0.184	0.192	0.191	0.039	-0.189	S
G2		0.109	0.115	0.116	0.034	-0.199	S
G3		0.237	0.255	0.254	0.03	-0.567	S
G4		0.237	0.255	0.252	0.02	-0.763	S
G1	K <sup>+</sup> mg/l	0.298	0.306	0.294	0.02	0.204	S
G2		0.192	0.204	0.198	0.018	-0.355	S
G3		0.476	0.509	0.501	0.032	-0.782	S
G4		0.385	0.407	0.399	0.023	-0.628	S
G1	pH pH units	4.26	4.22	4.283	0.096	-0.244	S
G2		4.43	4.4	4.431	0.078	-0.018	S
G3		4.03	4	4.035	0.06	-0.087	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	35.2	35.3	34.442	1.716	0.442	S
G2		23.6	23.4	23.141	0.851	0.539	S
G3		57.2	57.9	56.924	2.088	0.132	S
G4		60.1	57.9	59.644	2.643	0.173	S

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If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 10, Institute for Atmospheric Physics (Hungary)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.409	1.319	1.342	0.081	0.819	S
G2		0.887	0.856	0.876	0.103	0.109	S
G3		2.176	2.08	2.108	0.113	0.603	S
G4		2.302	2.2	2.231	0.151	0.469	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.246	0.241	0.241	0.016	0.298	S
G2		0.164	0.16	0.161	0.015	0.191	S
G3		0.409	0.401	0.404	0.023	0.226	S
G4		0.542	0.535	0.537	0.029	0.164	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.561	0.546	0.544	0.019	0.873	S
G2		0.371	0.364	0.363	0.015	0.561	S
G3		0.946	0.911	0.918	0.027	1.005	S
G4		0.978	0.942	0.938	0.084	0.476	S
G1	Na <sup>+</sup> mg/l	0.537	0.548	0.527	0.026	0.365	S
G2		0.356	0.365	0.355	0.025	0.033	S
G3		0.888	0.913	0.893	0.042	-0.111	S
G4		0.739	0.73	0.713	0.033	0.793	S
G1	Mg <sup>2+</sup> mg/l	0.161	0.155	0.153	0.007	1.22	S
G2		0.1	0.093	0.09	0.005	1.806	S
G3		0.22	0.206	0.205	0.009	1.627	S
G4		0.218	0.206	0.206	0.01	1.132	S
G1	Cl <sup>-</sup> mg/l	0.408	0.347	0.337	0.018	3.915	Q
G2		0.259	0.232	0.231	0.022	1.278	S
G3		0.549	0.579	0.57	0.028	-0.734	S
G4		0.437	0.463	0.457	0.03	-0.667	S
G1	Ca <sup>2+</sup> mg/l	0.221	0.192	0.191	0.039	0.754	Q
G2		0.137	0.115	0.116	0.034	0.621	Q
G3		0.22	0.255	0.254	0.03	-1.128	S
G4		0.234	0.255	0.252	0.02	-0.911	S
G1	K <sup>+</sup> mg/l	0.322	0.306	0.294	0.02	1.388	S
G2		0.221	0.204	0.198	0.018	1.264	S
G3		0.544	0.509	0.501	0.032	1.346	S
G4		0.422	0.407	0.399	0.023	0.981	S
G1	pH pH units	4.19	4.22	4.283	0.096	-0.975	S
G2		4.37	4.4	4.431	0.078	-0.792	S
G3		3.99	4	4.035	0.06	-0.758	S
G4		3.97	4	3.999	0.062	-0.475	S
G1	Cond µS/cm	35.17	35.3	34.442	1.716	0.424	S
G2		23.54	23.4	23.141	0.851	0.468	S
G3		57.47	57.9	56.924	2.088	0.261	S
G4		60.57	57.9	59.644	2.643	0.35	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 12, Met Eireann, Dublin (Ireland)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.33	1.319	1.342	0.081	-0.152	S
G2		0.86	0.856	0.876	0.103	-0.154	S
G3		2.09	2.08	2.108	0.113	-0.155	S
G4		2.2	2.2	2.231	0.151	-0.208	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.25	0.241	0.241	0.016	0.542	S
G2		0.15	0.16	0.161	0.015	-0.754	S
G3		0.45	0.401	0.404	0.023	1.989	S
G4		0.6	0.535	0.537	0.029	2.195	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.55	0.546	0.544	0.019	0.295	S
G2		0.36	0.364	0.363	0.015	-0.197	S
G3		0.92	0.911	0.918	0.027	0.059	S
G4		0.95	0.942	0.938	0.084	0.142	S
G1	Na <sup>+</sup> mg/l	0.52	0.548	0.527	0.026	-0.278	S
G2		0.35	0.365	0.355	0.025	-0.204	S
G3		0.9	0.913	0.893	0.042	0.177	S
G4		0.71	0.73	0.713	0.033	-0.098	S
G1	Mg <sup>2+</sup> mg/l	0.145	0.155	0.153	0.007	-1.104	S
G2		0.079	0.093	0.09	0.005	-2.113	Q
G3		0.201	0.206	0.205	0.009	-0.487	S
G4		0.2	0.206	0.206	0.01	-0.6	S
G1	Cl <sup>-</sup> mg/l	0.35	0.347	0.337	0.018	0.707	S
G2		0.23	0.232	0.231	0.022	-0.054	S
G3		0.59	0.579	0.57	0.028	0.707	S
G4		0.47	0.463	0.457	0.03	0.418	S
G1	Ca <sup>2+</sup> mg/l	0.16	0.192	0.191	0.039	-0.801	Q
G2		0.09	0.115	0.116	0.034	-0.755	Q
G3		0.22	0.255	0.254	0.03	-1.128	S
G4		0.22	0.255	0.252	0.02	-1.604	S
G1	K <sup>+</sup> mg/l	0.3	0.306	0.294	0.02	0.302	S
G2		0.19	0.204	0.198	0.018	-0.466	S
G3		0.51	0.509	0.501	0.032	0.282	S
G4		0.41	0.407	0.399	0.023	0.459	S
G1	pH pH units	4.26	4.22	4.283	0.096	-0.244	S
G2		4.43	4.4	4.431	0.078	-0.018	S
G3		4.03	4	4.035	0.06	-0.087	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	32.6	35.3	34.442	1.716	-1.073	S
G2		22.7	23.4	23.141	0.851	-0.519	S
G3		57.4	57.9	56.924	2.088	0.228	S
G4		58.3	57.9	59.644	2.643	-0.508	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 15, Norwegian Institute for Air Research NILU (Norway)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.353	1.319	1.342	0.081	0.131	S
G2		0.896	0.856	0.876	0.103	0.196	S
G3		2.137	2.08	2.108	0.113	0.259	S
G4		2.253	2.2	2.231	0.151	0.144	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.241	0.241	0.241	0.016	-0.007	S
G2		0.164	0.16	0.161	0.015	0.191	S
G3		0.406	0.401	0.404	0.023	0.097	S
G4		0.536	0.535	0.537	0.029	-0.046	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.553	0.546	0.544	0.019	0.453	S
G2		0.376	0.364	0.363	0.015	0.906	S
G3		0.928	0.911	0.918	0.027	0.35	S
G4		0.959	0.942	0.938	0.084	0.249	S
G1	Na <sup>+</sup> mg/l	0.556	0.548	0.527	0.026	1.084	S
G2		0.375	0.365	0.355	0.025	0.781	S
G3		0.933	0.913	0.893	0.042	0.967	S
G4		0.743	0.73	0.713	0.033	0.916	S
G1	Mg <sup>2+</sup> mg/l	0.158	0.155	0.153	0.007	0.784	S
G2		0.092	0.093	0.09	0.005	0.313	S
G3		0.213	0.206	0.205	0.009	0.848	S
G4		0.214	0.206	0.206	0.01	0.747	S
G1	Cl <sup>-</sup> mg/l	0.346	0.347	0.337	0.018	0.486	S
G2		0.243	0.232	0.231	0.022	0.543	S
G3		0.592	0.579	0.57	0.028	0.778	S
G4		0.472	0.463	0.457	0.03	0.484	S
G1	Ca <sup>2+</sup> mg/l	0.189	0.192	0.191	0.039	-0.062	S
G2		0.111	0.115	0.116	0.034	-0.14	S
G3		0.253	0.255	0.254	0.03	-0.039	S
G4		0.254	0.255	0.252	0.02	0.079	S
G1	K <sup>+</sup> mg/l	0.303	0.306	0.294	0.02	0.45	S
G2		0.2	0.204	0.198	0.018	0.092	S
G3		0.519	0.509	0.501	0.032	0.564	S
G4		0.41	0.407	0.399	0.023	0.459	S
G1	pH pH units	4.25	4.22	4.283	0.096	-0.349	S
G2		4.41	4.4	4.431	0.078	-0.276	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		3.99	4	3.999	0.062	-0.15	S
G1	Cond µS/cm	34.3	35.3	34.442	1.716	-0.083	S
G2		23.1	23.4	23.141	0.851	-0.049	S
G3		54.9	57.9	56.924	2.088	-0.969	S
G4		50.1	57.9	59.644	2.643	-3.611	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>



## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 16, Institute of Meteorology and Water Management, Warsaw (Poland)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.307	1.319	1.342	0.081	-0.434	S
G2		0.837	0.856	0.876	0.103	-0.377	S
G3		2.079	2.08	2.108	0.113	-0.252	S
G4		2.186	2.2	2.231	0.151	-0.301	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.246	0.241	0.241	0.016	0.298	S
G2		0.167	0.16	0.161	0.015	0.394	S
G3		0.408	0.401	0.404	0.023	0.183	S
G4		0.555	0.535	0.537	0.029	0.62	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.544	0.546	0.544	0.019	-0.021	S
G2		0.372	0.364	0.363	0.015	0.63	S
G3		0.911	0.911	0.918	0.027	-0.269	S
G4		0.943	0.942	0.938	0.084	0.058	S
G1	Na <sup>+</sup> mg/l	0.542	0.548	0.527	0.026	0.555	S
G2		0.372	0.365	0.355	0.025	0.663	S
G3		0.88	0.913	0.893	0.042	-0.303	S
G4		0.725	0.73	0.713	0.033	0.363	S
G1	Mg <sup>2+</sup> mg/l	0.154	0.155	0.153	0.007	0.203	S
G2		0.093	0.093	0.09	0.005	0.5	S
G3		0.203	0.206	0.205	0.009	-0.265	S
G4		0.201	0.206	0.206	0.01	-0.504	S
G1	Cl <sup>-</sup> mg/l	0.333	0.347	0.337	0.018	-0.233	S
G2		0.238	0.232	0.231	0.022	0.314	S
G3		0.561	0.579	0.57	0.028	-0.312	S
G4		0.456	0.463	0.457	0.03	-0.042	S
G1	Ca <sup>2+</sup> mg/l	0.201	0.192	0.191	0.039	0.244	S
G2		0.121	0.115	0.116	0.034	0.152	S
G3		0.268	0.255	0.254	0.03	0.456	S
G4		0.272	0.255	0.252	0.02	0.971	S
G1	K <sup>+</sup> mg/l	0.293	0.306	0.294	0.02	-0.043	S
G2		0.2	0.204	0.198	0.018	0.092	S
G3		0.491	0.509	0.501	0.032	-0.313	S
G4		0.385	0.407	0.399	0.023	-0.628	S
G1	pH pH units	4.2	4.22	4.283	0.096	-0.871	S
G2		4.37	4.4	4.431	0.078	-0.792	S
G3		3.97	4	4.035	0.06	-1.093	S
G4		3.96	4	3.999	0.062	-0.637	S
G1	Cond µS/cm	35.2	35.3	34.442	1.716	0.442	S
G2		23.5	23.4	23.141	0.851	0.421	S
G3		58.7	57.9	56.924	2.088	0.85	S
G4		61.4	57.9	59.644	2.643	0.664	S

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\* Z score is unitless

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 19, Centro Nacional de Sanidad Ambiental (Spain)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.28	1.319	1.342	0.081	-0.766	S
G2		0.83	0.856	0.876	0.103	-0.445	S
G3		1.88	2.08	2.108	0.113	-2.008	S
G4		1.99	2.2	2.231	0.151	-1.603	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.261	0.241	0.241	0.016	1.213	S
G2		0.178	0.16	0.161	0.015	1.136	S
G3		0.43	0.401	0.404	0.023	1.129	S
G4		0.565	0.535	0.537	0.029	0.97	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.54	0.546	0.544	0.019	-0.231	S
G2		0.36	0.364	0.363	0.015	-0.197	S
G3		0.93	0.911	0.918	0.027	0.423	S
G4		0.96	0.942	0.938	0.084	0.261	S
G1	Na <sup>+</sup> mg/l	0.53	0.548	0.527	0.026	0.1	S
G2		0.35	0.365	0.355	0.025	-0.204	S
G3		0.88	0.913	0.893	0.042	-0.303	S
G4		0.71	0.73	0.713	0.033	-0.098	S
G1	Mg <sup>2+</sup> mg/l	0.16	0.155	0.153	0.007	1.075	S
G2		0.09	0.093	0.09	0.005	-0.06	S
G3		0.21	0.206	0.205	0.009	0.514	S
G4		0.21	0.206	0.206	0.01	0.362	S
G1	Cl <sup>-</sup> mg/l	0.34	0.347	0.337	0.018	0.154	S
G2		< 0.300	0.232	0.231	0.022		B
G3		0.54	0.579	0.57	0.028	-1.05	S
G4		0.45	0.463	0.457	0.03	-0.239	S
G1	Ca <sup>2+</sup> mg/l	0.19	0.192	0.191	0.039	-0.036	S
G2		0.11	0.115	0.116	0.034	-0.169	S
G3		0.25	0.255	0.254	0.03	-0.138	S
G4		0.25	0.255	0.252	0.02	-0.119	S
G1	K <sup>+</sup> mg/l	0.3	0.306	0.294	0.02	0.302	S
G2		0.2	0.204	0.198	0.018	0.092	S
G3		0.52	0.509	0.501	0.032	0.595	S
G4		0.41	0.407	0.399	0.023	0.459	S
G1	pH pH units	4.2	4.22	4.283	0.096	-0.871	S
G2		4.37	4.4	4.431	0.078	-0.792	S
G3		< 4.000	4	4.035	0.06	-34.112	U
G4		< 4.000	4	3.999	0.062	-32.451	U
G1	Cond µS/cm	34.9	35.3	34.442	1.716	0.267	S
G2		23.4	23.4	23.141	0.851	0.304	S
G3		56.5	57.9	56.924	2.088	-0.203	S
G4		59.3	57.9	59.644	2.643	-0.13	S

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\* Z score is unitless

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 20, Swedish Environmental Research Institute IVL, Gothenburg (Sweden)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.279	1.319	1.342	0.081	-0.778	S
G2		0.831	0.856	0.876	0.103	-0.435	S
G3		2.026	2.08	2.108	0.113	-0.72	S
G4		2.13	2.2	2.231	0.151	-0.673	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.243	0.241	0.241	0.016	0.115	S
G2		0.166	0.16	0.161	0.015	0.326	S
G3		0.41	0.401	0.404	0.023	0.269	S
G4		0.54	0.535	0.537	0.029	0.094	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.542	0.546	0.544	0.019	-0.126	S
G2		0.362	0.364	0.363	0.015	-0.059	S
G3		0.913	0.911	0.918	0.027	-0.196	S
G4		0.939	0.942	0.938	0.084	0.011	S
G1	Na <sup>+</sup> mg/l	0.473	0.548	0.527	0.026	-2.057	S
G2		0.311	0.365	0.355	0.025	-1.741	S
G3		0.799	0.913	0.893	0.042	-2.243	S
G4		0.625	0.73	0.713	0.033	-2.71	S
G1	Mg <sup>2+</sup> mg/l	0.148	0.155	0.153	0.007	-0.668	S
G2		0.089	0.093	0.09	0.005	-0.247	S
G3		0.198	0.206	0.205	0.009	-0.821	S
G4		0.195	0.206	0.206	0.01	-1.082	S
G1	Cl <sup>-</sup> mg/l	0.374	0.347	0.337	0.018	2.035	S
G2		0.248	0.232	0.231	0.022	0.773	S
G3		0.623	0.579	0.57	0.028	1.867	S
G4		0.514	0.463	0.457	0.03	1.864	S
G1	Ca <sup>2+</sup> mg/l	0.198	0.192	0.191	0.039	0.168	S
G2		0.126	0.115	0.116	0.034	0.299	S
G3		0.269	0.255	0.254	0.03	0.489	S
G4		0.261	0.255	0.252	0.02	0.426	S
G1	K <sup>+</sup> mg/l	0.274	0.306	0.294	0.02	-0.98	S
G2		0.179	0.204	0.198	0.018	-1.08	S
G3		0.473	0.509	0.501	0.032	-0.876	S
G4		0.365	0.407	0.399	0.023	-1.497	S
G1	pH pH units	4.28	4.22	4.283	0.096	-0.035	S
G2		4.43	4.4	4.431	0.078	-0.018	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		3.99	4	3.999	0.062	-0.15	S
G1	Cond µS/cm	34.1	35.3	34.442	1.716	-0.199	S
G2		23.4	23.4	23.141	0.851	0.304	S
G3		56.8	57.9	56.924	2.088	-0.059	S
G4		59.6	57.9	59.644	2.643	-0.017	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 21, Swiss Federal Laboratories for Materials Testing EMPA (Switzerland)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.331	1.319	1.342	0.081	-0.139	S
G2		0.856	0.856	0.876	0.103	-0.192	S
G3		2.072	2.08	2.108	0.113	-0.314	S
G4		2.182	2.2	2.231	0.151	-0.328	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.249	0.241	0.241	0.016	0.481	S
G2		0.165	0.16	0.161	0.015	0.259	S
G3		0.41	0.401	0.404	0.023	0.269	S
G4		0.553	0.535	0.537	0.029	0.55	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.544	0.546	0.544	0.019	-0.021	S
G2		0.368	0.364	0.363	0.015	0.354	S
G3		0.916	0.911	0.918	0.027	-0.087	S
G4		0.945	0.942	0.938	0.084	0.082	S
G1	Na <sup>+</sup> mg/l	0.543	0.548	0.527	0.026	0.592	S
G2		0.362	0.365	0.355	0.025	0.269	S
G3		0.916	0.913	0.893	0.042	0.56	S
G4		0.73	0.73	0.713	0.033	0.516	S
G1	Mg <sup>2+</sup> mg/l	0.157	0.155	0.153	0.007	0.639	S
G2		0.094	0.093	0.09	0.005	0.686	S
G3		0.211	0.206	0.205	0.009	0.625	S
G4		0.21	0.206	0.206	0.01	0.362	S
G1	Cl <sup>-</sup> mg/l	0.341	0.347	0.337	0.018	0.21	S
G2		0.231	0.232	0.231	0.022	-0.008	S
G3		0.576	0.579	0.57	0.028	0.215	S
G4		0.463	0.463	0.457	0.03	0.188	S
G1	Ca <sup>2+</sup> mg/l	0.191	0.192	0.191	0.039	-0.011	S
G2		0.119	0.115	0.116	0.034	0.094	S
G3		0.251	0.255	0.254	0.03	-0.105	S
G4		0.253	0.255	0.252	0.02	0.03	S
G1	K <sup>+</sup> mg/l	0.29	0.306	0.294	0.02	-0.191	S
G2		0.191	0.204	0.198	0.018	-0.41	S
G3		0.487	0.509	0.501	0.032	-0.438	S
G4		0.392	0.407	0.399	0.023	-0.323	S
G1	pH pH units	4.25	4.22	4.283	0.096	-0.349	S
G2		4.42	4.4	4.431	0.078	-0.147	S
G3		4.03	4	4.035	0.06	-0.087	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	35.61	35.3	34.442	1.716	0.681	S
G2		23.77	23.4	23.141	0.851	0.739	S
G3		58.32	57.9	56.924	2.088	0.668	S
G4		61.24	57.9	59.644	2.643	0.604	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 22, Institute of Global Climate and Ecology (Russian Federation)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.431	1.319	1.342	0.081	1.089	S
G2		0.992	0.856	0.876	0.103	1.128	Q
G3		2.418	2.08	2.108	0.113	2.738	Q
G4		2.494	2.2	2.231	0.151	1.744	Q
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	-999	0.241	0.241	0.016		B
G2		-999	0.16	0.161	0.015		B
G3		-999	0.401	0.404	0.023		B
G4		-999	0.535	0.537	0.029		B
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.602	0.546	0.544	0.019	3.029	Q
G2		0.414	0.364	0.363	0.015	3.526	Q
G3		1.001	0.911	0.918	0.027	3.008	S
G4		1.047	0.942	0.938	0.084	1.3	Q
G1	Na <sup>+</sup> mg/l	-999	0.548	0.527	0.026		B
G2		-999	0.365	0.355	0.025		B
G3		-999	0.913	0.893	0.042		B
G4		-999	0.73	0.713	0.033		B
G1	Mg <sup>2+</sup> mg/l	-999	0.155	0.153	0.007		B
G2		-999	0.093	0.09	0.005		B
G3		-999	0.206	0.205	0.009		B
G4		-999	0.206	0.206	0.01		B
G1	Cl <sup>-</sup> mg/l	0.423	0.347	0.337	0.018	4.745	Q
G2		0.295	0.232	0.231	0.022	2.932	U
G3		0.798	0.579	0.57	0.028	8.017	U
G4		0.636	0.463	0.457	0.03	5.874	U
G1	Ca <sup>2+</sup> mg/l	-999	0.192	0.191	0.039		B
G2		-999	0.115	0.116	0.034		B
G3		-999	0.255	0.254	0.03		B
G4		-999	0.255	0.252	0.02		B
G1	K <sup>+</sup> mg/l	-999	0.306	0.294	0.02		B
G2		-999	0.204	0.198	0.018		B
G3		-999	0.509	0.501	0.032		B
G4		-999	0.407	0.399	0.023		B
G1	pH pH units	4.49	4.22	4.283	0.096	2.158	U
G2		4.81	4.4	4.431	0.078	4.883	U
G3		4.32	4	4.035	0.06	4.773	U
G4		4.33	4	3.999	0.062	5.369	U
G1	Cond µS/cm	23	35.3	34.442	1.716	-6.667	U
G2		15.8	23.4	23.141	0.851	-8.626	U
G3		38.7	57.9	56.924	2.088	-8.727	U
G4		40.6	57.9	59.644	2.643	-7.205	U

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 23, Ricardo-AEA Limited (United Kingdom)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.3	1.319	1.342	0.081	-0.52	S
G2		0.839	0.856	0.876	0.103	-0.357	S
G3		2.06	2.08	2.108	0.113	-0.42	S
G4		2.16	2.2	2.231	0.151	-0.474	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.234	0.241	0.241	0.016	-0.435	S
G2		0.158	0.16	0.161	0.015	-0.214	S
G3		0.389	0.401	0.404	0.023	-0.634	S
G4		0.523	0.535	0.537	0.029	-0.501	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.548	0.546	0.544	0.019	0.19	S
G2		0.366	0.364	0.363	0.015	0.216	S
G3		0.929	0.911	0.918	0.027	0.386	S
G4		0.956	0.942	0.938	0.084	0.214	S
G1	Na <sup>+</sup> mg/l	0.507	0.548	0.527	0.026	-0.77	S
G2		0.327	0.365	0.355	0.025	-1.11	S
G3		0.878	0.913	0.893	0.042	-0.35	S
G4		0.707	0.73	0.713	0.033	-0.19	S
G1	Mg <sup>2+</sup> mg/l	0.138	0.155	0.153	0.007	-2.121	S
G2		0.08	0.093	0.09	0.005	-1.926	S
G3		0.186	0.206	0.205	0.009	-2.157	S
G4		0.186	0.206	0.206	0.01	-1.947	S
G1	Cl <sup>-</sup> mg/l	0.323	0.347	0.337	0.018	-0.786	S
G2		0.212	0.232	0.231	0.022	-0.881	S
G3		0.556	0.579	0.57	0.028	-0.488	S
G4		0.439	0.463	0.457	0.03	-0.601	S
G1	Ca <sup>2+</sup> mg/l	0.17	0.192	0.191	0.039	-0.546	S
G2		0.096	0.115	0.116	0.034	-0.579	Q
G3		0.22	0.255	0.254	0.03	-1.128	S
G4		0.22	0.255	0.252	0.02	-1.604	S
G1	K <sup>+</sup> mg/l	0.257	0.306	0.294	0.02	-1.819	Q
G2		0.162	0.204	0.198	0.018	-2.029	Q
G3		0.449	0.509	0.501	0.032	-1.628	S
G4		0.353	0.407	0.399	0.023	-2.019	S
G1	pH pH units	4.43	4.22	4.283	0.096	1.531	U
G2		4.52	4.4	4.431	0.078	1.143	Q
G3		4.13	4	4.035	0.06	1.589	Q
G4		4.07	4	3.999	0.062	1.149	S
G1	Cond µS/cm	35.4	35.3	34.442	1.716	0.558	S
G2		23	23.4	23.141	0.851	-0.166	S
G3		57.9	57.9	56.924	2.088	0.467	S
G4		61.6	57.9	59.644	2.643	0.74	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 24, Serbian Environmental Protection Agency (Serbia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.315	1.319	1.342	0.081	-0.336	S
G2		0.872	0.856	0.876	0.103	-0.037	S
G3		2.162	2.08	2.108	0.113	0.48	S
G4		2.301	2.2	2.231	0.151	0.462	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.247	0.241	0.241	0.016	0.359	S
G2		0.16	0.16	0.161	0.015	-0.079	S
G3		0.42	0.401	0.404	0.023	0.699	S
G4		0.557	0.535	0.537	0.029	0.69	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.534	0.546	0.544	0.019	-0.546	S
G2		0.364	0.364	0.363	0.015	0.078	S
G3		0.922	0.911	0.918	0.027	0.131	S
G4		0.968	0.942	0.938	0.084	0.357	S
G1	Na <sup>+</sup> mg/l	0.485	0.548	0.527	0.026	-1.602	S
G2		0.322	0.365	0.355	0.025	-1.307	S
G3		0.816	0.913	0.893	0.042	-1.836	S
G4		0.642	0.73	0.713	0.033	-2.187	S
G1	Mg <sup>2+</sup> mg/l	0.16	0.155	0.153	0.007	1.075	S
G2		0.095	0.093	0.09	0.005	0.873	S
G3		0.213	0.206	0.205	0.009	0.848	S
G4		0.216	0.206	0.206	0.01	0.939	S
G1	Cl <sup>-</sup> mg/l	0.34	0.347	0.337	0.018	0.154	S
G2		0.233	0.232	0.231	0.022	0.084	S
G3		0.585	0.579	0.57	0.028	0.532	S
G4		0.492	0.463	0.457	0.03	1.141	S
G1	Ca <sup>2+</sup> mg/l	-999	0.192	0.191	0.039		B
G2		-999	0.115	0.116	0.034		B
G3		0.25	0.255	0.254	0.03	-0.138	S
G4		0.26	0.255	0.252	0.02	0.376	S
G1	K <sup>+</sup> mg/l	0.275	0.306	0.294	0.02	-0.931	S
G2		0.171	0.204	0.198	0.018	-1.526	Q
G3		0.485	0.509	0.501	0.032	-0.501	S
G4		0.39	0.407	0.399	0.023	-0.41	S
G1	pH pH units	4.23	4.22	4.283	0.096	-0.557	S
G2		4.4	4.4	4.431	0.078	-0.405	S
G3		4.01	4	4.035	0.06	-0.423	S
G4		3.99	4	3.999	0.062	-0.15	S
G1	Cond µS/cm	34.5	35.3	34.442	1.716	0.034	S
G2		23.6	23.4	23.141	0.851	0.539	S
G3		56.6	57.9	56.924	2.088	-0.155	S
G4		60.4	57.9	59.644	2.643	0.286	S

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\* Z score is unitless

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 26, Environment Canada, Ontario (Canada)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.316	1.319	1.342	0.081	-0.324	S
G2		0.853	0.856	0.876	0.103	-0.222	S
G3		2.083	2.08	2.108	0.113	-0.217	S
G4		2.192	2.2	2.231	0.151	-0.261	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.247	0.241	0.241	0.016	0.359	S
G2		0.167	0.16	0.161	0.015	0.394	S
G3		0.409	0.401	0.404	0.023	0.226	S
G4		0.538	0.535	0.537	0.029	0.024	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.545	0.546	0.544	0.019	0.032	S
G2		0.365	0.364	0.363	0.015	0.147	S
G3		0.916	0.911	0.918	0.027	-0.087	S
G4		0.945	0.942	0.938	0.084	0.082	S
G1	Na <sup>+</sup> mg/l	0.554	0.548	0.527	0.026	1.009	S
G2		0.363	0.365	0.355	0.025	0.309	S
G3		0.913	0.913	0.893	0.042	0.488	S
G4		0.731	0.73	0.713	0.033	0.547	S
G1	Mg <sup>2+</sup> mg/l	0.159	0.155	0.153	0.007	0.929	S
G2		0.094	0.093	0.09	0.005	0.686	S
G3		0.213	0.206	0.205	0.009	0.848	S
G4		0.213	0.206	0.206	0.01	0.65	S
G1	Cl <sup>-</sup> mg/l	0.349	0.347	0.337	0.018	0.652	S
G2		0.229	0.232	0.231	0.022	-0.1	S
G3		0.587	0.579	0.57	0.028	0.602	S
G4		0.467	0.463	0.457	0.03	0.319	S
G1	Ca <sup>2+</sup> mg/l	0.197	0.192	0.191	0.039	0.142	S
G2		0.116	0.115	0.116	0.034	0.006	S
G3		0.257	0.255	0.254	0.03	0.093	S
G4		0.257	0.255	0.252	0.02	0.228	S
G1	K <sup>+</sup> mg/l	0.314	0.306	0.294	0.02	0.993	S
G2		0.209	0.204	0.198	0.018	0.594	S
G3		0.521	0.509	0.501	0.032	0.626	S
G4		0.415	0.407	0.399	0.023	0.676	S
G1	pH pH units	4.28	4.22	4.283	0.096	-0.035	S
G2		4.46	4.4	4.431	0.078	0.369	S
G3		4.05	4	4.035	0.06	0.248	S
G4		4.02	4	3.999	0.062	0.337	S
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		-999	57.9	56.924	2.088		B
G4		-999	57.9	59.644	2.643		B

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 27, Illinois State Water Survey (United States of America)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.301	1.319	1.342	0.081	-0.508	S
G2		0.844	0.856	0.876	0.103	-0.309	S
G3		2.046	2.08	2.108	0.113	-0.544	S
G4		2.153	2.2	2.231	0.151	-0.52	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.25	0.241	0.241	0.016	0.542	S
G2		0.166	0.16	0.161	0.015	0.326	S
G3		0.422	0.401	0.404	0.023	0.785	S
G4		0.559	0.535	0.537	0.029	0.76	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.543	0.546	0.544	0.019	-0.073	S
G2		0.366	0.364	0.363	0.015	0.216	S
G3		0.903	0.911	0.918	0.027	-0.561	S
G4		0.934	0.942	0.938	0.084	-0.049	S
G1	Na <sup>+</sup> mg/l	0.527	0.548	0.527	0.026	-0.013	S
G2		0.352	0.365	0.355	0.025	-0.125	S
G3		0.888	0.913	0.893	0.042	-0.111	S
G4		0.707	0.73	0.713	0.033	-0.19	S
G1	Mg <sup>2+</sup> mg/l	0.154	0.155	0.153	0.007	0.203	S
G2		0.091	0.093	0.09	0.005	0.127	S
G3		0.205	0.206	0.205	0.009	-0.042	S
G4		0.206	0.206	0.206	0.01	-0.023	S
G1	Cl <sup>-</sup> mg/l	0.351	0.347	0.337	0.018	0.763	S
G2		0.236	0.232	0.231	0.022	0.222	S
G3		0.588	0.579	0.57	0.028	0.637	S
G4		0.472	0.463	0.457	0.03	0.484	S
G1	Ca <sup>2+</sup> mg/l	0.193	0.192	0.191	0.039	0.04	S
G2		0.115	0.115	0.116	0.034	-0.023	S
G3		0.255	0.255	0.254	0.03	0.027	S
G4		0.255	0.255	0.252	0.02	0.129	S
G1	K <sup>+</sup> mg/l	0.304	0.306	0.294	0.02	0.5	S
G2		0.204	0.204	0.198	0.018	0.315	S
G3		0.514	0.509	0.501	0.032	0.407	S
G4		0.407	0.407	0.399	0.023	0.329	S
G1	pH pH units	4.22	4.22	4.283	0.096	-0.662	S
G2		4.4	4.4	4.431	0.078	-0.405	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		3.99	4	3.999	0.062	-0.15	S
G1	Cond µS/cm	35.6	35.3	34.442	1.716	0.675	S
G2		23.8	23.4	23.141	0.851	0.774	S
G3		58.4	57.9	56.924	2.088	0.707	S
G4		61	57.9	59.644	2.643	0.513	S

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B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 30, Joint Research Centre, Ispra (Italy)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.468	1.319	1.342	0.081	1.543	Q
G2		0.957	0.856	0.876	0.103	0.788	Q
G3		2.319	2.08	2.108	0.113	1.865	Q
G4		2.437	2.2	2.231	0.151	1.366	Q
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.219	0.241	0.241	0.016	-1.35	S
G2		0.148	0.16	0.161	0.015	-0.889	S
G3		0.394	0.401	0.404	0.023	-0.419	S
G4		0.499	0.535	0.537	0.029	-1.341	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.584	0.546	0.544	0.019	2.083	S
G2		0.387	0.364	0.363	0.015	1.664	S
G3		0.994	0.911	0.918	0.027	2.753	S
G4		1.023	0.942	0.938	0.084	1.014	S
G1	Na <sup>+</sup> mg/l	0.552	0.548	0.527	0.026	0.933	S
G2		0.365	0.365	0.355	0.025	0.387	S
G3		0.933	0.913	0.893	0.042	0.967	S
G4		0.742	0.73	0.713	0.033	0.885	S
G1	Mg <sup>2+</sup> mg/l	0.147	0.155	0.153	0.007	-0.814	S
G2		0.083	0.093	0.09	0.005	-1.366	S
G3		0.205	0.206	0.205	0.009	-0.042	S
G4		0.205	0.206	0.206	0.01	-0.119	S
G1	Cl <sup>-</sup> mg/l	0.359	0.347	0.337	0.018	1.205	S
G2		0.231	0.232	0.231	0.022	-0.008	S
G3		0.603	0.579	0.57	0.028	1.164	S
G4		0.475	0.463	0.457	0.03	0.582	S
G1	Ca <sup>2+</sup> mg/l	0.192	0.192	0.191	0.039	0.015	S
G2		0.105	0.115	0.116	0.034	-0.316	S
G3		0.26	0.255	0.254	0.03	0.192	S
G4		0.264	0.255	0.252	0.02	0.574	S
G1	K <sup>+</sup> mg/l	0.326	0.306	0.294	0.02	1.585	S
G2		0.215	0.204	0.198	0.018	0.929	S
G3		0.56	0.509	0.501	0.032	1.847	S
G4		0.444	0.407	0.399	0.023	1.937	S
G1	pH pH units	4.65	4.22	4.283	0.096	3.829	U
G2		4.26	4.4	4.431	0.078	-2.211	Q
G3		3.91	4	4.035	0.06	-2.099	S
G4		3.83	4	3.999	0.062	-2.747	Q
G1	Cond µS/cm	37.1	35.3	34.442	1.716	1.549	S
G2		24.8	23.4	23.141	0.851	1.949	S
G3		60.5	57.9	56.924	2.088	1.712	S
G4		63.4	57.9	59.644	2.643	1.421	S

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 31, Slovak Hydrometeorological Institute (Slovakia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.403	1.319	1.342	0.081	0.745	S
G2		0.927	0.856	0.876	0.103	0.497	S
G3		2.199	2.08	2.108	0.113	0.806	S
G4		2.312	2.2	2.231	0.151	0.535	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.243	0.241	0.241	0.016	0.115	S
G2		0.165	0.16	0.161	0.015	0.259	S
G3		0.393	0.401	0.404	0.023	-0.462	S
G4		0.501	0.535	0.537	0.029	-1.271	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.529	0.546	0.544	0.019	-0.809	S
G2		0.357	0.364	0.363	0.015	-0.404	S
G3		0.918	0.911	0.918	0.027	-0.014	S
G4		0.947	0.942	0.938	0.084	0.106	S
G1	Na <sup>+</sup> mg/l	0.453	0.548	0.527	0.026	-2.813	Q
G2		0.302	0.365	0.355	0.025	-2.095	Q
G3		0.761	0.913	0.893	0.042	-3.154	Q
G4		0.621	0.73	0.713	0.033	-2.832	S
G1	Mg <sup>2+</sup> mg/l	0.135	0.155	0.153	0.007	-2.557	S
G2		0.08	0.093	0.09	0.005	-1.926	S
G3		0.187	0.206	0.205	0.009	-2.046	S
G4		0.188	0.206	0.206	0.01	-1.755	S
G1	Cl <sup>-</sup> mg/l	0.321	0.347	0.337	0.018	-0.897	S
G2		0.215	0.232	0.231	0.022	-0.743	S
G3		0.533	0.579	0.57	0.028	-1.296	S
G4		0.424	0.463	0.457	0.03	-1.094	S
G1	Ca <sup>2+</sup> mg/l	0.157	0.192	0.191	0.039	-0.878	Q
G2		0.093	0.115	0.116	0.034	-0.667	Q
G3		0.214	0.255	0.254	0.03	-1.326	Q
G4		0.222	0.255	0.252	0.02	-1.505	S
G1	K <sup>+</sup> mg/l	0.249	0.306	0.294	0.02	-2.214	Q
G2		0.166	0.204	0.198	0.018	-1.806	Q
G3		0.434	0.509	0.501	0.032	-2.097	S
G4		0.366	0.407	0.399	0.023	-1.454	S
G1	pH pH units	4.3	4.22	4.283	0.096	0.174	S
G2		4.5	4.4	4.431	0.078	0.885	S
G3		4.08	4	4.035	0.06	0.751	S
G4		4.03	4	3.999	0.062	0.499	S
G1	Cond µS/cm	35.17	35.3	34.442	1.716	0.424	S
G2		23.7	23.4	23.141	0.851	0.656	S
G3		57.57	57.9	56.924	2.088	0.309	S
G4		60.27	57.9	59.644	2.643	0.237	S

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 32, Atmospheric Pollution Research Laboratory, Institute of Physics, Vilnius (Lithuania)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.327	1.319	1.342	0.081	-0.188	S
G2		0.884	0.856	0.876	0.103	0.079	S
G3		2.117	2.08	2.108	0.113	0.083	S
G4		2.243	2.2	2.231	0.151	0.077	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.262	0.241	0.241	0.016	1.274	S
G2		0.184	0.16	0.161	0.015	1.541	S
G3		0.401	0.401	0.404	0.023	-0.118	S
G4		0.546	0.535	0.537	0.029	0.304	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.553	0.546	0.544	0.019	0.453	S
G2		0.368	0.364	0.363	0.015	0.354	S
G3		0.918	0.911	0.918	0.027	-0.014	S
G4		0.947	0.942	0.938	0.084	0.106	S
G1	Na <sup>+</sup> mg/l	0.55	0.548	0.527	0.026	0.857	S
G2		0.35	0.365	0.355	0.025	-0.204	S
G3		0.88	0.913	0.893	0.042	-0.303	S
G4		0.74	0.73	0.713	0.033	0.824	S
G1	Mg <sup>2+</sup> mg/l	-999	0.155	0.153	0.007		B
G2		-999	0.093	0.09	0.005		B
G3		-999	0.206	0.205	0.009		B
G4		-999	0.206	0.206	0.01		B
G1	Cl <sup>-</sup> mg/l	0.338	0.347	0.337	0.018	0.044	S
G2		0.237	0.232	0.231	0.022	0.268	S
G3		0.57	0.579	0.57	0.028	0.004	S
G4		0.463	0.463	0.457	0.03	0.188	S
G1	Ca <sup>2+</sup> mg/l	0.11	0.192	0.191	0.039	-2.076	U
G2		0.055	0.115	0.116	0.034	-1.779	U
G3		0.1	0.255	0.254	0.03	-5.089	U
G4		0.155	0.255	0.252	0.02	-4.823	U
G1	K <sup>+</sup> mg/l	0.307	0.306	0.294	0.02	0.648	S
G2		0.205	0.204	0.198	0.018	0.371	S
G3		0.51	0.509	0.501	0.032	0.282	S
G4		0.405	0.407	0.399	0.023	0.242	S
G1	pH pH units	4.27	4.22	4.283	0.096	-0.14	S
G2		4.46	4.4	4.431	0.078	0.369	S
G3		4	4	4.035	0.06	-0.59	S
G4		3.95	4	3.999	0.062	-0.799	S
G1	Cond µS/cm	35	35.3	34.442	1.716	0.325	S
G2		22	23.4	23.141	0.851	-1.341	S
G3		56	57.9	56.924	2.088	-0.443	S
G4		59	57.9	59.644	2.643	-0.244	S

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If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 33, Environmental Pollution Observ. Centre (Latvia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.335	1.319	1.342	0.081	-0.09	S
G2		0.83	0.856	0.876	0.103	-0.445	S
G3		2.172	2.08	2.108	0.113	0.568	S
G4		2.23	2.2	2.231	0.151	-0.009	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.23	0.241	0.241	0.016	-0.679	S
G2		0.15	0.16	0.161	0.015	-0.754	S
G3		0.38	0.401	0.404	0.023	-1.021	S
G4		0.51	0.535	0.537	0.029	-0.956	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.535	0.546	0.544	0.019	-0.494	S
G2		0.351	0.364	0.363	0.015	-0.818	S
G3		0.95	0.911	0.918	0.027	1.151	S
G4		0.971	0.942	0.938	0.084	0.393	S
G1	Na <sup>+</sup> mg/l	0.482	0.548	0.527	0.026	-1.716	S
G2		0.317	0.365	0.355	0.025	-1.504	S
G3		0.817	0.913	0.893	0.042	-1.812	S
G4		0.658	0.73	0.713	0.033	-1.696	S
G1	Mg <sup>2+</sup> mg/l	0.149	0.155	0.153	0.007	-0.523	S
G2		0.089	0.093	0.09	0.005	-0.247	S
G3		0.204	0.206	0.205	0.009	-0.154	S
G4		0.202	0.206	0.206	0.01	-0.408	S
G1	Cl <sup>-</sup> mg/l	0.3	0.347	0.337	0.018	-2.058	S
G2		0.196	0.232	0.231	0.022	-1.616	Q
G3		0.531	0.579	0.57	0.028	-1.366	S
G4		0.42	0.463	0.457	0.03	-1.225	S
G1	Ca <sup>2+</sup> mg/l	0.168	0.192	0.191	0.039	-0.597	S
G2		0.106	0.115	0.116	0.034	-0.287	S
G3		0.232	0.255	0.254	0.03	-0.732	S
G4		0.23	0.255	0.252	0.02	-1.109	S
G1	K <sup>+</sup> mg/l	0.276	0.306	0.294	0.02	-0.882	S
G2		0.182	0.204	0.198	0.018	-0.913	S
G3		0.476	0.509	0.501	0.032	-0.782	S
G4		0.374	0.407	0.399	0.023	-1.106	S
G1	pH pH units	4.3	4.22	4.283	0.096	0.174	S
G2		4.44	4.4	4.431	0.078	0.111	S
G3		4.04	4	4.035	0.06	0.08	S
G4		4.02	4	3.999	0.062	0.337	S
G1	Cond µS/cm	35.7	35.3	34.442	1.716	0.733	S
G2		23.72	23.4	23.141	0.851	0.68	S
G3		58.6	57.9	56.924	2.088	0.803	S
G4		61.6	57.9	59.644	2.643	0.74	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 34, Ministry of Environment and Urbanisation (Turkey)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	3.815	1.319	1.342	0.081	30.371	U
G2		2.454	0.856	0.876	0.103	15.318	U
G3		6.054	2.08	2.108	0.113	34.809	U
G4		6.376	2.2	2.231	0.151	27.521	U
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.011	0.241	0.241	0.016	-14.045	U
G2		0.002	0.16	0.161	0.015	-10.742	U
G3		0.001	0.401	0.404	0.023	-17.319	U
G4		0.079	0.535	0.537	0.029	-16.045	U
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	2.297	0.546	0.544	0.019	92.159	U
G2		1.557	0.364	0.363	0.015	82.326	U
G3		3.946	0.911	0.918	0.027	110.258	U
G4		4.024	0.942	0.938	0.084	36.846	U
G1	Na <sup>+</sup> mg/l	1.062	0.548	0.527	0.026	20.233	U
G2		0.715	0.365	0.355	0.025	14.179	U
G3		1.774	0.913	0.893	0.042	21.118	U
G4		1.454	0.73	0.713	0.033	22.76	U
G1	Mg <sup>2+</sup> mg/l	0.137	0.155	0.153	0.007	-2.266	S
G2		0.083	0.093	0.09	0.005	-1.366	S
G3		0.187	0.206	0.205	0.009	-2.046	S
G4		0.186	0.206	0.206	0.01	-1.947	S
G1	Cl <sup>-</sup> mg/l	0.31	0.347	0.337	0.018	-1.505	S
G2		0.21	0.232	0.231	0.022	-0.973	S
G3		0.51	0.579	0.57	0.028	-2.104	S
G4		0.41	0.463	0.457	0.03	-1.554	S
G1	Ca <sup>2+</sup> mg/l	0.192	0.192	0.191	0.039	0.015	S
G2		0.116	0.115	0.116	0.034	0.006	S
G3		0.279	0.255	0.254	0.03	0.819	S
G4		0.271	0.255	0.252	0.02	0.921	S
G1	K <sup>+</sup> mg/l	0.607	0.306	0.294	0.02	15.447	U
G2		0.408	0.204	0.198	0.018	11.7	U
G3		1.005	0.509	0.501	0.032	15.778	U
G4		0.827	0.407	0.399	0.023	18.585	U
G1	pH pH units	8.48	4.22	4.283	0.096	43.826	U
G2		8.34	4.4	4.431	0.078	50.41	U
G3		6.7	4	4.035	0.06	44.664	U
G4		6.01	4	3.999	0.062	32.639	U
G1	Cond µS/cm	30	35.3	34.442	1.716	-2.588	Q
G2		21.4	23.4	23.141	0.851	-2.046	S
G3		6.7	57.9	56.924	2.088	-24.051	U
G4		6.01	57.9	59.644	2.643	-20.291	U

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\* Z score is unitless

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 35, Meteorological and Hydrological Service of Croatia (Croatia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.336	1.319	1.342	0.081	-0.078	S
G2		0.869	0.856	0.876	0.103	-0.066	S
G3		2.116	2.08	2.108	0.113	0.074	S
G4		2.222	2.2	2.231	0.151	-0.062	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.246	0.241	0.241	0.016	0.298	S
G2		0.168	0.16	0.161	0.015	0.461	S
G3		0.41	0.401	0.404	0.023	0.269	S
G4		0.548	0.535	0.537	0.029	0.374	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.55	0.546	0.544	0.019	0.295	S
G2		0.366	0.364	0.363	0.015	0.216	S
G3		0.932	0.911	0.918	0.027	0.496	S
G4		0.961	0.942	0.938	0.084	0.273	S
G1	Na <sup>+</sup> mg/l	0.534	0.548	0.527	0.026	0.252	S
G2		0.358	0.365	0.355	0.025	0.111	S
G3		0.919	0.913	0.893	0.042	0.632	S
G4		0.73	0.73	0.713	0.033	0.516	S
G1	Mg <sup>2+</sup> mg/l	0.152	0.155	0.153	0.007	-0.087	S
G2		0.09	0.093	0.09	0.005	-0.06	S
G3		0.201	0.206	0.205	0.009	-0.487	S
G4		0.201	0.206	0.206	0.01	-0.504	S
G1	Cl <sup>-</sup> mg/l	0.344	0.347	0.337	0.018	0.375	S
G2		0.23	0.232	0.231	0.022	-0.054	S
G3		0.585	0.579	0.57	0.028	0.532	S
G4		0.467	0.463	0.457	0.03	0.319	S
G1	Ca <sup>2+</sup> mg/l	0.181	0.192	0.191	0.039	-0.266	S
G2		0.103	0.115	0.116	0.034	-0.374	S
G3		0.24	0.255	0.254	0.03	-0.468	S
G4		0.24	0.255	0.252	0.02	-0.614	S
G1	K <sup>+</sup> mg/l	0.303	0.306	0.294	0.02	0.45	S
G2		0.2	0.204	0.198	0.018	0.092	S
G3		0.514	0.509	0.501	0.032	0.407	S
G4		0.408	0.407	0.399	0.023	0.372	S
G1	pH pH units	4.27	4.22	4.283	0.096	-0.14	S
G2		4.43	4.4	4.431	0.078	-0.018	S
G3		4.03	4	4.035	0.06	-0.087	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	35	35.3	34.442	1.716	0.325	S
G2		23.2	23.4	23.141	0.851	0.069	S
G3		57.1	57.9	56.924	2.088	0.084	S
G4		60.1	57.9	59.644	2.643	0.173	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 36, Hydrometeorological Institute of Slovenia (Slovenia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.31	1.319	1.342	0.081	-0.397	S
G2		0.845	0.856	0.876	0.103	-0.299	S
G3		2.127	2.08	2.108	0.113	0.171	S
G4		2.23	2.2	2.231	0.151	-0.009	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.243	0.241	0.241	0.016	0.115	S
G2		0.164	0.16	0.161	0.015	0.191	S
G3		0.403	0.401	0.404	0.023	-0.032	S
G4		0.53	0.535	0.537	0.029	-0.256	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.546	0.546	0.544	0.019	0.085	S
G2		0.363	0.364	0.363	0.015	0.009	S
G3		0.942	0.911	0.918	0.027	0.86	S
G4		0.978	0.942	0.938	0.084	0.476	S
G1	Na <sup>+</sup> mg/l	0.545	0.548	0.527	0.026	0.668	S
G2		0.363	0.365	0.355	0.025	0.309	S
G3		0.897	0.913	0.893	0.042	0.105	S
G4		0.717	0.73	0.713	0.033	0.117	S
G1	Mg <sup>2+</sup> mg/l	0.154	0.155	0.153	0.007	0.203	S
G2		0.093	0.093	0.09	0.005	0.5	S
G3		0.205	0.206	0.205	0.009	-0.042	S
G4		0.21	0.206	0.206	0.01	0.362	S
G1	Cl <sup>-</sup> mg/l	0.308	0.347	0.337	0.018	-1.616	S
G2		0.21	0.232	0.231	0.022	-0.973	S
G3		0.542	0.579	0.57	0.028	-0.98	S
G4		0.437	0.463	0.457	0.03	-0.667	S
G1	Ca <sup>2+</sup> mg/l	0.193	0.192	0.191	0.039	0.04	S
G2		0.111	0.115	0.116	0.034	-0.14	S
G3		0.257	0.255	0.254	0.03	0.093	S
G4		0.253	0.255	0.252	0.02	0.03	S
G1	K <sup>+</sup> mg/l	0.304	0.306	0.294	0.02	0.5	S
G2		0.204	0.204	0.198	0.018	0.315	S
G3		0.507	0.509	0.501	0.032	0.188	S
G4		0.412	0.407	0.399	0.023	0.546	S
G1	pH pH units	4.27	4.22	4.283	0.096	-0.14	S
G2		4.44	4.4	4.431	0.078	0.111	S
G3		4.04	4	4.035	0.06	0.08	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	33.4	35.3	34.442	1.716	-0.607	S
G2		22.6	23.4	23.141	0.851	-0.636	S
G3		53.7	57.9	56.924	2.088	-1.544	S
G4		58.6	57.9	59.644	2.643	-0.395	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>



## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 38, Estonian Environmental Research Centre, Tallinn (Estonia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.324	1.319	1.342	0.081	-0.225	S
G2		0.855	0.856	0.876	0.103	-0.202	S
G3		2.084	2.08	2.108	0.113	-0.208	S
G4		2.205	2.2	2.231	0.151	-0.175	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.236	0.241	0.241	0.016	-0.312	S
G2		0.155	0.16	0.161	0.015	-0.416	S
G3		0.4	0.401	0.404	0.023	-0.161	S
G4		0.529	0.535	0.537	0.029	-0.291	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.543	0.546	0.544	0.019	-0.073	S
G2		0.366	0.364	0.363	0.015	0.216	S
G3		0.919	0.911	0.918	0.027	0.022	S
G4		0.954	0.942	0.938	0.084	0.19	S
G1	Na <sup>+</sup> mg/l	0.513	0.548	0.527	0.026	-0.543	S
G2		0.329	0.365	0.355	0.025	-1.031	S
G3		0.893	0.913	0.893	0.042	0.009	S
G4		0.703	0.73	0.713	0.033	-0.313	S
G1	Mg <sup>2+</sup> mg/l	0.151	0.155	0.153	0.007	-0.233	S
G2		0.091	0.093	0.09	0.005	0.127	S
G3		0.207	0.206	0.205	0.009	0.18	S
G4		0.207	0.206	0.206	0.01	0.073	S
G1	Cl <sup>-</sup> mg/l	0.319	0.347	0.337	0.018	-1.007	S
G2		0.236	0.232	0.231	0.022	0.222	S
G3		0.554	0.579	0.57	0.028	-0.558	S
G4		0.428	0.463	0.457	0.03	-0.963	S
G1	Ca <sup>2+</sup> mg/l	0.17	0.192	0.191	0.039	-0.546	S
G2		0.103	0.115	0.116	0.034	-0.374	S
G3		0.23	0.255	0.254	0.03	-0.798	S
G4		0.227	0.255	0.252	0.02	-1.258	S
G1	K <sup>+</sup> mg/l	0.278	0.306	0.294	0.02	-0.783	S
G2		0.175	0.204	0.198	0.018	-1.303	S
G3		0.459	0.509	0.501	0.032	-1.315	S
G4		0.398	0.407	0.399	0.023	-0.063	S
G1	pH pH units	4.3	4.22	4.283	0.096	0.174	S
G2		4.45	4.4	4.431	0.078	0.24	S
G3		4.03	4	4.035	0.06	-0.087	S
G4		3.97	4	3.999	0.062	-0.475	S
G1	Cond µS/cm	33.8	35.3	34.442	1.716	-0.374	S
G2		22.5	23.4	23.141	0.851	-0.754	S
G3		57.6	57.9	56.924	2.088	0.324	S
G4		61.1	57.9	59.644	2.643	0.551	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 39, Environmental Monitoring Laboratory, Institute of Environmental Protection (Poland)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.302	1.319	1.342	0.081	-0.496	S
G2		0.853	0.856	0.876	0.103	-0.222	S
G3		2.078	2.08	2.108	0.113	-0.261	S
G4		2.184	2.2	2.231	0.151	-0.314	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.242	0.241	0.241	0.016	0.054	S
G2		0.161	0.16	0.161	0.015	-0.011	S
G3		0.405	0.401	0.404	0.023	0.054	S
G4		0.543	0.535	0.537	0.029	0.199	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.543	0.546	0.544	0.019	-0.073	S
G2		0.367	0.364	0.363	0.015	0.285	S
G3		0.922	0.911	0.918	0.027	0.131	S
G4		0.945	0.942	0.938	0.084	0.082	S
G1	Na <sup>+</sup> mg/l	0.547	0.548	0.527	0.026	0.744	S
G2		0.36	0.365	0.355	0.025	0.19	S
G3		0.917	0.913	0.893	0.042	0.584	S
G4		0.721	0.73	0.713	0.033	0.24	S
G1	Mg <sup>2+</sup> mg/l	0.158	0.155	0.153	0.007	0.784	S
G2		0.094	0.093	0.09	0.005	0.705	S
G3		0.214	0.206	0.205	0.009	0.959	S
G4		0.214	0.206	0.206	0.01	0.747	S
G1	Cl <sup>-</sup> mg/l	0.355	0.347	0.337	0.018	0.984	S
G2		0.24	0.232	0.231	0.022	0.406	S
G3		0.577	0.579	0.57	0.028	0.25	S
G4		0.469	0.463	0.457	0.03	0.385	S
G1	Ca <sup>2+</sup> mg/l	0.194	0.192	0.191	0.039	0.066	S
G2		0.115	0.115	0.116	0.034	-0.023	S
G3		0.258	0.255	0.254	0.03	0.126	S
G4		0.258	0.255	0.252	0.02	0.277	S
G1	K <sup>+</sup> mg/l	0.309	0.306	0.294	0.02	0.746	S
G2		0.197	0.204	0.198	0.018	-0.076	S
G3		0.513	0.509	0.501	0.032	0.376	S
G4		0.416	0.407	0.399	0.023	0.72	S
G1	pH pH units	-999	4.22	4.283	0.096		B
G2		-999	4.4	4.431	0.078		B
G3		-999	4	4.035	0.06		B
G4		-999	4	3.999	0.062		B
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		-999	57.9	56.924	2.088		B
G4		-999	57.9	59.644	2.643		B

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 42, State Hydrometeorological Service, Chisnau (Moldova)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.278	1.319	1.342	0.081	-0.795	S
G2		0.807	0.856	0.876	0.103	-0.67	S
G3		2.039	2.08	2.108	0.113	-0.607	S
G4		2.184	2.2	2.231	0.151	-0.313	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.215	0.241	0.241	0.016	-1.588	S
G2		0.144	0.16	0.161	0.015	-1.186	S
G3		0.367	0.401	0.404	0.023	-1.576	S
G4		0.498	0.535	0.537	0.029	-1.376	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.545	0.546	0.544	0.019	0.048	S
G2		0.356	0.364	0.363	0.015	-0.48	S
G3		0.915	0.911	0.918	0.027	-0.12	S
G4		0.966	0.942	0.938	0.084	0.328	S
G1	Na <sup>+</sup> mg/l	0.556	0.548	0.527	0.026	1.081	S
G2		0.403	0.365	0.355	0.025	1.885	S
G3		0.944	0.913	0.893	0.042	1.226	S
G4		0.752	0.73	0.713	0.033	1.201	S
G1	Mg <sup>2+</sup> mg/l	0.176	0.155	0.153	0.007	3.399	S
G2		0.116	0.093	0.09	0.005	4.792	Q
G3		0.227	0.206	0.205	0.009	2.428	S
G4		0.228	0.206	0.206	0.01	2.065	S
G1	Cl <sup>-</sup> mg/l	0.278	0.347	0.337	0.018	-3.275	Q
G2		0.153	0.232	0.231	0.022	-3.582	U
G3		0.514	0.579	0.57	0.028	-1.949	S
G4		0.392	0.463	0.457	0.03	-2.142	Q
G1	Ca <sup>2+</sup> mg/l	0.4	0.192	0.191	0.039	5.315	U
G2		0.254	0.115	0.116	0.034	4.039	U
G3		0.416	0.255	0.254	0.03	5.351	U
G4		0.396	0.255	0.252	0.02	7.102	U
G1	K <sup>+</sup> mg/l	0.406	0.306	0.294	0.02	5.517	U
G2		0.363	0.204	0.198	0.018	9.211	U
G3		0.696	0.509	0.501	0.032	6.114	U
G4		0.547	0.407	0.399	0.023	6.401	U
G1	pH pH units	4.22	4.22	4.283	0.096	-0.662	S
G2		4.38	4.4	4.431	0.078	-0.663	S
G3		4	4	4.035	0.06	-0.59	S
G4		3.96	4	3.999	0.062	-0.637	S
G1	Cond µS/cm	29	35.3	34.442	1.716	-3.171	Q
G2		20	23.4	23.141	0.851	-3.691	S
G3		48	57.9	56.924	2.088	-4.274	Q
G4		50	57.9	59.644	2.643	-3.649	S

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**Foretaksnr./Enterprise no.** 941705561

If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 45, Environmental Impact Monitoring Center, Yerevan (Armenia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.42	1.319	1.342	0.081	0.958	S
G2		0.935	0.856	0.876	0.103	0.573	S
G3		2.218	2.08	2.108	0.113	0.976	S
G4		2.365	2.2	2.231	0.151	0.885	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.146	0.241	0.241	0.016	-5.806	U
G2		0.022	0.16	0.161	0.015	-9.393	U
G3		0.334	0.401	0.404	0.023	-2.999	Q
G4		0.458	0.535	0.537	0.029	-2.776	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.549	0.546	0.544	0.019	0.258	S
G2		0.372	0.364	0.363	0.015	0.644	S
G3		0.921	0.911	0.918	0.027	0.11	S
G4		0.954	0.942	0.938	0.084	0.19	S
G1	Na <sup>+</sup> mg/l	0.561	0.548	0.527	0.026	1.274	S
G2		0.38	0.365	0.355	0.025	0.978	S
G3		0.956	0.913	0.893	0.042	1.518	S
G4		0.764	0.73	0.713	0.033	1.561	S
G1	Mg <sup>2+</sup> mg/l	0.162	0.155	0.153	0.007	1.365	S
G2		0.098	0.093	0.09	0.005	1.433	S
G3		0.217	0.206	0.205	0.009	1.293	S
G4		0.217	0.206	0.206	0.01	1.035	S
G1	Cl <sup>-</sup> mg/l	0.341	0.347	0.337	0.018	0.21	S
G2		0.23	0.232	0.231	0.022	-0.035	S
G3		0.574	0.579	0.57	0.028	0.131	S
G4		0.459	0.463	0.457	0.03	0.06	S
G1	Ca <sup>2+</sup> mg/l	0.205	0.192	0.191	0.039	0.346	S
G2		0.121	0.115	0.116	0.034	0.152	S
G3		0.27	0.255	0.254	0.03	0.522	S
G4		0.266	0.255	0.252	0.02	0.674	S
G1	K <sup>+</sup> mg/l	0.319	0.306	0.294	0.02	1.24	S
G2		0.209	0.204	0.198	0.018	0.594	S
G3		0.537	0.509	0.501	0.032	1.127	S
G4		0.423	0.407	0.399	0.023	1.024	S
G1	pH pH units	4.383	4.22	4.283	0.096	1.04	Q
G2		4.446	4.4	4.431	0.078	0.188	S
G3		4.1	4	4.035	0.06	1.086	S
G4		4.067	4	3.999	0.062	1.1	S
G1	Cond µS/cm	31.9	35.3	34.442	1.716	-1.481	S
G2		22.85	23.4	23.141	0.851	-0.342	S
G3		55.95	57.9	56.924	2.088	-0.467	S
G4		57.2	57.9	59.644	2.643	-0.925	S

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\* Z score is unitless

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 46, Diabla Gora Station (Poland)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	-999	1.319	1.342	0.081		B
G2		-999	0.856	0.876	0.103		B
G3		-999	2.08	2.108	0.113		B
G4		-999	2.2	2.231	0.151		B
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	-999	0.241	0.241	0.016		B
G2		-999	0.16	0.161	0.015		B
G3		-999	0.401	0.404	0.023		B
G4		-999	0.535	0.537	0.029		B
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	-999	0.546	0.544	0.019		B
G2		-999	0.364	0.363	0.015		B
G3		-999	0.911	0.918	0.027		B
G4		-999	0.942	0.938	0.084		B
G1	Na <sup>+</sup> mg/l	-999	0.548	0.527	0.026		B
G2		-999	0.365	0.355	0.025		B
G3		-999	0.913	0.893	0.042		B
G4		-999	0.73	0.713	0.033		B
G1	Mg <sup>2+</sup> mg/l	-999	0.155	0.153	0.007		B
G2		-999	0.093	0.09	0.005		B
G3		-999	0.206	0.205	0.009		B
G4		-999	0.206	0.206	0.01		B
G1	Cl <sup>-</sup> mg/l	-999	0.347	0.337	0.018		B
G2		-999	0.232	0.231	0.022		B
G3		-999	0.579	0.57	0.028		B
G4		-999	0.463	0.457	0.03		B
G1	Ca <sup>2+</sup> mg/l	-999	0.192	0.191	0.039		B
G2		-999	0.115	0.116	0.034		B
G3		-999	0.255	0.254	0.03		B
G4		-999	0.255	0.252	0.02		B
G1	K <sup>+</sup> mg/l	-999	0.306	0.294	0.02		B
G2		-999	0.204	0.198	0.018		B
G3		-999	0.509	0.501	0.032		B
G4		-999	0.407	0.399	0.023		B
G1	pH pH units	4.26	4.22	4.283	0.096	-0.244	S
G2		4.45	4.4	4.431	0.078	0.24	S
G3		4.05	4	4.035	0.06	0.248	S
G4		4.02	4	3.999	0.062	0.337	S
G1	Cond µS/cm	34.53	35.3	34.442	1.716	0.051	S
G2		23.1	23.4	23.141	0.851	-0.049	S
G3		56.33	57.9	56.924	2.088	-0.285	S
G4		58.85	57.9	59.644	2.643	-0.3	S

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\* Z score is unitless

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 49, The Cyprus Institute (Cyl) (Cyprus)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.224	1.319	1.342	0.081	-1.454	S
G2		0.822	0.856	0.876	0.103	-0.522	S
G3		2.002	2.08	2.108	0.113	-0.932	S
G4		2.118	2.2	2.231	0.151	-0.753	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.248	0.241	0.241	0.016	0.42	S
G2		0.164	0.16	0.161	0.015	0.191	S
G3		0.411	0.401	0.404	0.023	0.312	S
G4		0.552	0.535	0.537	0.029	0.515	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.512	0.546	0.544	0.019	-1.703	S
G2		0.364	0.364	0.363	0.015	0.078	S
G3		0.916	0.911	0.918	0.027	-0.087	S
G4		0.946	0.942	0.938	0.084	0.094	S
G1	Na <sup>+</sup> mg/l	0.521	0.548	0.527	0.026	-0.24	S
G2		0.347	0.365	0.355	0.025	-0.322	S
G3		0.887	0.913	0.893	0.042	-0.135	S
G4		0.69	0.73	0.713	0.033	-0.713	S
G1	Mg <sup>2+</sup> mg/l	0.155	0.155	0.153	0.007	0.348	S
G2		0.09	0.093	0.09	0.005	-0.06	S
G3		0.209	0.206	0.205	0.009	0.403	S
G4		0.209	0.206	0.206	0.01	0.266	S
G1	Cl <sup>-</sup> mg/l	0.34	0.347	0.337	0.018	0.154	S
G2		0.235	0.232	0.231	0.022	0.176	S
G3		0.588	0.579	0.57	0.028	0.637	S
G4		0.47	0.463	0.457	0.03	0.418	S
G1	Ca <sup>2+</sup> mg/l	0.197	0.192	0.191	0.039	0.142	S
G2		0.111	0.115	0.116	0.034	-0.14	S
G3		0.259	0.255	0.254	0.03	0.159	S
G4		0.254	0.255	0.252	0.02	0.079	S
G1	K <sup>+</sup> mg/l	0.322	0.306	0.294	0.02	1.388	S
G2		0.206	0.204	0.198	0.018	0.427	S
G3		0.527	0.509	0.501	0.032	0.814	S
G4		0.436	0.407	0.399	0.023	1.589	S
G1	pH pH units	4.27	4.22	4.283	0.096	-0.14	S
G2		4.43	4.4	4.431	0.078	-0.018	S
G3		4.05	4	4.035	0.06	0.248	S
G4		4.02	4	3.999	0.062	0.337	S
G1	Cond µS/cm	33.4	35.3	34.442	1.716	-0.607	S
G2		22.3	23.4	23.141	0.851	-0.989	S
G3		54.75	57.9	56.924	2.088	-1.041	S
G4		57.5	57.9	59.644	2.643	-0.811	S

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\* Z score is unitless

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

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B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 50, CEA Saclay - Orme des Merisiers (France)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.353	1.319	1.342	0.081	0.131	S
G2		0.879	0.856	0.876	0.103	0.031	S
G3		2.137	2.08	2.108	0.113	0.259	S
G4		2.249	2.2	2.231	0.151	0.117	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.26	0.241	0.241	0.016	1.152	S
G2		0.183	0.16	0.161	0.015	1.473	S
G3		0.425	0.401	0.404	0.023	0.914	S
G4		0.553	0.535	0.537	0.029	0.55	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.566	0.546	0.544	0.019	1.136	S
G2		0.383	0.364	0.363	0.015	1.388	S
G3		0.947	0.911	0.918	0.027	1.042	S
G4		0.973	0.942	0.938	0.084	0.417	S
G1	Na <sup>+</sup> mg/l	0.518	0.548	0.527	0.026	-0.354	S
G2		0.331	0.365	0.355	0.025	-0.952	S
G3		0.906	0.913	0.893	0.042	0.32	S
G4		0.712	0.73	0.713	0.033	-0.037	S
G1	Mg <sup>2+</sup> mg/l	0.149	0.155	0.153	0.007	-0.523	S
G2		0.091	0.093	0.09	0.005	0.127	S
G3		0.205	0.206	0.205	0.009	-0.042	S
G4		0.206	0.206	0.206	0.01	-0.023	S
G1	Cl <sup>-</sup> mg/l	0.35	0.347	0.337	0.018	0.707	S
G2		0.238	0.232	0.231	0.022	0.314	S
G3		0.591	0.579	0.57	0.028	0.742	S
G4		0.471	0.463	0.457	0.03	0.451	S
G1	Ca <sup>2+</sup> mg/l	0.178	0.192	0.191	0.039	-0.342	S
G2		0.099	0.115	0.116	0.034	-0.491	S
G3		0.238	0.255	0.254	0.03	-0.534	S
G4		0.247	0.255	0.252	0.02	-0.267	S
G1	K <sup>+</sup> mg/l	0.294	0.306	0.294	0.02	0.006	S
G2		0.2	0.204	0.198	0.018	0.092	S
G3		0.517	0.509	0.501	0.032	0.501	S
G4		0.41	0.407	0.399	0.023	0.459	S
G1	pH pH units	4.19	4.22	4.283	0.096	-0.975	S
G2		4.36	4.4	4.431	0.078	-0.921	S
G3		3.95	4	4.035	0.06	-1.428	S
G4		3.93	4	3.999	0.062	-1.124	S
G1	Cond µS/cm	35.443	35.3	34.442	1.716	0.583	S
G2		23.883	23.4	23.141	0.851	0.871	S
G3		58.997	57.9	56.924	2.088	0.993	S
G4		61.12	57.9	59.644	2.643	0.558	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

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B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 110, Thüringer Landesanstalt für Landwirtschaft TTL, Jena (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.57	1.319	1.342	0.081	2.796	Q
G2		1	0.856	0.876	0.103	1.205	Q
G3		2.37	2.08	2.108	0.113	2.314	Q
G4		2.67	2.2	2.231	0.151	2.913	U
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.187	0.241	0.241	0.016	-3.303	Q
G2		0.114	0.16	0.161	0.015	-3.183	U
G3		0.365	0.401	0.404	0.023	-1.666	S
G4		0.488	0.535	0.537	0.029	-1.726	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.526	0.546	0.544	0.019	-0.967	S
G2		0.381	0.364	0.363	0.015	1.25	S
G3		0.86	0.911	0.918	0.027	-2.126	S
G4		0.914	0.942	0.938	0.084	-0.288	S
G1	Na <sup>+</sup> mg/l	0.51	0.548	0.527	0.026	-0.656	S
G2		0.338	0.365	0.355	0.025	-0.677	S
G3		0.847	0.913	0.893	0.042	-1.093	S
G4		0.678	0.73	0.713	0.033	-1.081	S
G1	Mg <sup>2+</sup> mg/l	0.147	0.155	0.153	0.007	-0.814	S
G2		0.087	0.093	0.09	0.005	-0.62	S
G3		0.195	0.206	0.205	0.009	-1.155	S
G4		0.194	0.206	0.206	0.01	-1.178	S
G1	Cl <sup>-</sup> mg/l	0.344	0.347	0.337	0.018	0.375	S
G2		0.21	0.232	0.231	0.022	-0.973	S
G3		0.572	0.579	0.57	0.028	0.075	S
G4		0.46	0.463	0.457	0.03	0.089	S
G1	Ca <sup>2+</sup> mg/l	0.188	0.192	0.191	0.039	-0.087	S
G2		0.113	0.115	0.116	0.034	-0.082	S
G3		0.251	0.255	0.254	0.03	-0.105	S
G4		0.253	0.255	0.252	0.02	0.03	S
G1	K <sup>+</sup> mg/l	0.293	0.306	0.294	0.02	-0.043	S
G2		0.196	0.204	0.198	0.018	-0.131	S
G3		0.483	0.509	0.501	0.032	-0.563	S
G4		0.386	0.407	0.399	0.023	-0.584	S
G1	pH pH units	4.66	4.22	4.283	0.096	3.933	U
G2		4.58	4.4	4.431	0.078	1.917	Q
G3		4.16	4	4.035	0.06	2.092	Q
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	34.7	35.3	34.442	1.716	0.15	S
G2		23.2	23.4	23.141	0.851	0.069	S
G3		57.7	57.9	56.924	2.088	0.372	S
G4		61.1	57.9	59.644	2.643	0.551	S

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\* Z score is unitless

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

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B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>



## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 112, Niedersächsische Forstliche Versuchsanstalt NVF (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.318	1.319	1.342	0.081	-0.299	S
G2		0.858	0.856	0.876	0.103	-0.173	S
G3		2.074	2.08	2.108	0.113	-0.297	S
G4		2.182	2.2	2.231	0.151	-0.328	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.238	0.241	0.241	0.016	-0.19	S
G2		0.158	0.16	0.161	0.015	-0.214	S
G3		0.399	0.401	0.404	0.023	-0.204	S
G4		0.526	0.535	0.537	0.029	-0.396	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.547	0.546	0.544	0.019	0.137	S
G2		0.369	0.364	0.363	0.015	0.423	S
G3		0.909	0.911	0.918	0.027	-0.342	S
G4		0.938	0.942	0.938	0.084	-0.001	S
G1	Na <sup>+</sup> mg/l	0.536	0.548	0.527	0.026	0.327	S
G2		0.363	0.365	0.355	0.025	0.309	S
G3		0.899	0.913	0.893	0.042	0.153	S
G4		0.718	0.73	0.713	0.033	0.148	S
G1	Mg <sup>2+</sup> mg/l	0.151	0.155	0.153	0.007	-0.233	S
G2		0.089	0.093	0.09	0.005	-0.247	S
G3		0.202	0.206	0.205	0.009	-0.376	S
G4		0.201	0.206	0.206	0.01	-0.504	S
G1	Cl <sup>-</sup> mg/l	0.347	0.347	0.337	0.018	0.541	S
G2		0.231	0.232	0.231	0.022	-0.008	S
G3		0.586	0.579	0.57	0.028	0.567	S
G4		0.468	0.463	0.457	0.03	0.352	S
G1	Ca <sup>2+</sup> mg/l	0.194	0.192	0.191	0.039	0.066	S
G2		0.114	0.115	0.116	0.034	-0.052	S
G3		0.257	0.255	0.254	0.03	0.093	S
G4		0.256	0.255	0.252	0.02	0.178	S
G1	K <sup>+</sup> mg/l	0.297	0.306	0.294	0.02	0.154	S
G2		0.201	0.204	0.198	0.018	0.148	S
G3		0.503	0.509	0.501	0.032	0.063	S
G4		0.398	0.407	0.399	0.023	-0.063	S
G1	pH pH units	4.25	4.22	4.283	0.096	-0.349	S
G2		4.44	4.4	4.431	0.078	0.111	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	34	35.3	34.442	1.716	-0.257	S
G2		22.1	23.4	23.141	0.851	-1.224	S
G3		56.6	57.9	56.924	2.088	-0.155	S
G4		59.5	57.9	59.644	2.643	-0.054	S

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

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B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 114, C.N.R. Istituto Italiano di Idrobiologia (Italy)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.39	1.319	1.342	0.081	0.585	S
G2		0.86	0.856	0.876	0.103	-0.154	S
G3		2.1	2.08	2.108	0.113	-0.067	S
G4		2.2	2.2	2.231	0.151	-0.208	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.25	0.241	0.241	0.016	0.542	S
G2		0.17	0.16	0.161	0.015	0.596	S
G3		0.38	0.401	0.404	0.023	-1.021	S
G4		0.51	0.535	0.537	0.029	-0.956	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.55	0.546	0.544	0.019	0.295	S
G2		0.35	0.364	0.363	0.015	-0.887	S
G3		0.89	0.911	0.918	0.027	-1.034	S
G4		0.91	0.942	0.938	0.084	-0.336	S
G1	Na <sup>+</sup> mg/l	0.54	0.548	0.527	0.026	0.479	S
G2		0.36	0.365	0.355	0.025	0.19	S
G3		0.92	0.913	0.893	0.042	0.656	S
G4		0.73	0.73	0.713	0.033	0.516	S
G1	Mg <sup>2+</sup> mg/l	0.16	0.155	0.153	0.007	1.075	S
G2		0.1	0.093	0.09	0.005	1.806	S
G3		0.22	0.206	0.205	0.009	1.627	S
G4		0.22	0.206	0.206	0.01	1.324	S
G1	Cl <sup>-</sup> mg/l	0.34	0.347	0.337	0.018	0.154	S
G2		0.22	0.232	0.231	0.022	-0.513	S
G3		0.56	0.579	0.57	0.028	-0.347	S
G4		0.43	0.463	0.457	0.03	-0.897	S
G1	Ca <sup>2+</sup> mg/l	0.22	0.192	0.191	0.039	0.728	S
G2		0.16	0.115	0.116	0.034	1.294	U
G3		0.31	0.255	0.254	0.03	1.842	Q
G4		0.3	0.255	0.252	0.02	2.357	Q
G1	K <sup>+</sup> mg/l	0.3	0.306	0.294	0.02	0.302	S
G2		0.21	0.204	0.198	0.018	0.65	S
G3		0.53	0.509	0.501	0.032	0.908	S
G4		0.41	0.407	0.399	0.023	0.459	S
G1	pH pH units	4.25	4.22	4.283	0.096	-0.349	S
G2		4.4	4.4	4.431	0.078	-0.405	S
G3		4.03	4	4.035	0.06	-0.087	S
G4		3.97	4	3.999	0.062	-0.475	S
G1	Cond µS/cm	35.1	35.3	34.442	1.716	0.384	S
G2		23.7	23.4	23.141	0.851	0.656	S
G3		58.3	57.9	56.924	2.088	0.659	S
G4		61.2	57.9	59.644	2.643	0.589	S

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 115, Bayerische Landesanstalt f. Wald- und Forstwirtschaft (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.4	1.319	1.342	0.081	0.708	S
G2		0.851	0.856	0.876	0.103	-0.241	S
G3		2.079	2.08	2.108	0.113	-0.252	S
G4		2.172	2.2	2.231	0.151	-0.394	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.233	0.241	0.241	0.016	-0.496	S
G2		0.161	0.16	0.161	0.015	-0.011	S
G3		0.395	0.401	0.404	0.023	-0.376	S
G4		0.535	0.535	0.537	0.029	-0.081	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.539	0.546	0.544	0.019	-0.284	S
G2		0.34	0.364	0.363	0.015	-1.576	S
G3		0.9	0.911	0.918	0.027	-0.67	S
G4		0.978	0.942	0.938	0.084	0.476	S
G1	Na <sup>+</sup> mg/l	0.539	0.548	0.527	0.026	0.441	S
G2		0.367	0.365	0.355	0.025	0.466	S
G3		0.91	0.913	0.893	0.042	0.416	S
G4		0.73	0.73	0.713	0.033	0.516	S
G1	Mg <sup>2+</sup> mg/l	0.147	0.155	0.153	0.007	-0.814	S
G2		0.086	0.093	0.09	0.005	-0.806	S
G3		0.198	0.206	0.205	0.009	-0.821	S
G4		0.198	0.206	0.206	0.01	-0.793	S
G1	Cl <sup>-</sup> mg/l	0.327	0.347	0.337	0.018	-0.565	S
G2		0.218	0.232	0.231	0.022	-0.605	S
G3		0.541	0.579	0.57	0.028	-1.015	S
G4		0.429	0.463	0.457	0.03	-0.93	S
G1	Ca <sup>2+</sup> mg/l	0.186	0.192	0.191	0.039	-0.138	S
G2		0.108	0.115	0.116	0.034	-0.228	S
G3		0.251	0.255	0.254	0.03	-0.105	S
G4		0.254	0.255	0.252	0.02	0.079	S
G1	K <sup>+</sup> mg/l	0.282	0.306	0.294	0.02	-0.586	S
G2		0.211	0.204	0.198	0.018	0.706	S
G3		0.46	0.509	0.501	0.032	-1.283	S
G4		0.383	0.407	0.399	0.023	-0.715	S
G1	pH pH units	4.34	4.22	4.283	0.096	0.591	Q
G2		4.42	4.4	4.431	0.078	-0.147	S
G3		3.98	4	4.035	0.06	-0.925	S
G4		3.95	4	3.999	0.062	-0.799	S
G1	Cond µS/cm	26.7	35.3	34.442	1.716	-4.511	Q
G2		20.7	23.4	23.141	0.851	-2.868	S
G3		55.1	57.9	56.924	2.088	-0.874	S
G4		58.3	57.9	59.644	2.643	-0.508	S

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Foretaksnr./Enterprise no. 941705561

If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 117, Standortserkundung/Bodenmonitoring Forsten, Graupa (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.376	1.319	1.342	0.081	0.413	S
G2		0.894	0.856	0.876	0.103	0.176	S
G3		2.206	2.08	2.108	0.113	0.868	S
G4		2.358	2.2	2.231	0.151	0.841	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.23	0.241	0.241	0.016	-0.679	S
G2		0.15	0.16	0.161	0.015	-0.754	S
G3		0.39	0.401	0.404	0.023	-0.591	S
G4		0.52	0.535	0.537	0.029	-0.606	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.53	0.546	0.544	0.019	-0.757	S
G2		0.35	0.364	0.363	0.015	-0.887	S
G3		0.9	0.911	0.918	0.027	-0.67	S
G4		0.92	0.942	0.938	0.084	-0.216	S
G1	Na <sup>+</sup> mg/l	0.515	0.548	0.527	0.026	-0.467	S
G2		0.35	0.365	0.355	0.025	-0.204	S
G3		0.859	0.913	0.893	0.042	-0.806	S
G4		0.682	0.73	0.713	0.033	-0.958	S
G1	Mg <sup>2+</sup> mg/l	0.168	0.155	0.153	0.007	2.237	S
G2		0.106	0.093	0.09	0.005	2.926	S
G3		0.233	0.206	0.205	0.009	3.074	S
G4		0.233	0.206	0.206	0.01	2.575	S
G1	Cl <sup>-</sup> mg/l	< 0.350	0.347	0.337	0.018		B
G2		< 0.350	0.232	0.231	0.022		B
G3		0.58	0.579	0.57	0.028	0.356	S
G4		0.53	0.463	0.457	0.03	2.39	S
G1	Ca <sup>2+</sup> mg/l	0.219	0.192	0.191	0.039	0.703	S
G2		0.139	0.115	0.116	0.034	0.679	Q
G3		0.312	0.255	0.254	0.03	1.908	Q
G4		0.3	0.255	0.252	0.02	2.357	Q
G1	K <sup>+</sup> mg/l	0.27	0.306	0.294	0.02	-1.178	S
G2		0.2	0.204	0.198	0.018	0.092	S
G3		0.531	0.509	0.501	0.032	0.939	S
G4		0.43	0.407	0.399	0.023	1.328	S
G1	pH pH units	4.26	4.22	4.283	0.096	-0.244	S
G2		4.36	4.4	4.431	0.078	-0.921	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	32.9	35.3	34.442	1.716	-0.898	S
G2		24.4	23.4	23.141	0.851	1.479	S
G3		55.9	57.9	56.924	2.088	-0.49	S
G4		56.9	57.9	59.644	2.643	-1.038	S

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\* Z score is unitless

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 118, Forstliche Versuchs-und Forschungsanstalt (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.36	1.319	1.342	0.081	0.217	S
G2		1.03	0.856	0.876	0.103	1.497	U
G3		2.53	2.08	2.108	0.113	3.726	U
G4		2.79	2.2	2.231	0.151	3.709	U
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.26	0.241	0.241	0.016	1.152	S
G2		0.17	0.16	0.161	0.015	0.596	S
G3		0.41	0.401	0.404	0.023	0.269	S
G4		0.55	0.535	0.537	0.029	0.444	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.61	0.546	0.544	0.019	3.45	Q
G2		0.39	0.364	0.363	0.015	1.871	S
G3		0.98	0.911	0.918	0.027	2.244	S
G4		1	0.942	0.938	0.084	0.739	S
G1	Na <sup>+</sup> mg/l	0.46	0.548	0.527	0.026	-2.549	Q
G2		0.3	0.365	0.355	0.025	-2.174	Q
G3		0.87	0.913	0.893	0.042	-0.542	S
G4		0.72	0.73	0.713	0.033	0.209	S
G1	Mg <sup>2+</sup> mg/l	0.162	0.155	0.153	0.007	1.365	S
G2		0.099	0.093	0.09	0.005	1.619	S
G3		0.213	0.206	0.205	0.009	0.848	S
G4		0.215	0.206	0.206	0.01	0.843	S
G1	Cl <sup>-</sup> mg/l	0.4	0.347	0.337	0.018	3.473	Q
G2		0.26	0.232	0.231	0.022	1.324	S
G3		0.63	0.579	0.57	0.028	2.113	S
G4		0.5	0.463	0.457	0.03	1.404	S
G1	Ca <sup>2+</sup> mg/l	0.69	0.192	0.191	0.039	12.71	U
G2		0.65	0.115	0.116	0.034	15.632	U
G3		0.32	0.255	0.254	0.03	2.172	U
G4		0.27	0.255	0.252	0.02	0.872	S
G1	K <sup>+</sup> mg/l	0.28	0.306	0.294	0.02	-0.684	S
G2		0.18	0.204	0.198	0.018	-1.024	S
G3		0.51	0.509	0.501	0.032	0.282	S
G4		0.41	0.407	0.399	0.023	0.459	S
G1	pH pH units	4.28	4.22	4.283	0.096	-0.035	S
G2		4.45	4.4	4.431	0.078	0.24	S
G3		4.04	4	4.035	0.06	0.08	S
G4		4.01	4	3.999	0.062	0.175	S
G1	Cond µS/cm	33	35.3	34.442	1.716	-0.84	S
G2		22	23.4	23.141	0.851	-1.341	S
G3		57	57.9	56.924	2.088	0.036	S
G4		60	57.9	59.644	2.643	0.135	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

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U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 120, Landwirtschaftliche Untersuchungs- und Forschungsanstalt LUFA (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.258	1.319	1.342	0.081	-1.036	S
G2		0.795	0.856	0.876	0.103	-0.784	S
G3		1.993	2.08	2.108	0.113	-1.011	S
G4		2.106	2.2	2.231	0.151	-0.832	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.243	0.241	0.241	0.016	0.115	S
G2		0.163	0.16	0.161	0.015	0.124	S
G3		0.393	0.401	0.404	0.023	-0.462	S
G4		0.543	0.535	0.537	0.029	0.199	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.53	0.546	0.544	0.019	-0.757	S
G2		0.35	0.364	0.363	0.015	-0.887	S
G3		0.89	0.911	0.918	0.027	-1.034	S
G4		0.917	0.942	0.938	0.084	-0.252	S
G1	Na <sup>+</sup> mg/l	0.572	0.548	0.527	0.026	1.69	S
G2		0.376	0.365	0.355	0.025	0.821	S
G3		0.948	0.913	0.893	0.042	1.327	S
G4		0.769	0.73	0.713	0.033	1.715	S
G1	Mg <sup>2+</sup> mg/l	0.156	0.155	0.153	0.007	0.494	S
G2		0.096	0.093	0.09	0.005	1.06	S
G3		0.216	0.206	0.205	0.009	1.182	S
G4		0.221	0.206	0.206	0.01	1.42	S
G1	Cl <sup>-</sup> mg/l	0.367	0.347	0.337	0.018	1.648	S
G2		0.273	0.232	0.231	0.022	1.921	Q
G3		0.653	0.579	0.57	0.028	2.921	S
G4		0.51	0.463	0.457	0.03	1.732	S
G1	Ca <sup>2+</sup> mg/l	0.193	0.192	0.191	0.039	0.04	S
G2		0.119	0.115	0.116	0.034	0.094	S
G3		0.267	0.255	0.254	0.03	0.423	S
G4		0.269	0.255	0.252	0.02	0.822	S
G1	K <sup>+</sup> mg/l	0.325	0.306	0.294	0.02	1.536	S
G2		0.215	0.204	0.198	0.018	0.929	S
G3		0.537	0.509	0.501	0.032	1.127	S
G4		0.421	0.407	0.399	0.023	0.937	S
G1	pH pH units	4.24	4.22	4.283	0.096	-0.453	S
G2		4.4	4.4	4.431	0.078	-0.405	S
G3		4	4	4.035	0.06	-0.59	S
G4		3.97	4	3.999	0.062	-0.475	S
G1	Cond µS/cm	36	35.3	34.442	1.716	0.908	S
G2		24	23.4	23.141	0.851	1.009	S
G3		58	57.9	56.924	2.088	0.515	S
G4		61	57.9	59.644	2.643	0.513	S

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If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 121, Landeslabor Schleswig-Holsteinmwelt (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.3	1.319	1.342	0.081	-0.52	S
G2		0.88	0.856	0.876	0.103	0.041	S
G3		2.04	2.08	2.108	0.113	-0.596	S
G4		2.13	2.2	2.231	0.151	-0.673	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.242	0.241	0.241	0.016	0.054	S
G2		0.158	0.16	0.161	0.015	-0.214	S
G3		0.409	0.401	0.404	0.023	0.226	S
G4		0.55	0.535	0.537	0.029	0.444	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.525	0.546	0.544	0.019	-1.02	S
G2		0.372	0.364	0.363	0.015	0.63	S
G3		0.87	0.911	0.918	0.027	-1.762	S
G4		0.899	0.942	0.938	0.084	-0.467	S
G1	Na <sup>+</sup> mg/l	0.518	0.548	0.527	0.026	-0.354	S
G2		0.343	0.365	0.355	0.025	-0.48	S
G3		0.877	0.913	0.893	0.042	-0.374	S
G4		0.702	0.73	0.713	0.033	-0.344	S
G1	Mg <sup>2+</sup> mg/l	0.148	0.155	0.153	0.007	-0.668	S
G2		0.088	0.093	0.09	0.005	-0.433	S
G3		0.197	0.206	0.205	0.009	-0.933	S
G4		0.197	0.206	0.206	0.01	-0.889	S
G1	Cl <sup>-</sup> mg/l	0.338	0.347	0.337	0.018	0.044	S
G2		0.247	0.232	0.231	0.022	0.727	S
G3		0.527	0.579	0.57	0.028	-1.507	S
G4		0.428	0.463	0.457	0.03	-0.963	S
G1	Ca <sup>2+</sup> mg/l	0.19	0.192	0.191	0.039	-0.036	S
G2		0.113	0.115	0.116	0.034	-0.082	S
G3		0.246	0.255	0.254	0.03	-0.27	S
G4		0.248	0.255	0.252	0.02	-0.218	S
G1	K <sup>+</sup> mg/l	0.281	0.306	0.294	0.02	-0.635	S
G2		0.185	0.204	0.198	0.018	-0.745	S
G3		0.493	0.509	0.501	0.032	-0.25	S
G4		0.377	0.407	0.399	0.023	-0.975	S
G1	pH pH units	4.26	4.22	4.283	0.096	-0.244	S
G2		4.43	4.4	4.431	0.078	-0.018	S
G3		4.01	4	4.035	0.06	-0.423	S
G4		3.99	4	3.999	0.062	-0.15	S
G1	Cond µS/cm	35.5	35.3	34.442	1.716	0.617	S
G2		22.8	23.4	23.141	0.851	-0.401	S
G3		57.4	57.9	56.924	2.088	0.228	S
G4		60.3	57.9	59.644	2.643	0.248	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 124, Laboratorium voor Bondemkunde, Gent (Belgium)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.347	1.319	1.342	0.081	0.057	S
G2		0.819	0.856	0.876	0.103	-0.552	S
G3		2.15	2.08	2.108	0.113	0.374	S
G4		2.225	2.2	2.231	0.151	-0.042	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.239	0.241	0.241	0.016	-0.129	S
G2		0.141	0.16	0.161	0.015	-1.361	S
G3		0.406	0.401	0.404	0.023	0.097	S
G4		0.544	0.535	0.537	0.029	0.234	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.55	0.546	0.544	0.019	0.295	S
G2		0.361	0.364	0.363	0.015	-0.128	S
G3		0.943	0.911	0.918	0.027	0.896	S
G4		0.971	0.942	0.938	0.084	0.393	S
G1	Na <sup>+</sup> mg/l	0.513	0.548	0.527	0.026	-0.543	S
G2		0.361	0.365	0.355	0.025	0.23	S
G3		0.796	0.913	0.893	0.042	-2.315	S
G4		0.66	0.73	0.713	0.033	-1.634	S
G1	Mg <sup>2+</sup> mg/l	0.153	0.155	0.153	0.007	0.058	S
G2		0.091	0.093	0.09	0.005	0.127	S
G3		0.205	0.206	0.205	0.009	-0.042	S
G4		0.209	0.206	0.206	0.01	0.266	S
G1	Cl <sup>-</sup> mg/l	0.368	0.347	0.337	0.018	1.703	S
G2		0.247	0.232	0.231	0.022	0.727	S
G3		0.606	0.579	0.57	0.028	1.27	S
G4		0.487	0.463	0.457	0.03	0.977	S
G1	Ca <sup>2+</sup> mg/l	0.186	0.192	0.191	0.039	-0.138	S
G2		0.111	0.115	0.116	0.034	-0.14	S
G3		0.248	0.255	0.254	0.03	-0.204	S
G4		0.25	0.255	0.252	0.02	-0.119	S
G1	K <sup>+</sup> mg/l	0.3	0.306	0.294	0.02	0.302	S
G2		0.221	0.204	0.198	0.018	1.264	S
G3		0.457	0.509	0.501	0.032	-1.377	S
G4		0.38	0.407	0.399	0.023	-0.845	S
G1	pH pH units	4.28	4.22	4.283	0.096	-0.035	S
G2		4.46	4.4	4.431	0.078	0.369	S
G3		4.04	4	4.035	0.06	0.08	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	36	35.3	34.442	1.716	0.908	S
G2		23	23.4	23.141	0.851	-0.166	S
G3		58	57.9	56.924	2.088	0.515	S
G4		60	57.9	59.644	2.643	0.135	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>



## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 125, Bayerisches Landesamt für Umweltschutz, Augsburg (Germany)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.26	1.319	1.342	0.081	-1.011	S
G2		2.18	0.856	0.876	0.103	12.659	U
G3		2.08	2.08	2.108	0.113	-0.244	S
G4		0.821	2.2	2.231	0.151	-9.365	U
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.25	0.241	0.241	0.016	0.542	S
G2		0.17	0.16	0.161	0.015	0.596	S
G3		0.43	0.401	0.404	0.023	1.129	S
G4		0.57	0.535	0.537	0.029	1.145	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.556	0.546	0.544	0.019	0.61	S
G2		0.968	0.364	0.363	0.015	41.719	U
G3		0.925	0.911	0.918	0.027	0.241	S
G4		0.383	0.942	0.938	0.084	-6.628	U
G1	Na <sup>+</sup> mg/l	0.529	0.548	0.527	0.026	0.063	S
G2		0.37	0.365	0.355	0.025	0.584	S
G3		0.912	0.913	0.893	0.042	0.464	S
G4		0.728	0.73	0.713	0.033	0.455	S
G1	Mg <sup>2+</sup> mg/l	0.149	0.155	0.153	0.007	-0.523	S
G2		0.092	0.093	0.09	0.005	0.313	S
G3		0.202	0.206	0.205	0.009	-0.376	S
G4		0.203	0.206	0.206	0.01	-0.312	S
G1	Cl <sup>-</sup> mg/l	0.354	0.347	0.337	0.018	0.929	S
G2		0.463	0.232	0.231	0.022	10.65	U
G3		0.571	0.579	0.57	0.028	0.04	S
G4		0.23	0.463	0.457	0.03	-7.47	U
G1	Ca <sup>2+</sup> mg/l	0.179	0.192	0.191	0.039	-0.317	S
G2		0.112	0.115	0.116	0.034	-0.111	S
G3		0.242	0.255	0.254	0.03	-0.402	S
G4		0.242	0.255	0.252	0.02	-0.515	S
G1	K <sup>+</sup> mg/l	0.288	0.306	0.294	0.02	-0.29	S
G2		0.204	0.204	0.198	0.018	0.315	S
G3		0.498	0.509	0.501	0.032	-0.094	S
G4		0.395	0.407	0.399	0.023	-0.193	S
G1	pH pH units	4.3	4.22	4.283	0.096	0.174	S
G2		4.5	4.4	4.431	0.078	0.885	S
G3		4.1	4	4.035	0.06	1.086	S
G4		4	4	3.999	0.062	0.012	S
G1	Cond µS/cm	34	35.3	34.442	1.716	-0.257	S
G2		23	23.4	23.141	0.851	-0.166	S
G3		58	57.9	56.924	2.088	0.515	S
G4		61	57.9	59.644	2.643	0.513	S

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\* Z score is unitless

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 126, APPA Laboratorio Biologico Provinciale (Italy)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.331	1.319	1.342	0.081	-0.139	S
G2		0.804	0.856	0.876	0.103	-0.697	S
G3		1.902	2.08	2.108	0.113	-1.814	S
G4		1.906	2.2	2.231	0.151	-2.16	Q
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.185	0.241	0.241	0.016	-3.425	Q
G2		0.116	0.16	0.161	0.015	-3.048	U
G3		0.335	0.401	0.404	0.023	-2.956	Q
G4		0.467	0.535	0.537	0.029	-2.461	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.565	0.546	0.544	0.019	1.084	S
G2		0.339	0.364	0.363	0.015	-1.645	S
G3		0.902	0.911	0.918	0.027	-0.597	S
G4		0.879	0.942	0.938	0.084	-0.706	S
G1	Na <sup>+</sup> mg/l	0.486	0.548	0.527	0.026	-1.565	S
G2		0.437	0.365	0.355	0.025	3.225	Q
G3		0.816	0.913	0.893	0.042	-1.836	S
G4		0.664	0.73	0.713	0.033	-1.511	S
G1	Mg <sup>2+</sup> mg/l	0.144	0.155	0.153	0.007	-1.249	S
G2		0.068	0.093	0.09	0.005	-4.165	U
G3		0.146	0.206	0.205	0.009	-6.608	U
G4		0.148	0.206	0.206	0.01	-5.604	U
G1	Cl <sup>-</sup> mg/l	0.317	0.347	0.337	0.018	-1.118	S
G2		0.397	0.232	0.231	0.022	7.618	U
G3		0.524	0.579	0.57	0.028	-1.612	S
G4		0.37	0.463	0.457	0.03	-2.869	Q
G1	Ca <sup>2+</sup> mg/l	0.64	0.192	0.191	0.039	11.435	U
G2		0.262	0.115	0.116	0.034	4.278	U
G3		0.375	0.255	0.254	0.03	3.988	U
G4		0.311	0.255	0.252	0.02	2.902	Q
G1	K <sup>+</sup> mg/l	0.241	0.306	0.294	0.02	-2.608	Q
G2		0.27	0.204	0.198	0.018	3.998	U
G3		0.426	0.509	0.501	0.032	-2.348	Q
G4		0.359	0.407	0.399	0.023	-1.758	S
G1	pH pH units	4.26	4.22	4.283	0.096	-0.244	S
G2		4.27	4.4	4.431	0.078	-2.082	Q
G3		4.03	4	4.035	0.06	-0.087	S
G4		4.01	4	3.999	0.062	0.175	S
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		55.8	57.9	56.924	2.088	-0.538	S
G4		58.1	57.9	59.644	2.643	-0.584	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 145, Estonian Environmental Research Centre, Tartu laboratory (Estonia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.33	1.319	1.342	0.081	-0.152	S
G2		0.852	0.856	0.876	0.103	-0.231	S
G3		2.11	2.08	2.108	0.113	0.021	S
G4		2.2	2.2	2.231	0.151	-0.208	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.25	0.241	0.241	0.016	0.542	S
G2		0.154	0.16	0.161	0.015	-0.484	S
G3		0.414	0.401	0.404	0.023	0.441	S
G4		0.543	0.535	0.537	0.029	0.199	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.547	0.546	0.544	0.019	0.137	S
G2		0.363	0.364	0.363	0.015	0.009	S
G3		0.93	0.911	0.918	0.027	0.423	S
G4		0.95	0.942	0.938	0.084	0.142	S
G1	Na <sup>+</sup> mg/l	0.516	0.548	0.527	0.026	-0.429	S
G2		0.347	0.365	0.355	0.025	-0.322	S
G3		0.896	0.913	0.893	0.042	0.081	S
G4		0.703	0.73	0.713	0.033	-0.313	S
G1	Mg <sup>2+</sup> mg/l	0.142	0.155	0.153	0.007	-1.54	S
G2		0.085	0.093	0.09	0.005	-0.993	S
G3		0.192	0.206	0.205	0.009	-1.489	S
G4		0.191	0.206	0.206	0.01	-1.466	S
G1	Cl <sup>-</sup> mg/l	0.337	0.347	0.337	0.018	-0.012	S
G2		0.226	0.232	0.231	0.022	-0.238	S
G3		0.57	0.579	0.57	0.028	0.004	S
G4		0.448	0.463	0.457	0.03	-0.305	S
G1	Ca <sup>2+</sup> mg/l	0.107	0.192	0.191	0.039	-2.152	U
G2		0.063	0.115	0.116	0.034	-1.545	U
G3		0.174	0.255	0.254	0.03	-2.647	U
G4		0.183	0.255	0.252	0.02	-3.437	U
G1	K <sup>+</sup> mg/l	0.271	0.306	0.294	0.02	-1.128	S
G2		0.184	0.204	0.198	0.018	-0.801	S
G3		0.475	0.509	0.501	0.032	-0.814	S
G4		0.376	0.407	0.399	0.023	-1.019	S
G1	pH pH units	4.25	4.22	4.283	0.096	-0.349	S
G2		4.44	4.4	4.431	0.078	0.111	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		4.01	4	3.999	0.062	0.175	S
G1	Cond µS/cm	33.9	35.3	34.442	1.716	-0.316	S
G2		22.5	23.4	23.141	0.851	-0.754	S
G3		56	57.9	56.924	2.088	-0.443	S
G4		59	57.9	59.644	2.643	-0.244	S

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\* Z score is unitless

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 153, Slovenian Forestry Institute, Ljubljana (Slovenia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.265	1.319	1.342	0.081	-0.95	S
G2		0.814	0.856	0.876	0.103	-0.6	S
G3		2.032	2.08	2.108	0.113	-0.667	S
G4		2.144	2.2	2.231	0.151	-0.58	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.24	0.241	0.241	0.016	-0.068	S
G2		0.161	0.16	0.161	0.015	-0.011	S
G3		0.396	0.401	0.404	0.023	-0.333	S
G4		0.53	0.535	0.537	0.029	-0.256	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.513	0.546	0.544	0.019	-1.651	S
G2		0.341	0.364	0.363	0.015	-1.507	S
G3		0.868	0.911	0.918	0.027	-1.835	S
G4		0.906	0.942	0.938	0.084	-0.383	S
G1	Na <sup>+</sup> mg/l	0.528	0.548	0.527	0.026	0.025	S
G2		0.339	0.365	0.355	0.025	-0.637	S
G3		0.907	0.913	0.893	0.042	0.344	S
G4		0.71	0.73	0.713	0.033	-0.098	S
G1	Mg <sup>2+</sup> mg/l	0.151	0.155	0.153	0.007	-0.233	S
G2		0.085	0.093	0.09	0.005	-0.993	S
G3		0.201	0.206	0.205	0.009	-0.487	S
G4		0.2	0.206	0.206	0.01	-0.6	S
G1	Cl <sup>-</sup> mg/l	0.307	0.347	0.337	0.018	-1.671	S
G2		0.204	0.232	0.231	0.022	-1.248	S
G3		0.524	0.579	0.57	0.028	-1.612	S
G4		0.418	0.463	0.457	0.03	-1.291	S
G1	Ca <sup>2+</sup> mg/l	0.181	0.192	0.191	0.039	-0.266	S
G2		0.099	0.115	0.116	0.034	-0.491	S
G3		0.236	0.255	0.254	0.03	-0.6	S
G4		0.236	0.255	0.252	0.02	-0.812	S
G1	K <sup>+</sup> mg/l	0.277	0.306	0.294	0.02	-0.832	S
G2		0.183	0.204	0.198	0.018	-0.857	S
G3		0.475	0.509	0.501	0.032	-0.814	S
G4		0.378	0.407	0.399	0.023	-0.932	S
G1	pH pH units	4.31	4.22	4.283	0.096	0.278	S
G2		4.49	4.4	4.431	0.078	0.756	S
G3		4.08	4	4.035	0.06	0.751	S
G4		4.05	4	3.999	0.062	0.824	S
G1	Cond µS/cm	35.37	35.3	34.442	1.716	0.541	S
G2		23.63	23.4	23.141	0.851	0.574	S
G3		58.15	57.9	56.924	2.088	0.587	S
G4		61.53	57.9	59.644	2.643	0.714	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 155, Environmental Research Branch, Farnheim (UK)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.335	1.319	1.342	0.081	-0.09	S
G2		0.858	0.856	0.876	0.103	-0.173	S
G3		2.126	2.08	2.108	0.113	0.162	S
G4		2.239	2.2	2.231	0.151	0.051	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.235	0.241	0.241	0.016	-0.374	S
G2		0.154	0.16	0.161	0.015	-0.484	S
G3		0.4	0.401	0.404	0.023	-0.161	S
G4		0.544	0.535	0.537	0.029	0.234	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.551	0.546	0.544	0.019	0.348	S
G2		0.367	0.364	0.363	0.015	0.285	S
G3		0.926	0.911	0.918	0.027	0.277	S
G4		0.961	0.942	0.938	0.084	0.273	S
G1	Na <sup>+</sup> mg/l	0.542	0.548	0.527	0.026	0.555	S
G2		0.353	0.365	0.355	0.025	-0.086	S
G3		0.902	0.913	0.893	0.042	0.225	S
G4		0.726	0.73	0.713	0.033	0.393	S
G1	Mg <sup>2+</sup> mg/l	0.149	0.155	0.153	0.007	-0.523	S
G2		0.088	0.093	0.09	0.005	-0.433	S
G3		0.201	0.206	0.205	0.009	-0.487	S
G4		0.201	0.206	0.206	0.01	-0.504	S
G1	Cl <sup>-</sup> mg/l	0.336	0.347	0.337	0.018	-0.067	S
G2		0.224	0.232	0.231	0.022	-0.329	S
G3		0.575	0.579	0.57	0.028	0.18	S
G4		0.452	0.463	0.457	0.03	-0.174	S
G1	Ca <sup>2+</sup> mg/l	0.18	0.192	0.191	0.039	-0.291	S
G2		0.108	0.115	0.116	0.034	-0.228	S
G3		0.238	0.255	0.254	0.03	-0.534	S
G4		0.24	0.255	0.252	0.02	-0.614	S
G1	K <sup>+</sup> mg/l	0.274	0.306	0.294	0.02	-0.98	S
G2		0.182	0.204	0.198	0.018	-0.913	S
G3		0.466	0.509	0.501	0.032	-1.096	S
G4		0.368	0.407	0.399	0.023	-1.367	S
G1	pH pH units	4.25	4.22	4.283	0.096	-0.349	S
G2		4.42	4.4	4.431	0.078	-0.147	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		3.99	4	3.999	0.062	-0.15	S
G1	Cond µS/cm	35.1	35.3	34.442	1.716	0.384	S
G2		23.4	23.4	23.141	0.851	0.304	S
G3		58	57.9	56.924	2.088	0.515	S
G4		60.8	57.9	59.644	2.643	0.437	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 158, Asia Center for Air Pollution Research (ACAP) (Japan)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.241	1.319	1.342	0.081	-1.245	S
G2		0.791	0.856	0.876	0.103	-0.823	S
G3		1.991	2.08	2.108	0.113	-1.029	S
G4		2.092	2.2	2.231	0.151	-0.925	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.248	0.241	0.241	0.016	0.42	S
G2		0.168	0.16	0.161	0.015	0.461	S
G3		0.413	0.401	0.404	0.023	0.398	S
G4		0.551	0.535	0.537	0.029	0.479	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.55	0.546	0.544	0.019	0.295	S
G2		0.363	0.364	0.363	0.015	0.009	S
G3		0.926	0.911	0.918	0.027	0.277	S
G4		0.954	0.942	0.938	0.084	0.19	S
G1	Na <sup>+</sup> mg/l	0.56	0.548	0.527	0.026	1.236	S
G2		0.374	0.365	0.355	0.025	0.742	S
G3		0.941	0.913	0.893	0.042	1.159	S
G4		0.749	0.73	0.713	0.033	1.1	S
G1	Mg <sup>2+</sup> mg/l	0.164	0.155	0.153	0.007	1.656	S
G2		0.102	0.093	0.09	0.005	2.179	S
G3		0.219	0.206	0.205	0.009	1.516	S
G4		0.22	0.206	0.206	0.01	1.324	S
G1	Cl <sup>-</sup> mg/l	0.319	0.347	0.337	0.018	-1.007	S
G2		0.211	0.232	0.231	0.022	-0.927	S
G3		0.549	0.579	0.57	0.028	-0.734	S
G4		0.438	0.463	0.457	0.03	-0.634	S
G1	Ca <sup>2+</sup> mg/l	0.202	0.192	0.191	0.039	0.27	S
G2		0.124	0.115	0.116	0.034	0.24	S
G3		0.266	0.255	0.254	0.03	0.39	S
G4		0.265	0.255	0.252	0.02	0.624	S
G1	K <sup>+</sup> mg/l	0.317	0.306	0.294	0.02	1.141	S
G2		0.213	0.204	0.198	0.018	0.817	S
G3		0.521	0.509	0.501	0.032	0.626	S
G4		0.414	0.407	0.399	0.023	0.633	S
G1	pH pH units	4.27	4.22	4.283	0.096	-0.14	S
G2		4.46	4.4	4.431	0.078	0.369	S
G3		4.05	4	4.035	0.06	0.248	S
G4		4.01	4	3.999	0.062	0.175	S
G1	Cond µS/cm	34.9	35.3	34.442	1.716	0.267	S
G2		23.1	23.4	23.141	0.851	-0.049	S
G3		57.2	57.9	56.924	2.088	0.132	S
G4		60.1	57.9	59.644	2.643	0.173	S

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 166, Forest Research Institute, Laboratory of Forest Environment Chemistry (Poland)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.369	1.319	1.342	0.081	0.327	S
G2		0.862	0.856	0.876	0.103	-0.134	S
G3		2.15	2.08	2.108	0.113	0.374	S
G4		2.286	2.2	2.231	0.151	0.363	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.237	0.241	0.241	0.016	-0.251	S
G2		0.164	0.16	0.161	0.015	0.191	S
G3		0.39	0.401	0.404	0.023	-0.591	S
G4		0.509	0.535	0.537	0.029	-0.991	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.566	0.546	0.544	0.019	1.136	S
G2		0.373	0.364	0.363	0.015	0.699	S
G3		0.934	0.911	0.918	0.027	0.568	S
G4		0.978	0.942	0.938	0.084	0.476	S
G1	Na <sup>+</sup> mg/l	0.54	0.548	0.527	0.026	0.479	S
G2		0.356	0.365	0.355	0.025	0.033	S
G3		0.923	0.913	0.893	0.042	0.728	S
G4		0.72	0.73	0.713	0.033	0.209	S
G1	Mg <sup>2+</sup> mg/l	0.153	0.155	0.153	0.007	0.058	S
G2		0.091	0.093	0.09	0.005	0.127	S
G3		0.211	0.206	0.205	0.009	0.625	S
G4		0.211	0.206	0.206	0.01	0.458	S
G1	Cl <sup>-</sup> mg/l	0.339	0.347	0.337	0.018	0.099	S
G2		0.205	0.232	0.231	0.022	-1.202	S
G3		0.564	0.579	0.57	0.028	-0.206	S
G4		0.474	0.463	0.457	0.03	0.549	S
G1	Ca <sup>2+</sup> mg/l	0.183	0.192	0.191	0.039	-0.215	S
G2		0.107	0.115	0.116	0.034	-0.257	S
G3		0.256	0.255	0.254	0.03	0.06	S
G4		0.258	0.255	0.252	0.02	0.277	S
G1	K <sup>+</sup> mg/l	0.285	0.306	0.294	0.02	-0.438	S
G2		0.187	0.204	0.198	0.018	-0.634	S
G3		0.524	0.509	0.501	0.032	0.72	S
G4		0.419	0.407	0.399	0.023	0.85	S
G1	pH pH units	4.28	4.22	4.283	0.096	-0.035	S
G2		4.42	4.4	4.431	0.078	-0.147	S
G3		4.02	4	4.035	0.06	-0.255	S
G4		3.98	4	3.999	0.062	-0.312	S
G1	Cond µS/cm	35.1	35.3	34.442	1.716	0.384	S
G2		23.4	23.4	23.141	0.851	0.304	S
G3		57.5	57.9	56.924	2.088	0.276	S
G4		60.6	57.9	59.644	2.643	0.362	S

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B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 178, Environmental Chemistry and EANET Monitoring Laboratory, Limnological Institute RAS/SB, Irkutsk (Russian Federation)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>†</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.291	1.319	1.342	0.081	-0.631	S
G2		0.834	0.856	0.876	0.103	-0.406	S
G3		2.036	2.08	2.108	0.113	-0.632	S
G4		2.149	2.2	2.231	0.151	-0.547	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.27	0.241	0.241	0.016	1.763	S
G2		0.19	0.16	0.161	0.015	1.946	Q
G3		0.39	0.401	0.404	0.023	-0.591	S
G4		0.55	0.535	0.537	0.029	0.444	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.534	0.546	0.544	0.019	-0.546	S
G2		0.356	0.364	0.363	0.015	-0.473	S
G3		0.897	0.911	0.918	0.027	-0.779	S
G4		0.932	0.942	0.938	0.084	-0.073	S
G1	Na <sup>+</sup> mg/l	0.533	0.548	0.527	0.026	0.214	S
G2		0.345	0.365	0.355	0.025	-0.401	S
G3		0.907	0.913	0.893	0.042	0.344	S
G4		0.714	0.73	0.713	0.033	0.025	S
G1	Mg <sup>2+</sup> mg/l	0.158	0.155	0.153	0.007	0.784	S
G2		0.094	0.093	0.09	0.005	0.686	S
G3		0.211	0.206	0.205	0.009	0.625	S
G4		0.211	0.206	0.206	0.01	0.458	S
G1	Cl <sup>-</sup> mg/l	0.337	0.347	0.337	0.018	-0.012	S
G2		0.223	0.232	0.231	0.022	-0.375	S
G3		0.566	0.579	0.57	0.028	-0.136	S
G4		0.456	0.463	0.457	0.03	-0.042	S
G1	Ca <sup>2+</sup> mg/l	0.183	0.192	0.191	0.039	-0.215	S
G2		0.112	0.115	0.116	0.034	-0.111	S
G3		0.252	0.255	0.254	0.03	-0.072	S
G4		0.245	0.255	0.252	0.02	-0.366	S
G1	K <sup>+</sup> mg/l	0.269	0.306	0.294	0.02	-1.227	S
G2		0.174	0.204	0.198	0.018	-1.359	S
G3		0.456	0.509	0.501	0.032	-1.409	S
G4		0.359	0.407	0.399	0.023	-1.758	S
G1	pH pH units	4.25	4.22	4.283	0.096	-0.349	S
G2		4.44	4.4	4.431	0.078	0.111	S
G3		4.05	4	4.035	0.06	0.248	S
G4		4.01	4	3.999	0.062	0.175	S
G1	Cond µS/cm	35	35.3	34.442	1.716	0.325	S
G2		23.1	23.4	23.141	0.851	-0.049	S
G3		58.9	57.9	56.924	2.088	0.946	S
G4		62	57.9	59.644	2.643	0.891	S

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B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 179, Murmansk Environmental Monitoring Center, Murmansk (Russian Federation)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.442	1.319	1.342	0.081	1.224	S
G2		0.892	0.856	0.876	0.103	0.157	S
G3		2.111	2.08	2.108	0.113	0.03	S
G4		2.321	2.2	2.231	0.151	0.595	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.267	0.241	0.241	0.016	1.58	S
G2		0.184	0.16	0.161	0.015	1.541	S
G3		0.446	0.401	0.404	0.023	1.817	S
G4		0.589	0.535	0.537	0.029	1.81	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.545	0.546	0.544	0.019	0.032	S
G2		0.337	0.364	0.363	0.015	-1.783	S
G3		0.886	0.911	0.918	0.027	-1.18	S
G4		0.916	0.942	0.938	0.084	-0.264	S
G1	Na <sup>+</sup> mg/l	0.517	0.548	0.527	0.026	-0.392	S
G2		0.346	0.365	0.355	0.025	-0.361	S
G3		0.872	0.913	0.893	0.042	-0.494	S
G4		0.688	0.73	0.713	0.033	-0.774	S
G1	Mg <sup>2+</sup> mg/l	0.148	0.155	0.153	0.007	-0.668	S
G2		0.088	0.093	0.09	0.005	-0.433	S
G3		0.203	0.206	0.205	0.009	-0.265	S
G4		0.197	0.206	0.206	0.01	-0.889	S
G1	Cl <sup>-</sup> mg/l	0.362	0.347	0.337	0.018	1.371	S
G2		0.223	0.232	0.231	0.022	-0.375	S
G3		0.581	0.579	0.57	0.028	0.391	S
G4		0.52	0.463	0.457	0.03	2.061	S
G1	Ca <sup>2+</sup> mg/l	0.177	0.192	0.191	0.039	-0.368	S
G2		0.094	0.115	0.116	0.034	-0.638	Q
G3		0.257	0.255	0.254	0.03	0.093	S
G4		0.251	0.255	0.252	0.02	-0.069	S
G1	K <sup>+</sup> mg/l	0.298	0.306	0.294	0.02	0.204	S
G2		0.204	0.204	0.198	0.018	0.315	S
G3		0.497	0.509	0.501	0.032	-0.125	S
G4		0.384	0.407	0.399	0.023	-0.671	S
G1	pH pH units	-999	4.22	4.283	0.096		B
G2		-999	4.4	4.431	0.078		B
G3		-999	4	4.035	0.06		B
G4		-999	4	3.999	0.062		B
G1	Cond µS/cm	30.8	35.3	34.442	1.716	-2.122	S
G2		22.2	23.4	23.141	0.851	-1.106	S
G3		56.3	57.9	56.924	2.088	-0.299	S
G4		59.3	57.9	59.644	2.643	-0.13	S

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 181, TNO innovation for life (The Netherlands)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.32	1.319	1.342	0.081	-0.274	S
G2		0.82	0.856	0.876	0.103	-0.542	S
G3		2.06	2.08	2.108	0.113	-0.42	S
G4		2.17	2.2	2.231	0.151	-0.407	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.25	0.241	0.241	0.016	0.542	S
G2		0.18	0.16	0.161	0.015	1.271	S
G3		0.41	0.401	0.404	0.023	0.269	S
G4		0.55	0.535	0.537	0.029	0.444	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.53	0.546	0.544	0.019	-0.757	S
G2		0.36	0.364	0.363	0.015	-0.197	S
G3		0.88	0.911	0.918	0.027	-1.398	S
G4		0.92	0.942	0.938	0.084	-0.216	S
G1	Na <sup>+</sup> mg/l	0.55	0.548	0.527	0.026	0.857	S
G2		0.37	0.365	0.355	0.025	0.584	S
G3		0.94	0.913	0.893	0.042	1.135	S
G4		0.74	0.73	0.713	0.033	0.824	S
G1	Mg <sup>2+</sup> mg/l	0.16	0.155	0.153	0.007	1.075	S
G2		0.093	0.093	0.09	0.005	0.5	S
G3		0.21	0.206	0.205	0.009	0.514	S
G4		0.21	0.206	0.206	0.01	0.362	S
G1	Cl <sup>-</sup> mg/l	0.35	0.347	0.337	0.018	0.707	S
G2		0.24	0.232	0.231	0.022	0.406	S
G3		0.55	0.579	0.57	0.028	-0.698	S
G4		0.46	0.463	0.457	0.03	0.089	S
G1	Ca <sup>2+</sup> mg/l	0.2	0.192	0.191	0.039	0.219	S
G2		0.12	0.115	0.116	0.034	0.123	S
G3		0.28	0.255	0.254	0.03	0.852	S
G4		0.28	0.255	0.252	0.02	1.367	S
G1	K <sup>+</sup> mg/l	0.31	0.306	0.294	0.02	0.796	S
G2		0.21	0.204	0.198	0.018	0.65	S
G3		0.54	0.509	0.501	0.032	1.221	S
G4		0.43	0.407	0.399	0.023	1.328	S
G1	pH pH units	4.19	4.22	4.283	0.096	-0.975	S
G2		4.46	4.4	4.431	0.078	0.369	S
G3		4.05	4	4.035	0.06	0.248	S
G4		4.02	4	3.999	0.062	0.337	S
G1	Cond µS/cm	38	35.3	34.442	1.716	2.073	S
G2		25	23.4	23.141	0.851	2.184	S
G3		61	57.9	56.924	2.088	1.952	S
G4		64	57.9	59.644	2.643	1.648	S

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If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

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B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 187, Public Health Institute - Nis, Department for Sanitary Chemistry (Republic of Serbia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	-999	1.319	1.342	0.081		B
G2		-999	0.856	0.876	0.103		B
G3		-999	2.08	2.108	0.113		B
G4		-999	2.2	2.231	0.151		B
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	-999	0.241	0.241	0.016		B
G2		-999	0.16	0.161	0.015		B
G3		-999	0.401	0.404	0.023		B
G4		-999	0.535	0.537	0.029		B
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.522	0.546	0.544	0.019	-1.177	S
G2		0.33	0.364	0.363	0.015	-2.266	S
G3		0.936	0.911	0.918	0.027	0.641	S
G4		0.964	0.942	0.938	0.084	0.309	S
G1	Na <sup>+</sup> mg/l	-999	0.548	0.527	0.026		B
G2		-999	0.365	0.355	0.025		B
G3		-999	0.913	0.893	0.042		B
G4		-999	0.73	0.713	0.033		B
G1	Mg <sup>2+</sup> mg/l	-999	0.155	0.153	0.007		B
G2		-999	0.093	0.09	0.005		B
G3		-999	0.206	0.205	0.009		B
G4		-999	0.206	0.206	0.01		B
G1	Cl <sup>-</sup> mg/l	-999	0.347	0.337	0.018		B
G2		-999	0.232	0.231	0.022		B
G3		-999	0.579	0.57	0.028		B
G4		-999	0.463	0.457	0.03		B
G1	Ca <sup>2+</sup> mg/l	-999	0.192	0.191	0.039		B
G2		-999	0.115	0.116	0.034		B
G3		-999	0.255	0.254	0.03		B
G4		-999	0.255	0.252	0.02		B
G1	K <sup>+</sup> mg/l	-999	0.306	0.294	0.02		B
G2		-999	0.204	0.198	0.018		B
G3		-999	0.509	0.501	0.032		B
G4		-999	0.407	0.399	0.023		B
G1	pH pH units	-999	4.22	4.283	0.096		B
G2		-999	4.4	4.431	0.078		B
G3		-999	4	4.035	0.06		B
G4		-999	4	3.999	0.062		B
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		-999	57.9	56.924	2.088		B
G4		-999	57.9	59.644	2.643		B

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If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 191, Institute for Public Health - Pancevo (Republic of Serbia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.73	1.319	1.342	0.081	4.761	U
G2		1.51	0.856	0.876	0.103	6.156	U
G3		1.94	2.08	2.108	0.113	-1.478	S
G4		2.58	2.2	2.231	0.151	2.315	Q
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	-999	0.241	0.241	0.016		B
G2		-999	0.16	0.161	0.015		B
G3		-999	0.401	0.404	0.023		B
G4		-999	0.535	0.537	0.029		B
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	-999	0.546	0.544	0.019		B
G2		-999	0.364	0.363	0.015		B
G3		-999	0.911	0.918	0.027		B
G4		-999	0.942	0.938	0.084		B
G1	Na <sup>+</sup> mg/l	-999	0.548	0.527	0.026		B
G2		-999	0.365	0.355	0.025		B
G3		-999	0.913	0.893	0.042		B
G4		-999	0.73	0.713	0.033		B
G1	Mg <sup>2+</sup> mg/l	-999	0.155	0.153	0.007		B
G2		-999	0.093	0.09	0.005		B
G3		-999	0.206	0.205	0.009		B
G4		-999	0.206	0.206	0.01		B
G1	Cl <sup>-</sup> mg/l	-999	0.347	0.337	0.018		B
G2		-999	0.232	0.231	0.022		B
G3		-999	0.579	0.57	0.028		B
G4		-999	0.463	0.457	0.03		B
G1	Ca <sup>2+</sup> mg/l	-999	0.192	0.191	0.039		B
G2		-999	0.115	0.116	0.034		B
G3		-999	0.255	0.254	0.03		B
G4		-999	0.255	0.252	0.02		B
G1	K <sup>+</sup> mg/l	-999	0.306	0.294	0.02		B
G2		-999	0.204	0.198	0.018		B
G3		-999	0.509	0.501	0.032		B
G4		-999	0.407	0.399	0.023		B
G1	pH pH units	-999	4.22	4.283	0.096		B
G2		-999	4.4	4.431	0.078		B
G3		-999	4	4.035	0.06		B
G4		-999	4	3.999	0.062		B
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		-999	57.9	56.924	2.088		B
G4		-999	57.9	59.644	2.643		B

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\* Z score is unitless

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 193, Institute of Public Health of Vojvodina (Republic of Serbia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.311	1.319	1.342	0.081	-0.385	S
G2		0.842	0.856	0.876	0.103	-0.328	S
G3		2.048	2.08	2.108	0.113	-0.526	S
G4		2.125	2.2	2.231	0.151	-0.706	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.242	0.241	0.241	0.016	0.054	S
G2		0.155	0.16	0.161	0.015	-0.416	S
G3		0.404	0.401	0.404	0.023	0.011	S
G4		0.522	0.535	0.537	0.029	-0.536	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.526	0.546	0.544	0.019	-0.967	S
G2		0.353	0.364	0.363	0.015	-0.68	S
G3		0.899	0.911	0.918	0.027	-0.706	S
G4		0.942	0.942	0.938	0.084	0.046	S
G1	Na <sup>+</sup> mg/l	0.52	0.548	0.527	0.026	-0.278	S
G2		0.353	0.365	0.355	0.025	-0.086	S
G3		0.919	0.913	0.893	0.042	0.632	S
G4		0.72	0.73	0.713	0.033	0.209	S
G1	Mg <sup>2+</sup> mg/l	-999	0.155	0.153	0.007		B
G2		-999	0.093	0.09	0.005		B
G3		0.205	0.206	0.205	0.009	-0.042	S
G4		0.235	0.206	0.206	0.01	2.767	S
G1	Cl <sup>-</sup> mg/l	0.301	0.347	0.337	0.018	-2.003	S
G2		0.252	0.232	0.231	0.022	0.957	S
G3		0.583	0.579	0.57	0.028	0.461	S
G4		0.454	0.463	0.457	0.03	-0.108	S
G1	Ca <sup>2+</sup> mg/l	-999	0.192	0.191	0.039		B
G2		-999	0.115	0.116	0.034		B
G3		-999	0.255	0.254	0.03		B
G4		-999	0.255	0.252	0.02		B
G1	K <sup>+</sup> mg/l	0.304	0.306	0.294	0.02	0.5	S
G2		0.213	0.204	0.198	0.018	0.817	S
G3		0.533	0.509	0.501	0.032	1.002	S
G4		0.416	0.407	0.399	0.023	0.72	S
G1	pH pH units	-999	4.22	4.283	0.096		B
G2		-999	4.4	4.431	0.078		B
G3		-999	4	4.035	0.06		B
G4		-999	4	3.999	0.062		B
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		-999	57.9	56.924	2.088		B
G4		-999	57.9	59.644	2.643		B

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>

## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 194, Institute of Public Health - Zrenjanin (Republic of Serbia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	-999	1.319	1.342	0.081		B
G2		-999	0.856	0.876	0.103		B
G3		-999	2.08	2.108	0.113		B
G4		-999	2.2	2.231	0.151		B
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	-999	0.241	0.241	0.016		B
G2		-999	0.16	0.161	0.015		B
G3		-999	0.401	0.404	0.023		B
G4		-999	0.535	0.537	0.029		B
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	-999	0.546	0.544	0.019		B
G2		-999	0.364	0.363	0.015		B
G3		-999	0.911	0.918	0.027		B
G4		-999	0.942	0.938	0.084		B
G1	Na <sup>+</sup> mg/l	0.497	0.548	0.527	0.026	-1.148	S
G2		0.322	0.365	0.355	0.025	-1.307	S
G3		0.865	0.913	0.893	0.042	-0.662	S
G4		0.681	0.73	0.713	0.033	-0.989	S
G1	Mg <sup>2+</sup> mg/l	0.155	0.155	0.153	0.007	0.348	S
G2		0.092	0.093	0.09	0.005	0.313	S
G3		0.206	0.206	0.205	0.009	0.069	S
G4		0.207	0.206	0.206	0.01	0.073	S
G1	Cl <sup>-</sup> mg/l	-999	0.347	0.337	0.018		B
G2		-999	0.232	0.231	0.022		B
G3		-999	0.579	0.57	0.028		B
G4		-999	0.463	0.457	0.03		B
G1	Ca <sup>2+</sup> mg/l	0.192	0.192	0.191	0.039	0.015	S
G2		0.112	0.115	0.116	0.034	-0.111	S
G3		0.253	0.255	0.254	0.03	-0.039	S
G4		0.253	0.255	0.252	0.02	0.03	S
G1	K <sup>+</sup> mg/l	0.292	0.306	0.294	0.02	-0.092	S
G2		0.188	0.204	0.198	0.018	-0.578	S
G3		0.511	0.509	0.501	0.032	0.313	S
G4		0.398	0.407	0.399	0.023	-0.063	S
G1	pH pH units	-999	4.22	4.283	0.096		B
G2		-999	4.4	4.431	0.078		B
G3		-999	4	4.035	0.06		B
G4		-999	4	3.999	0.062		B
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		-999	57.9	56.924	2.088		B
G4		-999	57.9	59.644	2.643		B

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\* Z score is unitless

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S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 197, Institute of Occupational Health - Novi Sad (Republic of Serbia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.305	1.319	1.342	0.081	-0.459	S
G2		0.838	0.856	0.876	0.103	-0.367	S
G3		2.028	2.08	2.108	0.113	-0.702	S
G4		2.12	2.2	2.231	0.151	-0.739	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.238	0.241	0.241	0.016	-0.19	S
G2		0.146	0.16	0.161	0.015	-1.024	S
G3		0.396	0.401	0.404	0.023	-0.333	S
G4		0.515	0.535	0.537	0.029	-0.781	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.519	0.546	0.544	0.019	-1.335	S
G2		0.345	0.364	0.363	0.015	-1.231	S
G3		0.898	0.911	0.918	0.027	-0.743	S
G4		0.951	0.942	0.938	0.084	0.154	S
G1	Na <sup>+</sup> mg/l	-999	0.548	0.527	0.026		B
G2		-999	0.365	0.355	0.025		B
G3		-999	0.913	0.893	0.042		B
G4		-999	0.73	0.713	0.033		B
G1	Mg <sup>2+</sup> mg/l	-999	0.155	0.153	0.007		B
G2		-999	0.093	0.09	0.005		B
G3		-999	0.206	0.205	0.009		B
G4		-999	0.206	0.206	0.01		B
G1	Cl <sup>-</sup> mg/l	0.297	0.347	0.337	0.018	-2.224	S
G2		0.254	0.232	0.231	0.022	1.049	S
G3		0.581	0.579	0.57	0.028	0.391	S
G4		0.45	0.463	0.457	0.03	-0.239	S
G1	Ca <sup>2+</sup> mg/l	-999	0.192	0.191	0.039		B
G2		-999	0.115	0.116	0.034		B
G3		-999	0.255	0.254	0.03		B
G4		-999	0.255	0.252	0.02		B
G1	K <sup>+</sup> mg/l	-999	0.306	0.294	0.02		B
G2		-999	0.204	0.198	0.018		B
G3		-999	0.509	0.501	0.032		B
G4		-999	0.407	0.399	0.023		B
G1	pH pH units	-999	4.22	4.283	0.096		B
G2		-999	4.4	4.431	0.078		B
G3		-999	4	4.035	0.06		B
G4		-999	4	3.999	0.062		B
G1	Cond µS/cm	-999	35.3	34.442	1.716		B
G2		-999	23.4	23.141	0.851		B
G3		-999	57.9	56.924	2.088		B
G4		-999	57.9	59.644	2.643		B

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Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 200, FUB AG (Switzerland)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	1.325	1.319	1.342	0.081	-0.213	S
G2		0.847	0.856	0.876	0.103	-0.28	S
G3		2.126	2.08	2.108	0.113	0.162	S
G4		2.093	2.2	2.231	0.151	-0.919	S
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	0.253	0.241	0.241	0.016	0.725	S
G2		0.172	0.16	0.161	0.015	0.731	S
G3		0.416	0.401	0.404	0.023	0.527	S
G4		0.552	0.535	0.537	0.029	0.515	S
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	0.542	0.546	0.544	0.019	-0.126	S
G2		0.362	0.364	0.363	0.015	-0.059	S
G3		0.921	0.911	0.918	0.027	0.095	S
G4		0.917	0.942	0.938	0.084	-0.252	S
G1	Na <sup>+</sup> mg/l	0.537	0.548	0.527	0.026	0.365	S
G2		0.424	0.365	0.355	0.025	2.712	Q
G3		0.907	0.913	0.893	0.042	0.344	S
G4		0.758	0.73	0.713	0.033	1.377	S
G1	Mg <sup>2+</sup> mg/l	0.153	0.155	0.153	0.007	0.058	S
G2		0.09	0.093	0.09	0.005	-0.06	S
G3		0.203	0.206	0.205	0.009	-0.265	S
G4		0.203	0.206	0.206	0.01	-0.312	S
G1	Cl <sup>-</sup> mg/l	0.342	0.347	0.337	0.018	0.265	S
G2		0.245	0.232	0.231	0.022	0.635	S
G3		0.586	0.579	0.57	0.028	0.567	S
G4		0.488	0.463	0.457	0.03	1.009	S
G1	Ca <sup>2+</sup> mg/l	0.193	0.192	0.191	0.039	0.04	S
G2		0.121	0.115	0.116	0.034	0.152	S
G3		0.259	0.255	0.254	0.03	0.159	S
G4		0.255	0.255	0.252	0.02	0.129	S
G1	K <sup>+</sup> mg/l	0.311	0.306	0.294	0.02	0.845	S
G2		0.215	0.204	0.198	0.018	0.929	S
G3		0.519	0.509	0.501	0.032	0.564	S
G4		0.422	0.407	0.399	0.023	0.981	S
G1	pH pH units	4.23	4.22	4.283	0.096	-0.557	S
G2		4.42	4.4	4.431	0.078	-0.147	S
G3		4.01	4	4.035	0.06	-0.423	S
G4		3.98	4	3.999	0.062	-0.312	S
G1	Cond µS/cm	34.7	35.3	34.442	1.716	0.15	S
G2		23.23	23.4	23.141	0.851	0.104	S
G3		57.1	57.9	56.924	2.088	0.084	S
G4		59.9	57.9	59.644	2.643	0.097	S

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\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
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## EMEP – 35<sup>th</sup> intercomparison of analytical methods

Laboratory 203, The Public Health Institute Vranje (Republic of Serbia)

### Precipitation (G-samples)

Sample name	Determinand	Reported value	Expected value	Mean value	Standard deviation	Z score *	EMEP quality norm <sup>x</sup>
G1	SO <sub>4</sub> <sup>2-</sup> mg S/l	-999	1.319	1.342	0.081		B
G2		-999	0.856	0.876	0.103		B
G3		-999	2.08	2.108	0.113		B
G4		-999	2.2	2.231	0.151		B
G1	NH <sub>4</sub> <sup>+</sup> mg N/l	-999	0.241	0.241	0.016		B
G2		-999	0.16	0.161	0.015		B
G3		-999	0.401	0.404	0.023		B
G4		-999	0.535	0.537	0.029		B
G1	NO <sub>3</sub> <sup>-</sup> mg N/l	-999	0.546	0.544	0.019		B
G2		-999	0.364	0.363	0.015		B
G3		-999	0.911	0.918	0.027		B
G4		-999	0.942	0.938	0.084		B
G1	Na <sup>+</sup> mg/l	0.497	0.548	0.527	0.026	-1.148	S
G2		0.356	0.365	0.355	0.025	0.033	S
G3		0.892	0.913	0.893	0.042	-0.015	S
G4		0.711	0.73	0.713	0.033	-0.067	S
G1	Mg <sup>2+</sup> mg/l	0.154	0.155	0.153	0.007	0.203	S
G2		0.094	0.093	0.09	0.005	0.686	S
G3		0.21	0.206	0.205	0.009	0.514	S
G4		0.217	0.206	0.206	0.01	1.035	S
G1	Cl <sup>-</sup> mg/l	0.319	0.347	0.337	0.018	-1.007	S
G2		0.263	0.232	0.231	0.022	1.462	S
G3		0.568	0.579	0.57	0.028	-0.066	S
G4		0.443	0.463	0.457	0.03	-0.47	S
G1	Ca <sup>2+</sup> mg/l	0.273	0.192	0.191	0.039	2.08	U
G2		0.32	0.115	0.116	0.034	5.976	U
G3		0.528	0.255	0.254	0.03	9.038	U
G4		0.208	0.255	0.252	0.02	-2.199	Q
G1	K <sup>+</sup> mg/l	0.321	0.306	0.294	0.02	1.338	S
G2		0.205	0.204	0.198	0.018	0.371	S
G3		0.543	0.509	0.501	0.032	1.315	S
G4		0.43	0.407	0.399	0.023	1.328	S
G1	pH pH units	-999	4.22	4.283	0.096		B
G2		-999	4.4	4.431	0.078		B
G3		-999	4	4.035	0.06		B
G4		-999	4	3.999	0.062		B
G1	Cond µS/cm	31.3	35.3	34.442	1.716	-1.831	S
G2		21.3	23.4	23.141	0.851	-2.164	S
G3		51.6	57.9	56.924	2.088	-2.55	S
G4		54.1	57.9	59.644	2.643	-2.097	S

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If your laboratory reported values as less than the detection limit, and your detection limit is lower than the expected value,  $\frac{1}{2}$  DL is taken as the reported value in further calculations.

\* Z score is unitless

✎ EMEP quality norm; the letters in the column indicates:

S – Satisfactory: Your result deviates less than  $\pm 10\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , less than  $\pm 15\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and less than  $\pm 0.1$  pH-units for pH

Q – Questionable: Your result deviates between  $\pm 10\text{-}20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , between  $\pm 15\text{-}25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and between  $\pm 0.1\text{-}0.2$  pH-units for pH

U – Unsatisfactory: Your result deviates more than  $\pm 20\%$  of the expected value for  $\text{SO}_4^{2-}$  and  $\text{NO}_3^-$ , more than  $\pm 25\%$  of the expected value for  $\text{NH}_4^+$ ,  $\text{Cl}^-$ ,  $\text{Na}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{K}^+$  and cond and more than  $\pm 0.2$  pH-units for pH

B – Blank: You reported either no value or the detection limit

Please check the EMEP intercalibration website for more statistics, Youden plots, updated expected values ect:  
<http://www.nilu.no/projects/ccc/intercomparison.html>