WALSPMF 1.0
User Guide

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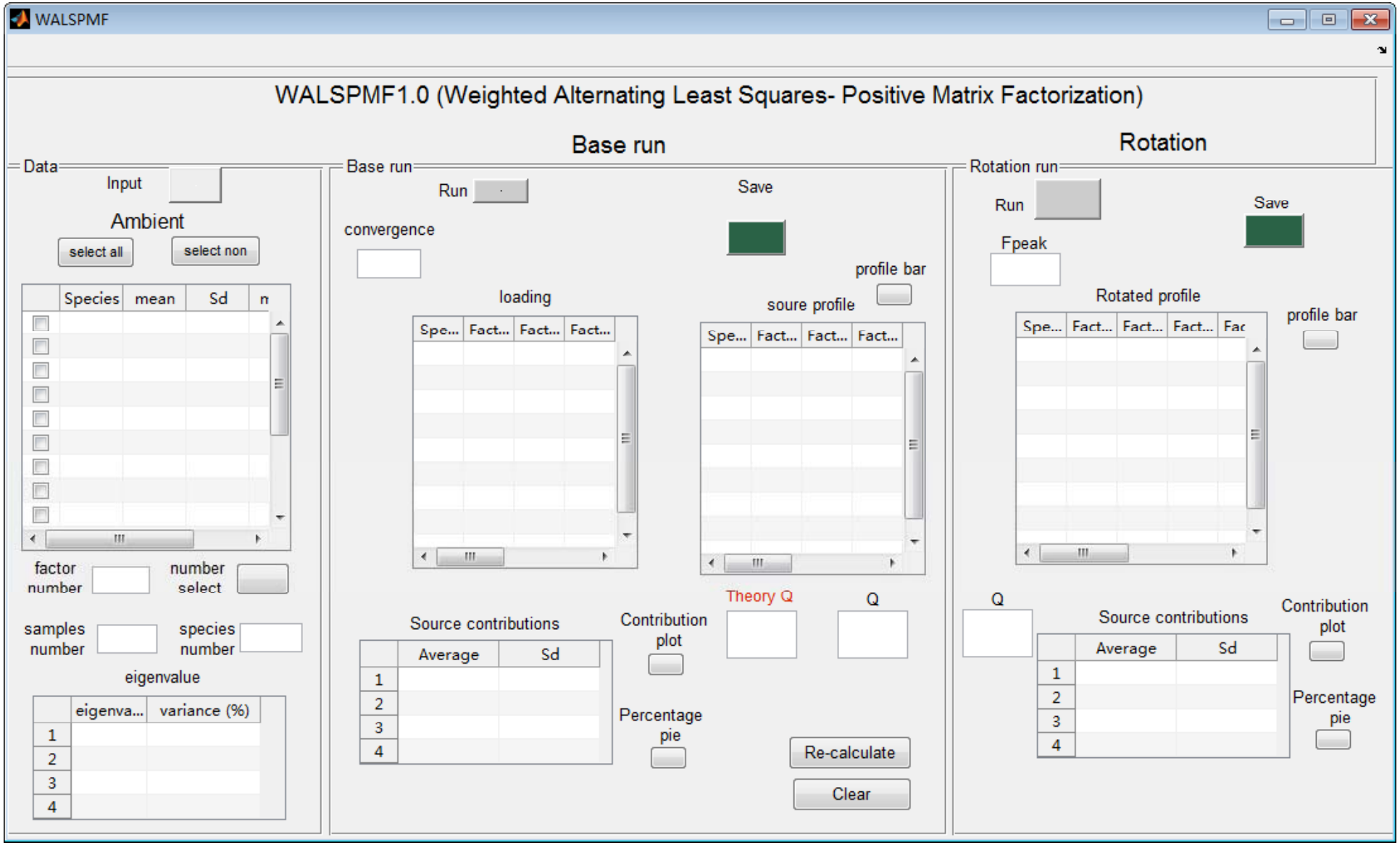
WALSPMF 1.0

WALSPMF (Weighted Alternating Least Squares-Positive Matrix Factorization) model is an extension to the more traditional PMF model and can be applied to estimate the contributions of sources to particulate matter, based on the Weighted Alternating Least Squares and Positive Matrix Factorization method.

WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species
mean
Sd
n
factor number
number select
samples number
species number
eigenvalue
eigenva...
variance (%)
Base run
Run
Save
convergence
profile bar
loading
soure profile
Spe...
Fact...
Source contributions
Average
Sd
Contribution plot
Theory Q
Q
Percentage pie
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
Rotated profile
profile bar
Q
Source contributions
Average
Sd
Contribution plot
Percentage pie

WALSPMF 1.0

- **RUNNING ENVIRONMENT：**

  Win XP、Win7、Win8（32 bit or 64 bit system）

  Before running the program, **Matlab (2009 or higher) should be** install firstly.

WALSPMF 1.0

- **Download address:**

http://russellgroup.ce.gatech.edu/node/16

or

http://env.nankai.edu.cn/air/list/?110_1.html

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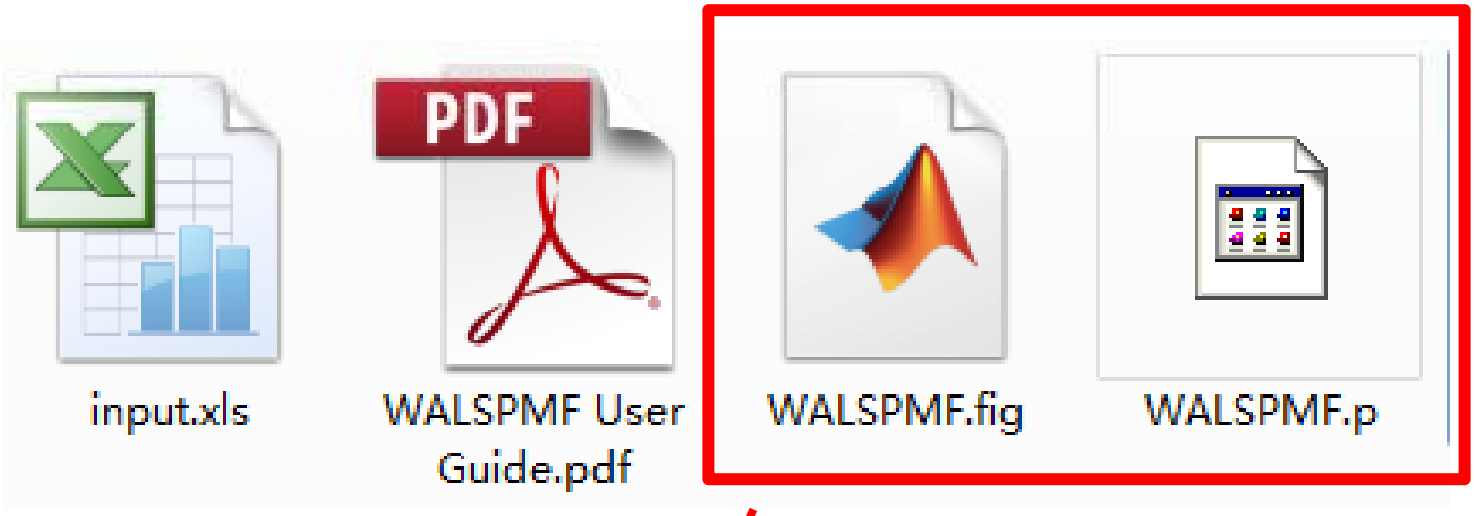
Extract the WALSPMF.zip file

WALSPMF 1.0

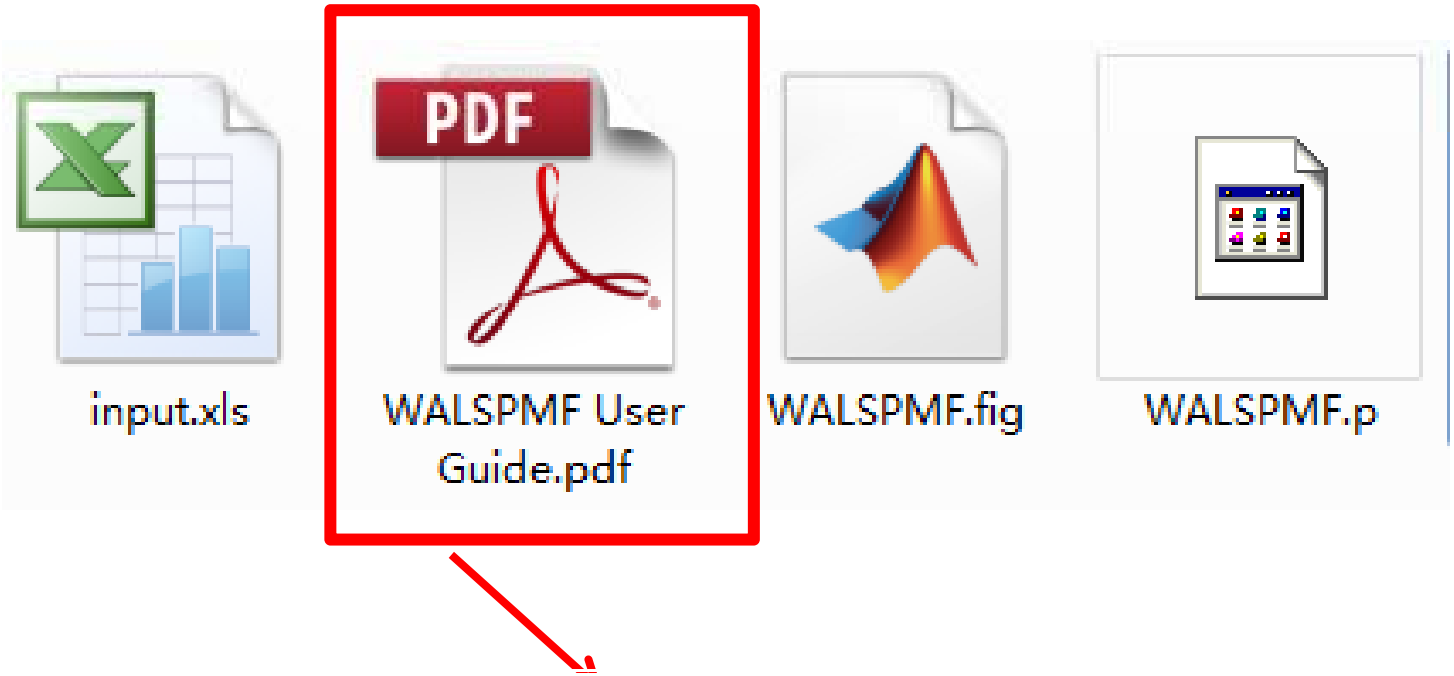
Four files in WALSPMF.zip



Matlab program files

WALSPMF 1.0

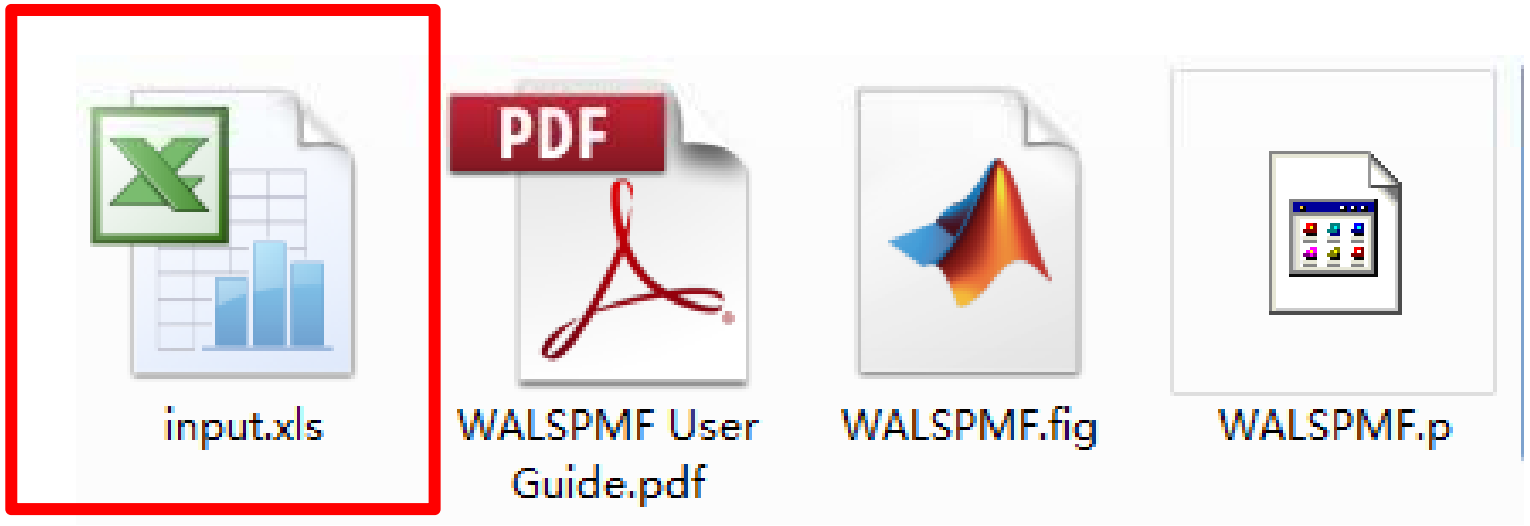
Four files in WALSPMF.zip



User Guide for CMB-GC

WALSPMF 1.0

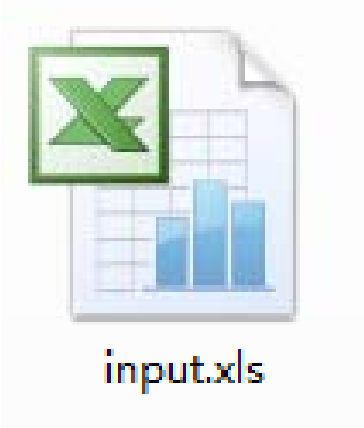
Four files in WALSPMF.zip



Example of input file

WALSPMF 1.0

- Input file

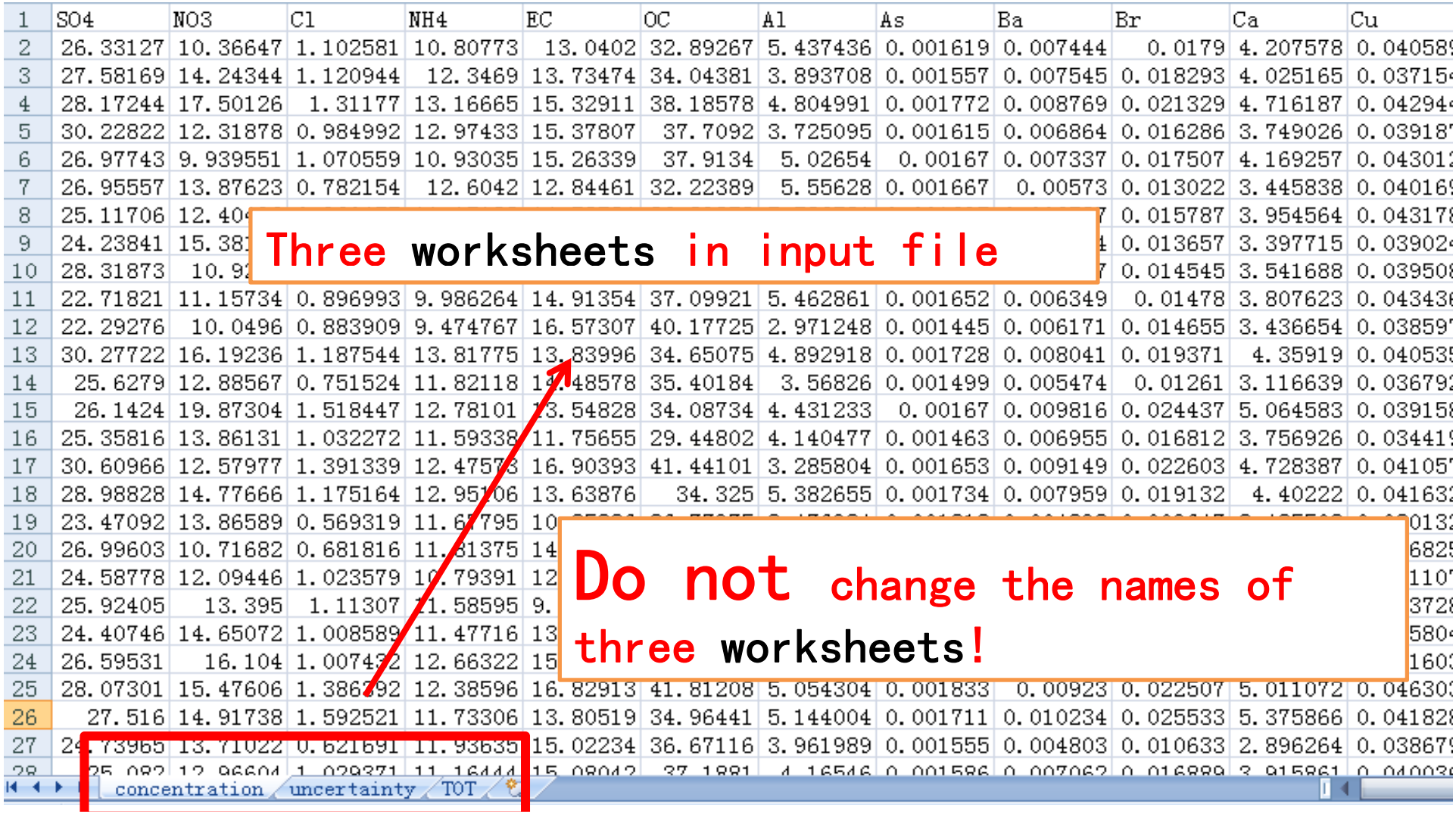


Input file of WALSPMF 1.0 is .xls file

(User can modify the name of input file)

WALSPMF 1.0

Input file



1	SO4	NO3	Cl	NH4	EC	OC	Al	As	Ba	Br	Ca	Cu
2	26.33127	10.36647	1.102581	10.80773	13.0402	32.89267	5.437436	0.001619	0.007444	0.0179	4.207578	0.040589
3	27.58169	14.24344	1.120944	12.3469	13.73474	34.04381	3.893708	0.001557	0.007545	0.018293	4.025165	0.03715
4	28.17244	17.50126	1.31177	13.16665	15.32911	38.18578	4.804991	0.001772	0.008769	0.021329	4.716187	0.04294
5	30.22822	12.31878	0.984992	12.97433	15.37807	37.7092	3.725095	0.001615	0.006864	0.016286	3.749026	0.03918
6	26.97743	9.939551	1.070559	10.93035	15.26339	37.9134	5.02654	0.00167	0.007337	0.017507	4.169257	0.043012
7	26.95557	13.87623	0.782154	12.6042	12.84461	32.22389	5.55628	0.001667	0.00573	0.013022	3.445838	0.040169
8	25.11706	12.40								0.015787	3.954564	0.043178
9	24.23841	15.38								0.013657	3.397715	0.03902
10	28.31873	10.9								0.014545	3.541688	0.039508
11	22.71821	11.15734	0.896993	9.986264	14.91354	37.09921	5.462861	0.001652	0.006349	0.01478	3.807623	0.043436
12	22.29276	10.0496	0.883909	9.474767	16.57307	40.17725	2.971248	0.001445	0.006171	0.014655	3.436654	0.038597
13	30.27722	16.19236	1.187544	13.81775	13.83996	34.65075	4.892918	0.001728	0.008041	0.019371	4.35919	0.040535
14	25.6279	12.88567	0.751524	11.82118	14.48578	35.40184	3.56826	0.001499	0.005474	0.01261	3.116639	0.036792
15	26.1424	19.87304	1.518447	12.78101	13.54828	34.08734	4.431233	0.00167	0.009816	0.024437	5.064583	0.039158
16	25.35816	13.86131	1.032272	11.59338	11.75655	29.44802	4.140477	0.001463	0.006955	0.016812	3.756926	0.034419
17	30.60966	12.57977	1.391339	12.47573	16.90393	41.44101	3.285804	0.001653	0.009149	0.022603	4.728387	0.041057
18	28.98828	14.77666	1.175164	12.95106	13.63876	34.325	5.382655	0.001734	0.007959	0.019132	4.40222	0.041632
19	23.47092	13.86589	0.569319	11.61795	10							0132
20	26.99603	10.71682	0.681816	11.81375	14							6825
21	24.58778	12.09446	1.023579	10.79391	12							1107
22	25.92405	13.395	1.11307	11.58595	9.							3728
23	24.40746	14.65072	1.008589	11.47716	13							5804
24	26.59531	16.104	1.007432	12.66322	15							1603
25	28.07301	15.47606	1.386792	12.38596	16.82913	41.81208	5.054304	0.001833	0.00923	0.022507	5.011072	0.046303
26	27.516	14.91738	1.592521	11.73306	13.80519	34.96441	5.144004	0.001711	0.010234	0.025533	5.375866	0.041828
27	24.73965	13.71022	0.621691	11.93635	15.02234	36.67116	3.961989	0.001555	0.004803	0.010633	2.896264	0.038679
28	25.082	12.96604	1.029371	11.16444	15.08042	37.1881	4.16546	0.001586	0.007062	0.016889	3.915861	0.040036

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Three worksheets in input file

Do not change the names of three worksheets!

WALSPMF 1.0

Input file

1	SO4	NO3	Cl	NH4	EC	OC	Al	As	Ba	Br	Ca	Cu
2	26.33127	10.36647	1.102581	10.80773	13.0402	32.89267	5.437436	0.001619	0.007444	0.0179	4.207578	0.040589
3	27.58169	14.24344	1.120944	12.3469	13.73474	34.04381	3.893708	0.001557	0.007545	0.018293	4.025165	0.03715
4	28.17244	17.50126	1.31177	13.16665	15.32911	38.18578	4.804991	0.001772	0.008769	0.021329	4.716187	0.04294
5	30.22822	12.31878	0.984992	12.97433	15.37807	37.7092	3.725095	0.001615	0.006864	0.016286	3.749026	0.03918
6	26.97743	9.939551	1.070559	10.93035	15.26339	37.9134	5.02654	0.00167	0.007337	0.017507	4.169257	0.043012
7	26.95557	13.87623	0.782154	12.6042	12.84461	32.22389	5.55628	0.001667	0.00573	0.013022	3.445838	0.040169
8	25.11706	12.40496	0.960457	11.15128	14.53584	36.29273	5.536721	0.001695	0.006737	0.015787	3.954564	0.043178
9	24.23841	15.38181	0.819328	11.91528	14.47387	35.64481	4.269608	0.001585	0.005904	0.013657	3.397715	0.03902
10	28.31873	10							7	0.014545	3.541688	0.039508
11	22.71821	11.							9	0.01478	3.807623	0.043436
12	22.29276	10							1	0.014655	3.436654	0.038597
13	30.27722	16.							1	0.019371	4.35919	0.040535
14	25.6279	12.							4	0.01261	3.116639	0.036792
15	26.1424	19.87304	1.518447	12.78101	13.54828	34.08734	4.431233	0.00167	0.009816	0.024437	5.064583	0.039158
16	25.35816	13.86131	1.032272	11.59338	11.75655	29.44802	4.140477	0.001463	0.006955	0.016812	3.756926	0.034419
17	30.60966	12.57977	1.391339	12.47573	16.90393	41.44101	3.285804	0.001653	0.009149	0.022603	4.728387	0.041057
18	28.98828	14.77666	1.175164	12.95106	13.63876	34.325	5.382655	0.001734	0.007959	0.019132	4.40222	0.041632
19	23.47092	13.86589	0.569319	11.67795	10.85386	26.77975	3.476924	0.001318	0.004298	0.009647	2.485503	0.030132
20	26.99603	10.71682	0.681816	11.81375	14.84344	36.13412	3.421585	0.001487	0.005087	0.011547	2.941331	0.036825
21	24.58778	12.09446	1.023579	10.79391	12.83484	32.45399	5.762554	0.00164	0.007019	0.016673	4.062038	0.041107
22	25.92405	13.395	1.11307	11.58595	9.630184	24.84265	5.040825	0.001473	0.007371	0.017958	4.000036	0.033728
23	24.40746	14.65072	1.008589	11.47716	13.01523	32.28896	3.916713	0.001488	0.00686	0.0165	3.723349	0.035804
24	26.59531	16.104	1.007432	12.66322	15.91896	39.13619	4.210926	0.001686	0.007039	0.016647	3.911348	0.041603
25	28.07301	15.47606	1.386392	12.38596	16.82913	41.81208	5.054304	0.001833	0.00923	0.022507	5.011072	0.046303
26	27.516	14.91738	1.592521	11.73306	13.80519	34.96441	5.144004	0.001711	0.010234	0.025533	5.375866	0.041828
27	24.73965	13.71022	0.621691	11.93635	15.02234	36.67116	3.961989	0.001555	0.004803	0.010633	2.896264	0.038679
28	25.082	12.96694	1.029371	11.16444	15.08042	37.1881	4.16546	0.001586	0.007062	0.016889	3.915861	0.040036

Concentration of ambient dataset (ug/m^3)

concentration | uncertainty | TOT

WALSPMF 1.0

Input file

Concentration of ambient dataset

First line: title line

1	SO4	NO3	Cl	NH4	EC	OC	Al	As	Ba	Br	Ca	Cu
3	27.58169	14.24344	1.120944	12.3469	13.73474	34.04381	3.893708	0.001557	0.007545	0.018293	4.025165	0.03715
4	28.17244	17.50126	1.31177	13.16665	15.32911	38.18578	4.804991	0.001772	0.008769	0.021329	4.716187	0.04294
5	30.22822	12.31878	0.984992	12.97433	15.37807	37.7092	3.725095	0.001615	0.006864	0.016286	3.749026	0.03918
6	26.97743	9.939551	1.070559	10.93035	15.26339	37.9134	5.02654	0.00167	0.007337	0.017507	4.169257	0.04301
7	26.95557	13.87623	0.782154	12.6042	12.84461	32.22389	5.55628	0.001667	0.00573	0.013022	3.445838	0.04016
8	25.11706	12.40496	0.960457	11.15128	14.53584	36.29273	5.536721	0.001695	0.006737	0.015787	3.954564	0.04317
9	24.23841	15.38181	0.819328	11.91528	14.47387	35.64481	4.269608	0.001585	0.005904	0.013657	3.397715	0.03902
10	28.31873	10.9218	0.876288	12.04932	14.81842	36.47257	4.209992	0.001594	0.006227	0.014545	3.541688	0.03950
11	22.71821	11.15734	0.896993	9.986264	14.91354	37.09921	5.462861	0.001652	0.006349	0.01478	3.807623	0.04343
12	22.29276	10.0496	0.88390								3.436654	0.03859
13	30.27722	16.19236	1.18754								4.35919	0.04053
14	25.6279	12.88567	0.751524	11.82118	14.48578	35.40184	3.56826	0.001499	0.005474	0.01261	3.116639	0.03679
15	26.1424	19.87304	1.518447	12.78101	13.54828	34.08734	4.431233	0.00167	0.009816	0.024437	5.064583	0.03915
16	25.35816	13.86131	1.032272	11.59338	11.75655	29.44802	4.140477	0.001463	0.006955	0.016812	3.756926	0.03441
17	30.60966	12.57977	1.391339	12.47573	16.90393	41.44101	3.285804	0.001653	0.009149	0.022603	4.728387	0.04105
18	28.98828	14.77666	1.175164	12.95106	13.63876	34.325	5.382655	0.001734	0.007959	0.019132	4.40222	0.04163
19	23.47092	13.86589	0.569319	11.67795	10.85386	26.77975	3.476924	0.001318	0.004298	0.009647	2.485503	0.03013
20	26.99603	10.71682	0.681816	11.81375	14.84344	36.13412	3.421585	0.001487	0.005087	0.011547	2.941331	0.03682
21	24.58778	12.09446	1.023579	10.79391	12.83484	32.45399	5.762554	0.00164	0.007019	0.016673	4.062038	0.04110
22	25.92405	13.395	1.11307	11.58595	9.630184	24.84265	5.040825	0.001473	0.007371	0.017958	4.000036	0.03372
23	24.40746	14.65072	1.008589	11.47716	13.01523	32.28896	3.916713	0.001488	0.00686	0.0165	3.723349	0.03580
24	26.59531	16.104	1.007432	12.66322	15.91896	39.13619	4.210926	0.001686	0.007039	0.016647	3.911348	0.04160
25	28.07301	15.47606	1.386392	12.38596	16.82913	41.81208	5.054304	0.001833	0.00923	0.022507	5.011072	0.04630
26	27.516	14.91738	1.592521	11.73306	13.80519	34.96441	5.144004	0.001711	0.010234	0.025533	5.375866	0.04182
27	24.73965	13.71022	0.621691	11.93635	15.02234	36.67116	3.961989	0.001555	0.004803	0.010633	2.896264	0.03867
28	25.082	12.96604	1.029371	11.16444	15.08042	37.1881	4.16546	0.001586	0.007062	0.016889	3.915861	0.04003

concentration | uncertainty | TOT

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Input file

Concentration of ambient dataset

	SO4	NO3	Cl	NH4	EC	OC	Al	As	Ba	Br	Ca	Cu
2	26.33127	10.36647	1.102581	10.80773	13.0402	32.89267	5.437436	0.001619	0.007444	0.0179	4.207578	0.04058
3	27.58169	14.24344	1.120944	12.3469	13.73474	34.04381	3.893708	0.001557	0.007545	0.018293	4.025165	0.03715
4	28.17244	17.50126	1.31177	13.16665	15.32911	38.18578	4.804991	0.001772	0.008769	0.021329	4.716187	0.04294
5	30.22822	12.31878	0.984992	12.97433	15.37807	37.7092	3.725095	0.001615	0.006864	0.016286	3.749026	0.03918
6	26.97743	9.939551	1.070559	10.93035	15.26339	37.9134	5.02654	0.00167	0.007337	0.017507	4.169257	0.04301
7	26.95557	13.87623	0.782154	12.6042	12.84461	32.22389	5.55628	0.001667	0.00573	0.013022	3.445838	0.04016
8	25.11706	12.40496	0.960457	11.15128	14.53584	36.29273	5.536721	0.001695	0.006737	0.015787	3.954564	0.04317
9	24.23841	15.38181	0.819328	11.91528	14.47387			585	0.005904	0.013657	3.397715	0.03902
10	28.31873	10.9218	0.876288	12.04932	14.81842			594	0.006227	0.014545	3.541688	0.03950
11	22.71821	11.15734	0.896993	9.986264	14.91354			652	0.006349	0.01478	3.807623	0.04343
12	22.29276	10.0496	0.883909	9.474767	16.57307	40.17725	2.971248	0.001445	0.006171	0.014655	3.436654	0.03859
13	30.27722	16.19236	1.187544	13.81775	13.83996	34.65075	4.892918	0.001728	0.008041	0.019371	4.35919	0.04053
14	25.6279	12.88567	0.751524	11.82118	14.48578	35.40184	3.56826	0.001499	0.005474	0.01261	3.116639	0.03679
15	26.1424	19.87304	1.518447	12.78101	13.54828	34.08734	4.431233	0.00167	0.009816	0.024437	5.064583	0.03915
16	25.35816	13.86131	1.032272	11.59338	11.75655	29.44802	4.140477	0.001463	0.006955	0.016812	3.756926	0.03441
17	30.60966	12.57977	1.391339	12.47573	16.90393	41.44101	3.285804	0.001653	0.009149	0.022603	4.728387	0.04105
18	28.98828	14.77666	1.175164	12.95106	13.63876	34.325	5.382655	0.001734	0.007959	0.019132	4.40222	0.04163
19	23.47092	13.86589	0.569319	11.67795	10.85386	26.77975	3.476924	0.001318	0.004298	0.009647	2.485503	0.03013
20	26.99603	10.71682	0.681816	11.81375	14.84344	36.13412	3.421585	0.001487	0.005087	0.011547	2.941331	0.03682
21	24.58778	12.09446	1.023579	10.79391	12.83484	32.45399	5.762554	0.00164	0.007019	0.016673	4.062038	0.04110
22	25.92405	13.395	1.11307	11.58595	9.630184	24.84265	5.040825	0.001473	0.007371	0.017958	4.000036	0.03372
23	24.40746	14.65072	1.008589	11.47716	13.01523	32.28896	3.916713	0.001488	0.00686	0.0165	3.723349	0.03580
24	26.59531	16.104	1.007432	12.66322	15.91896	39.13619	4.210926	0.001686	0.007039	0.016647	3.911348	0.04160
25	28.07301	15.47606	1.386392	12.38596	16.82913	41.81208	5.054304	0.001833	0.00923	0.022507	5.011072	0.04630
26	27.516	14.91738	1.592521	11.73306	13.80519	34.96441	5.144004	0.001711	0.010234	0.025533	5.375866	0.04182
27	24.73965	13.71022	0.621691	11.93635	15.02234	36.67116	3.961989	0.001555	0.004803	0.010633	2.896264	0.03867

Dataset

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WALSPMF 1.0

Input file

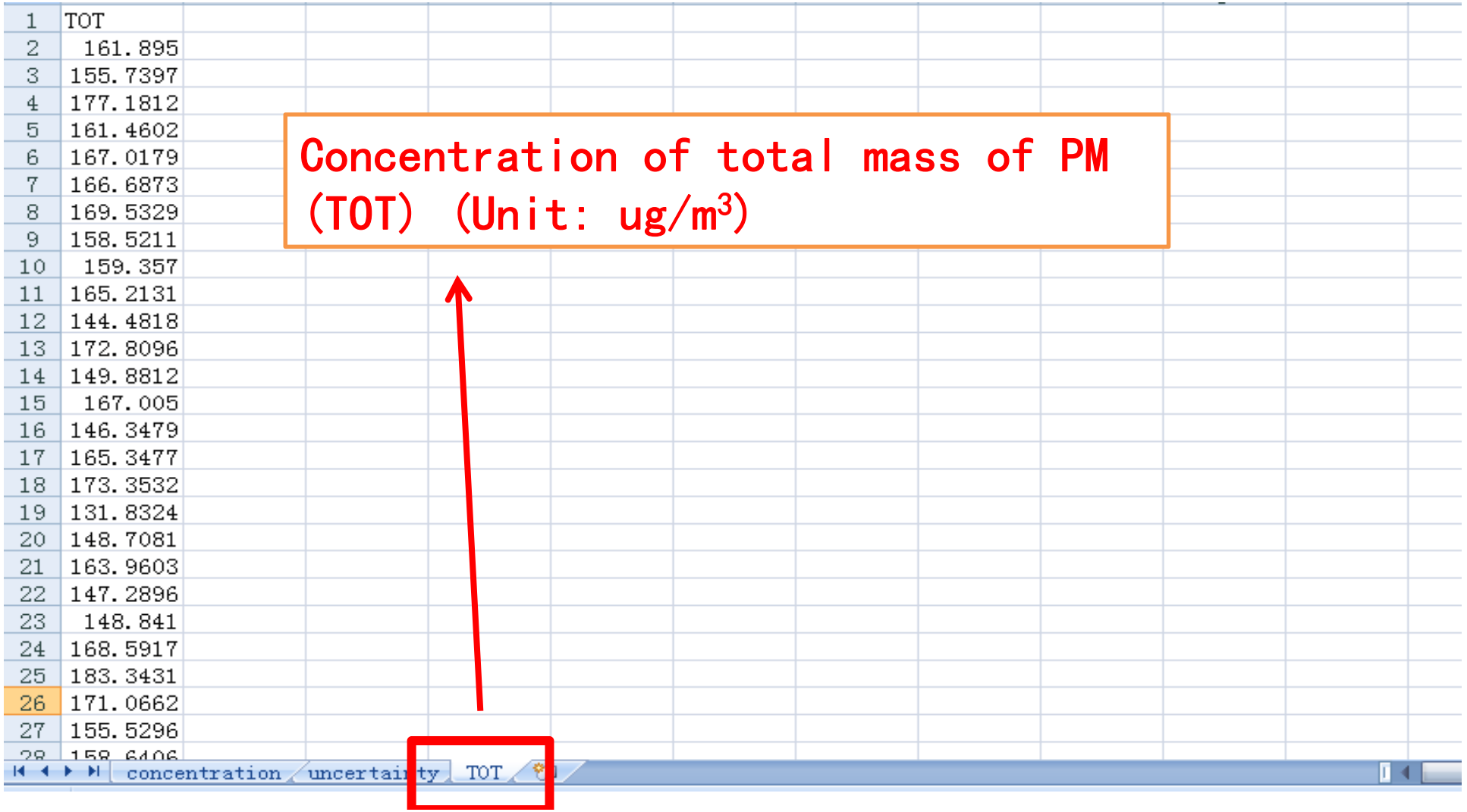
1	SO4	NO3	Cl	NH4	EC	OC	Al	As	Ba	Br	Ca	Cu
2	2.633127	1.036647	0.110258	1.080773	1.30402	3.289267	0.543744	0.000162	0.000744	0.00179	0.420758	0.00
3	2.758169	1.424344	0.112094	1.23469	1.373474	3.404381	0.389371	0.000156	0.000755	0.001829	0.402517	0.00
4	2.817244	1.750126	0.131177	1.316665	1.532911	3.818578	0.480499	0.000177	0.000877	0.002133	0.471619	0.00
5	3.022822	1.23187								0.001629	0.374903	0.00
6	2.697743	0.99395								0.001751	0.416926	0.00
7	2.695557	1.38762								0.001302	0.344584	0.00
8	2.511706	1.24049								0.001579	0.395456	0.00
9	2.423841	1.53818								0.001366	0.339771	0.00
10	2.831873	1.09218	0.087629	1.204932	1.481842	3.647257	0.420999	0.000159	0.000623	0.001454	0.354169	0.00
11	2.271821	1.115734	0.089699	0.998626	1.491354	3.709921	0.546286	0.000165	0.000635	0.001478	0.380762	0.00
12	2.229276	1.00496	0.088391	0.947477	1.657307	4.017725	0.297125	0.000144	0.000617	0.001465	0.343665	0.0
13	3.027722	1.619236	0.118754	1.381775	1.383996	3.465075	0.489292	0.000173	0.000804	0.001937	0.435919	0.00
14	2.56279	1.288567	0.075152	1.182118	1.448578	3.540184	0.356826	0.00015	0.000547	0.001261	0.311664	0.00
15	2.61424	1.987304	0.151845	1.278101	1.354828	3.408734	0.443123	0.000167	0.000982	0.002444	0.506458	0.00
16	2.535816	1.386131	0.103227	1.159338	1.175655	2.944802	0.414048	0.000146	0.000696	0.001681	0.375693	0.00
17	3.060966	1.257977	0.139134	1.247573	1.690393	4.144101	0.32858	0.000165	0.000915	0.00226	0.472839	0.00
18	2.898828	1.477666	0.117516	1.295106	1.363876	3.4325	0.538265	0.000173	0.000796	0.001913	0.440222	0.00
19	2.347092	1.386589	0.056932	1.167795	1.085386	2.677975	0.347692	0.000132	0.00043	0.000965	0.24855	0.00
20	2.699603	1.071682	0.068182	1.181375	1.484344	3.613412	0.342159	0.000149	0.000509	0.001155	0.294133	0.00
21	2.458778	1.209446	0.102358	1.079391	1.283484	3.245399	0.576255	0.000164	0.000702	0.001667	0.406204	0.00
22	2.592405	1.3395	0.111307	1.158595	0.963018	2.484265	0.504083	0.000147	0.000737	0.001796	0.400004	0.00
23	2.440746	1.465072	0.100859	1.147716	1.301523	3.228896	0.391671	0.000149	0.000686	0.00165	0.372335	0.0
24	2.659531	1.6104	0.100743	1.266322	1.591896	3.913619	0.421093	0.000169	0.000704	0.001665	0.391135	0.0
25	2.807301	1.547606	0.138639	1.238596	1.682913	4.181208	0.50543	0.000183	0.000923	0.002251	0.501107	0.0
26	2.7516	1.491738	0.159252	1.173306	1.380519	3.496441	0.5144	0.000171	0.001023	0.002553	0.537587	0.00
27	2.473965	1.371022		1.193635	1.502234	3.667116	0.396199	0.000156	0.00048	0.001063	0.289626	0.00
28	2.5082	1.296604	0.102937	1.116444	1.508042	3.71881	0.416546	0.000159	0.000706	0.001689	0.391586	0.00

Uncertainties of concentration for PM (Unit: ug/m^3)

concentration | uncertainty | TOT

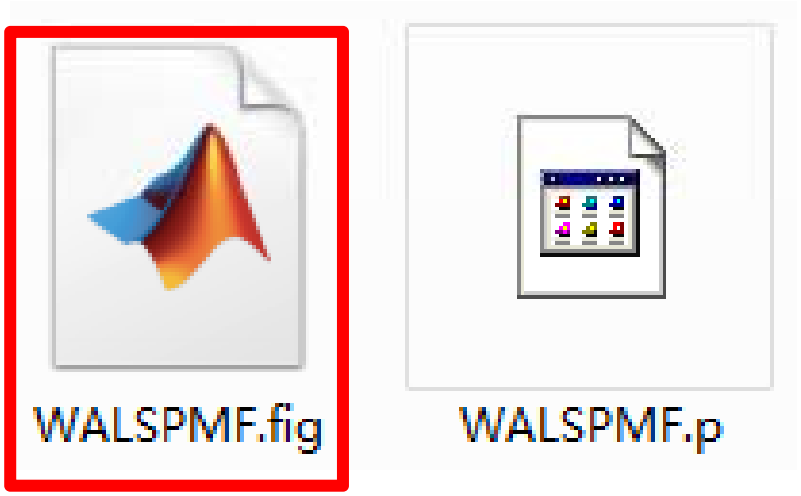
WALSPMF 1.0

Input file



WALSPMF 1.0

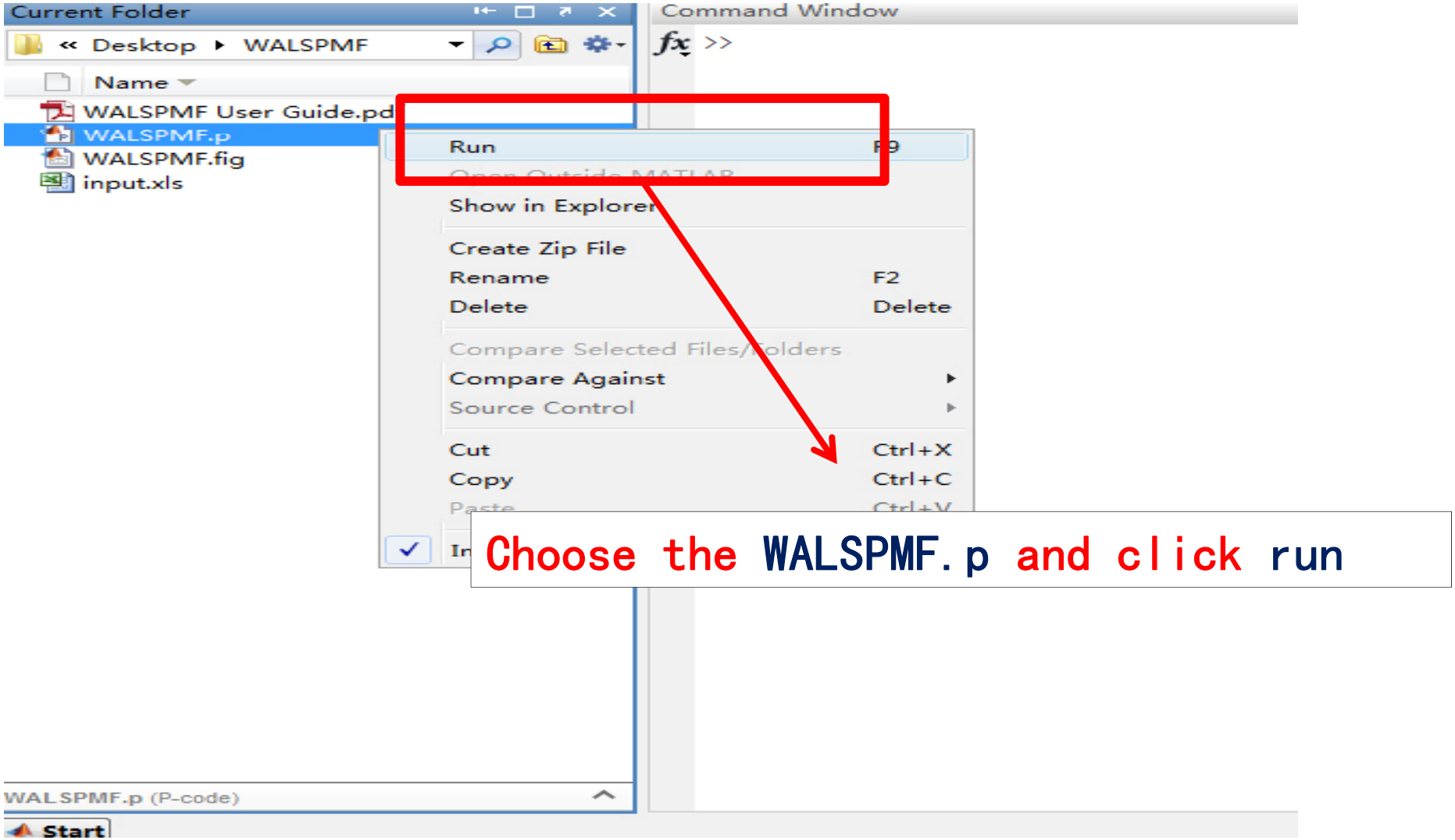
- Run the model



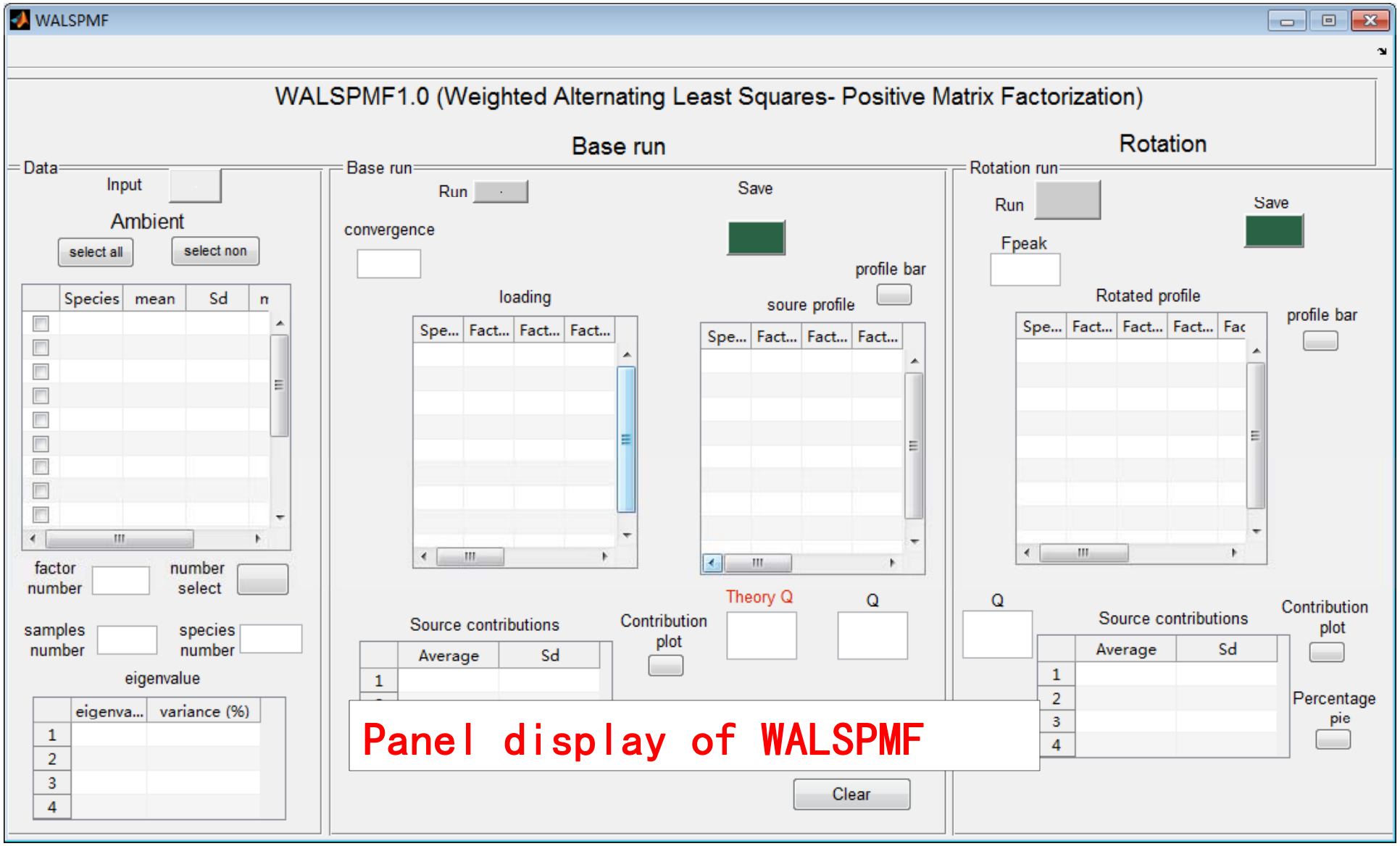
Double click the WALSPMF.fig file

WALSPMF 1.0

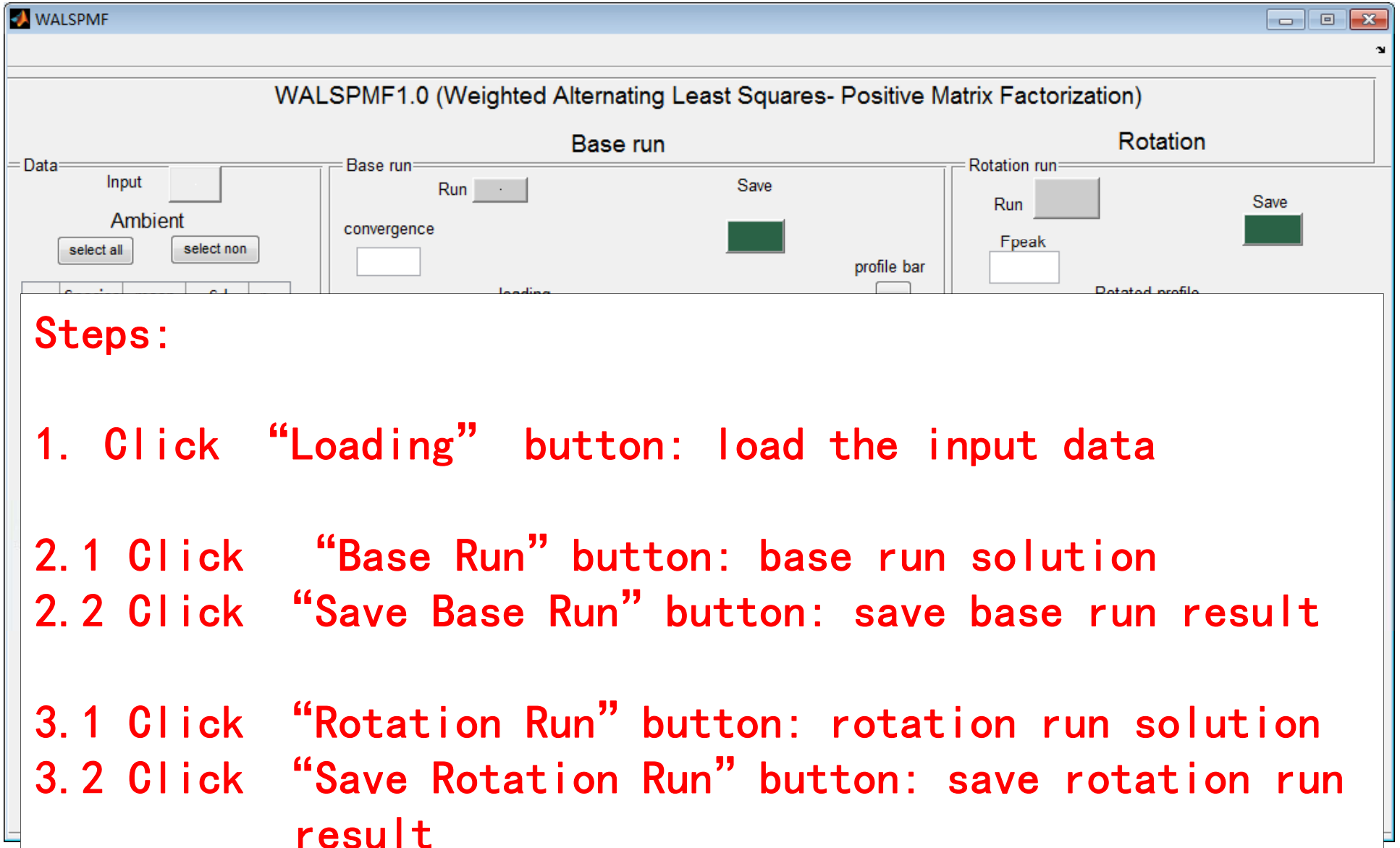
- Run the model



WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species
mean
Sd
factor number
number select
samples number
species number
eigenvalue
eigenva...
variance (%)
Base run
Run
Save
convergence
profile bar
loading
soure profile
Spe...
Fact...
Source contributions
Average
Sd
Contribution plot
Theory Q
Q
Rotation run
Run
Save
Fpeak
Rotated profile
profile bar
Q
Source contributions
Average
Sd
Contribution plot
Percentage pie
Panel display of WALSPMF
Clear

WALSPMF 1.0



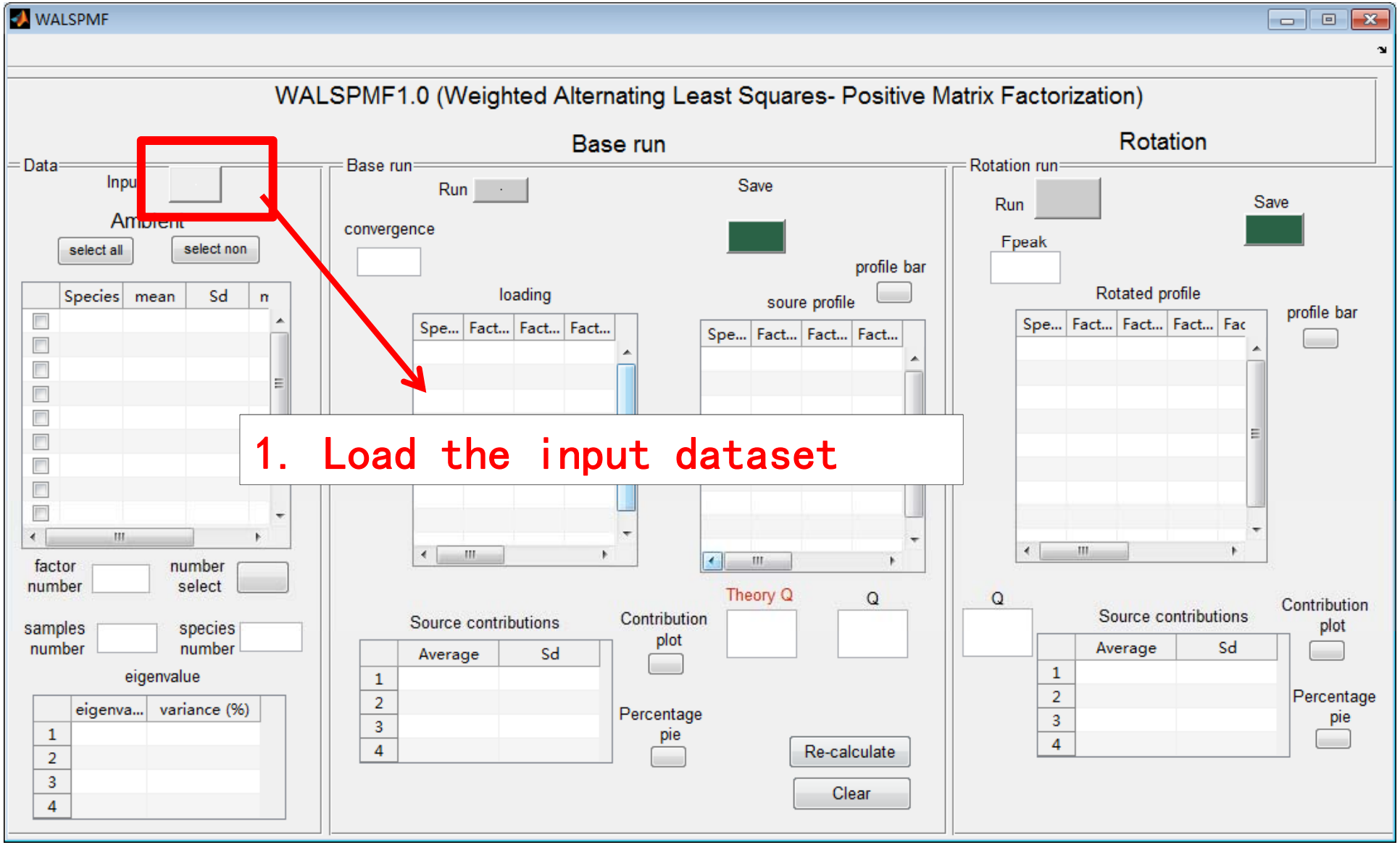
Steps:

1. Click “Loading” button: load the input data

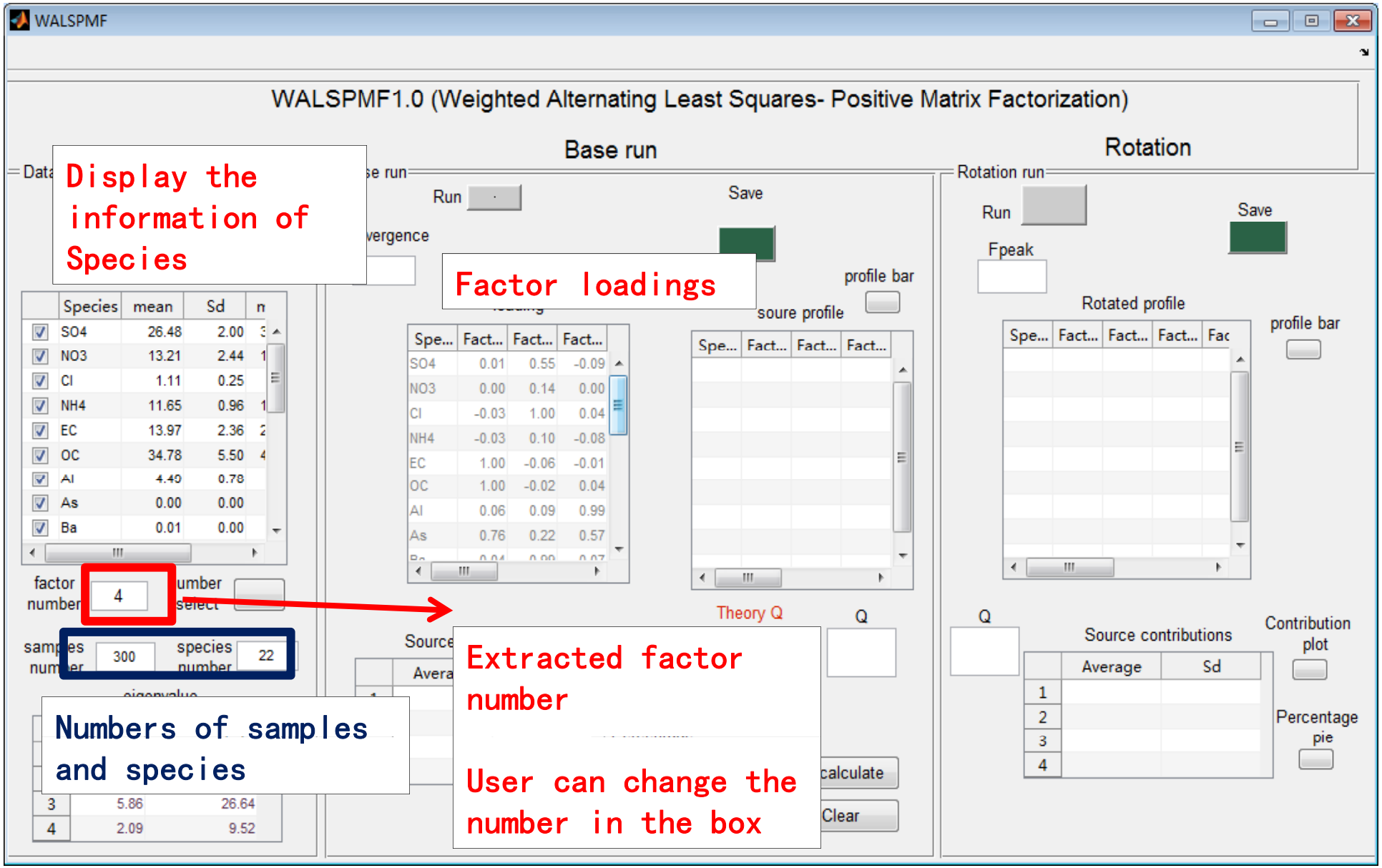
2.1 Click “Base Run” button: base run solution
2.2 Click “Save Base Run” button: save base run result

3.1 Click “Rotation Run” button: rotation run solution
3.2 Click “Save Rotation Run” button: save rotation run result

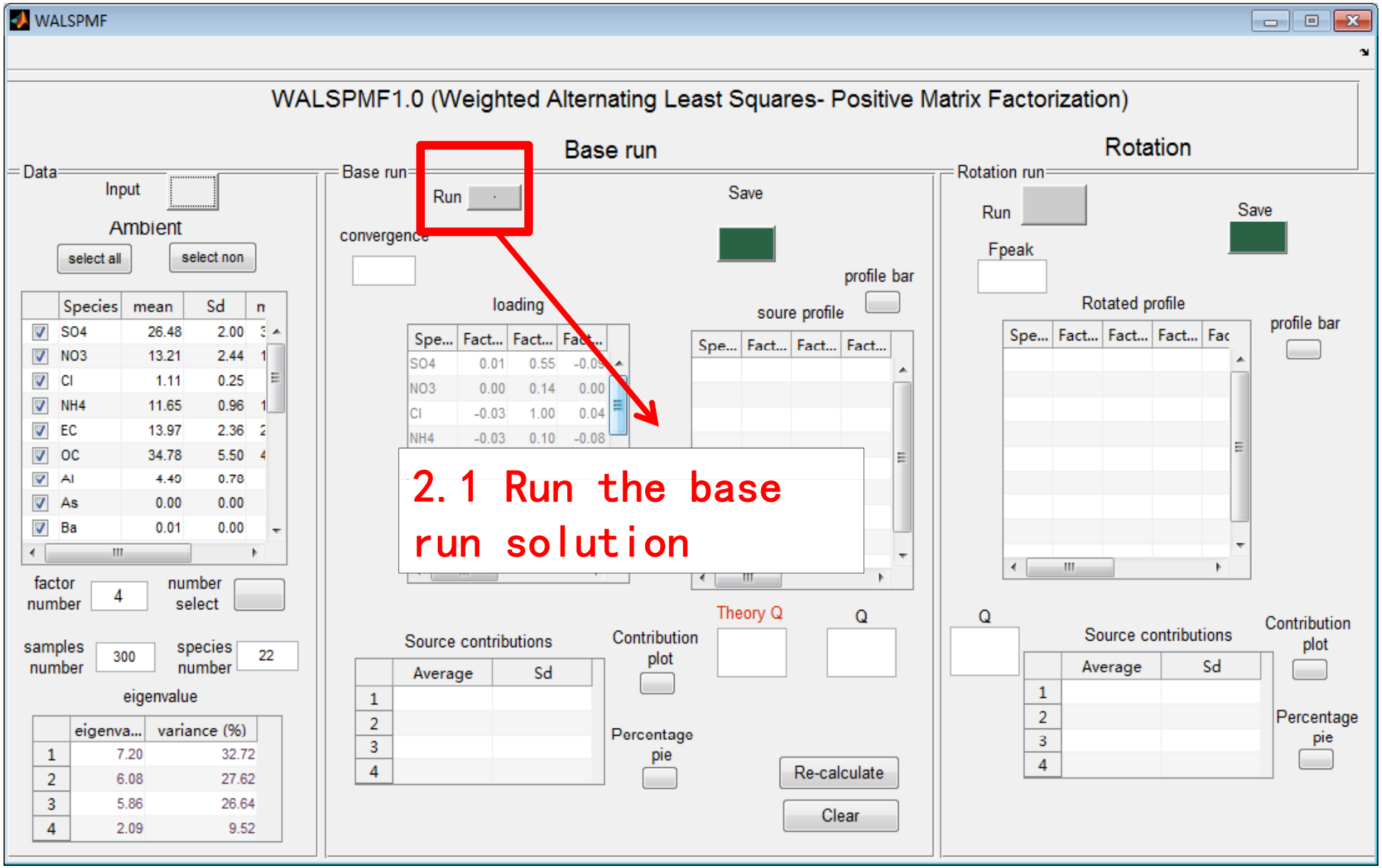
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species
mean
Sd
factor number
number select
samples number
species number
eigenvalue
eigenva...
variance (%)
Base run
Run
convergence
Save
profile bar
loading
soure profile
Spe...
Fact...
Source contributions
Average
Sd
Contribution plot
Percentage pie
Theory Q
Q
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
Rotated profile
profile bar
Q
Source contributions
Average
Sd
Contribution plot
Percentage pie
1. Load the input dataset

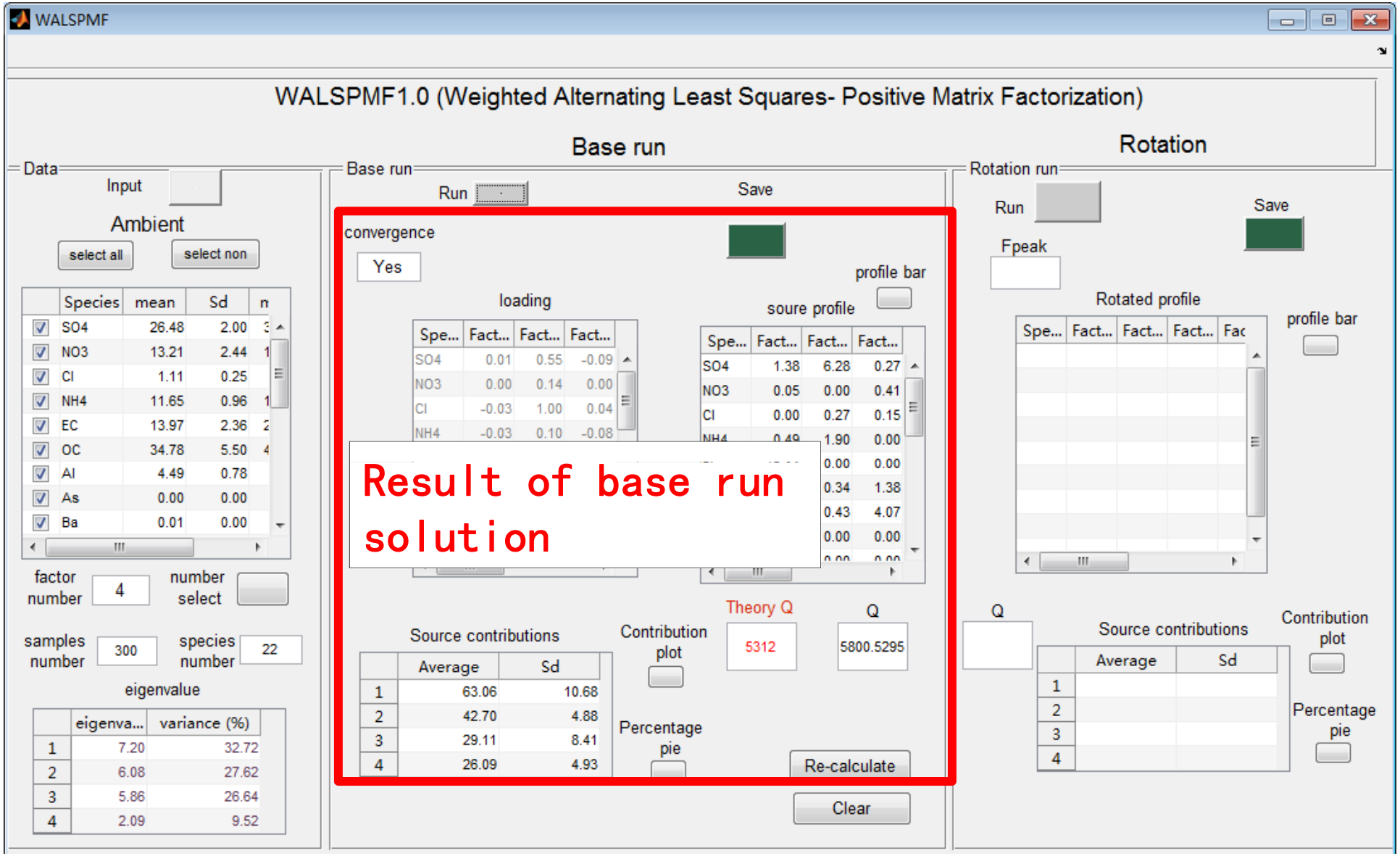
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Display the information of Species
Factor loadings
Extracted factor number
User can change the number in the box
Numbers of samples and species
Run
Save
Rotation run
Fpeak
Rotated profile
profile bar
soure profile
Theory Q
Q
Source contributions
Contribution plot
Percentage pie
calculate
Clear
factor number
4
sample number
300
species number
22
Species
mean
Sd
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
As 0.00 0.00
Ba 0.01 0.00
Average
Sd

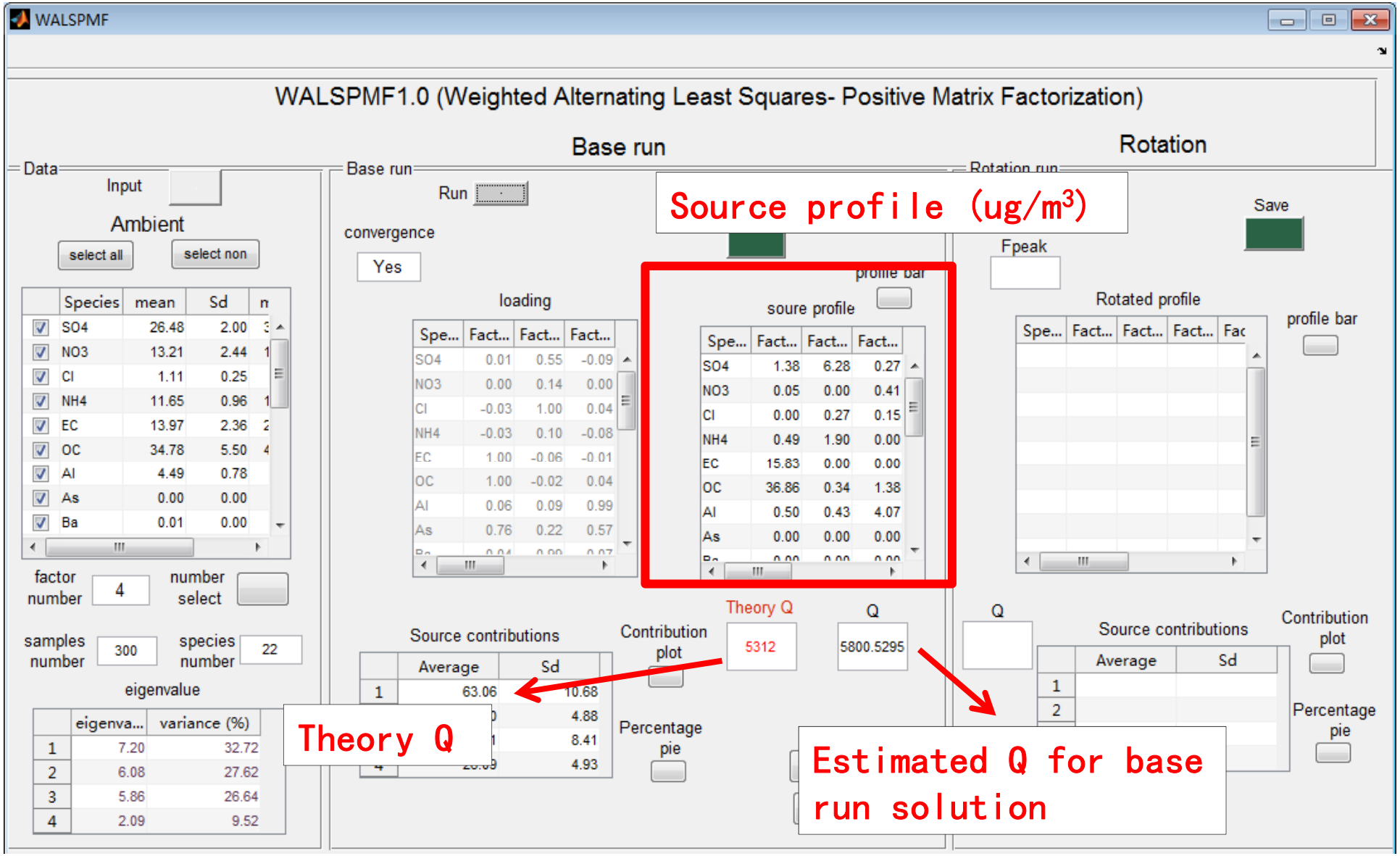
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
convergence
Save
profile bar
loading
soure profile
Spe... Fact... Fact... Fact...
SO4 0.01 0.55
NO3 0.00 0.14 0.00
Cl -0.03 1.00 0.04
NH4 -0.03 0.10 -0.08
2.1 Run the base run solution
Source contributions
Average Sd
Contribution plot
Percentage pie
Theory Q
Q
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
Rotated profile
profile bar
Q
Source contributions
Average Sd
Contribution plot
Percentage pie

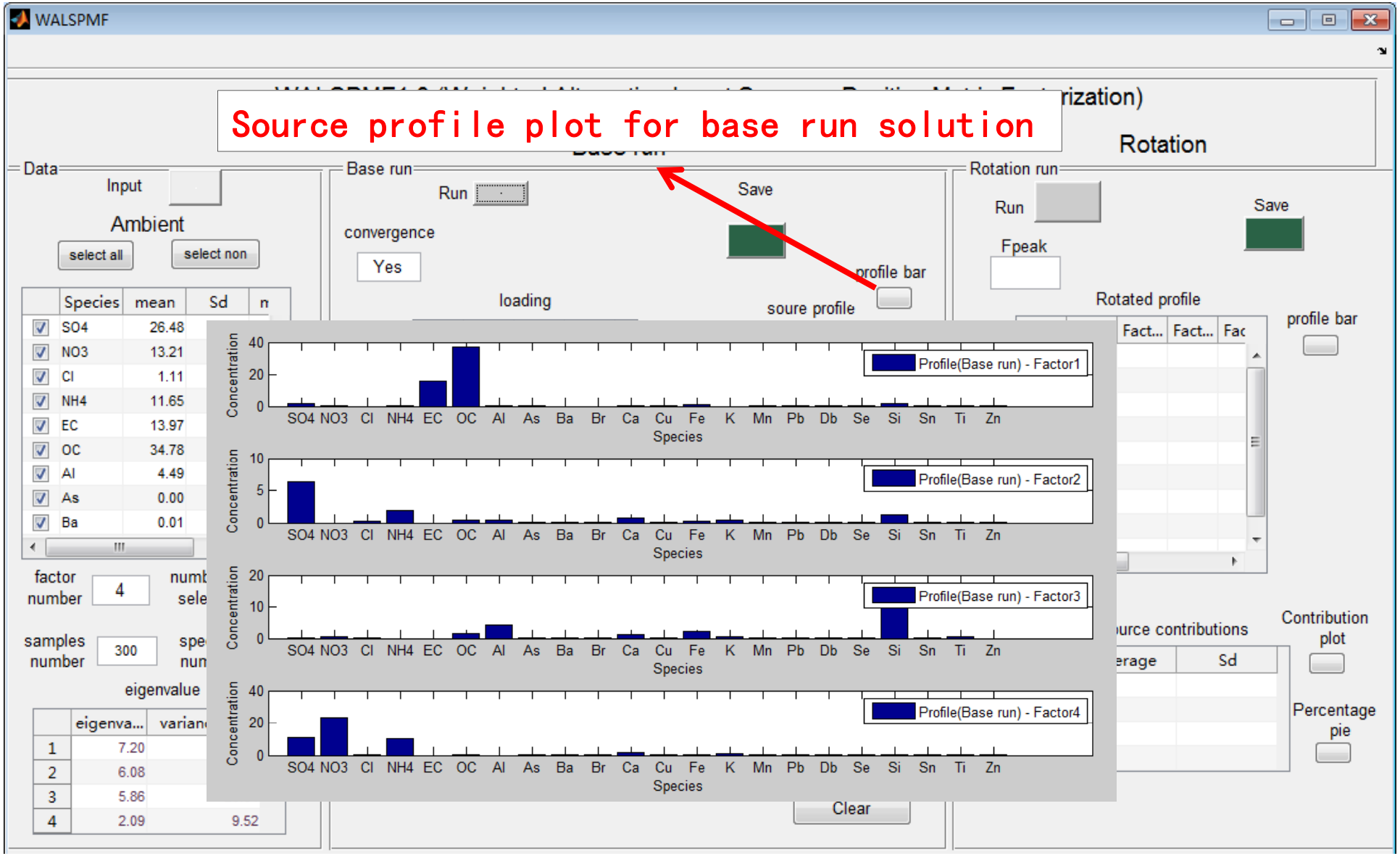
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd n
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
Save
convergence
Yes
profile bar
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
Cl -0.03 1.00 0.04
NH4 -0.03 0.10 -0.08
soure profile
Spe... Fact... Fact... Fact...
SO4 1.38 6.28 0.27
NO3 0.05 0.00 0.41
Cl 0.00 0.27 0.15
Result of base run solution
Theory Q
5312
Q
5800.5295
Source contributions
Average Sd
1 63.06 10.68
2 42.70 4.88
3 29.11 8.41
4 26.09 4.93
Contribution plot
Percentage pie
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
Rotated profile
Spe... Fact... Fact... Fact... Fac
profile bar
Q
Source contributions
Average Sd
1
2
3
4
Contribution plot
Percentage pie

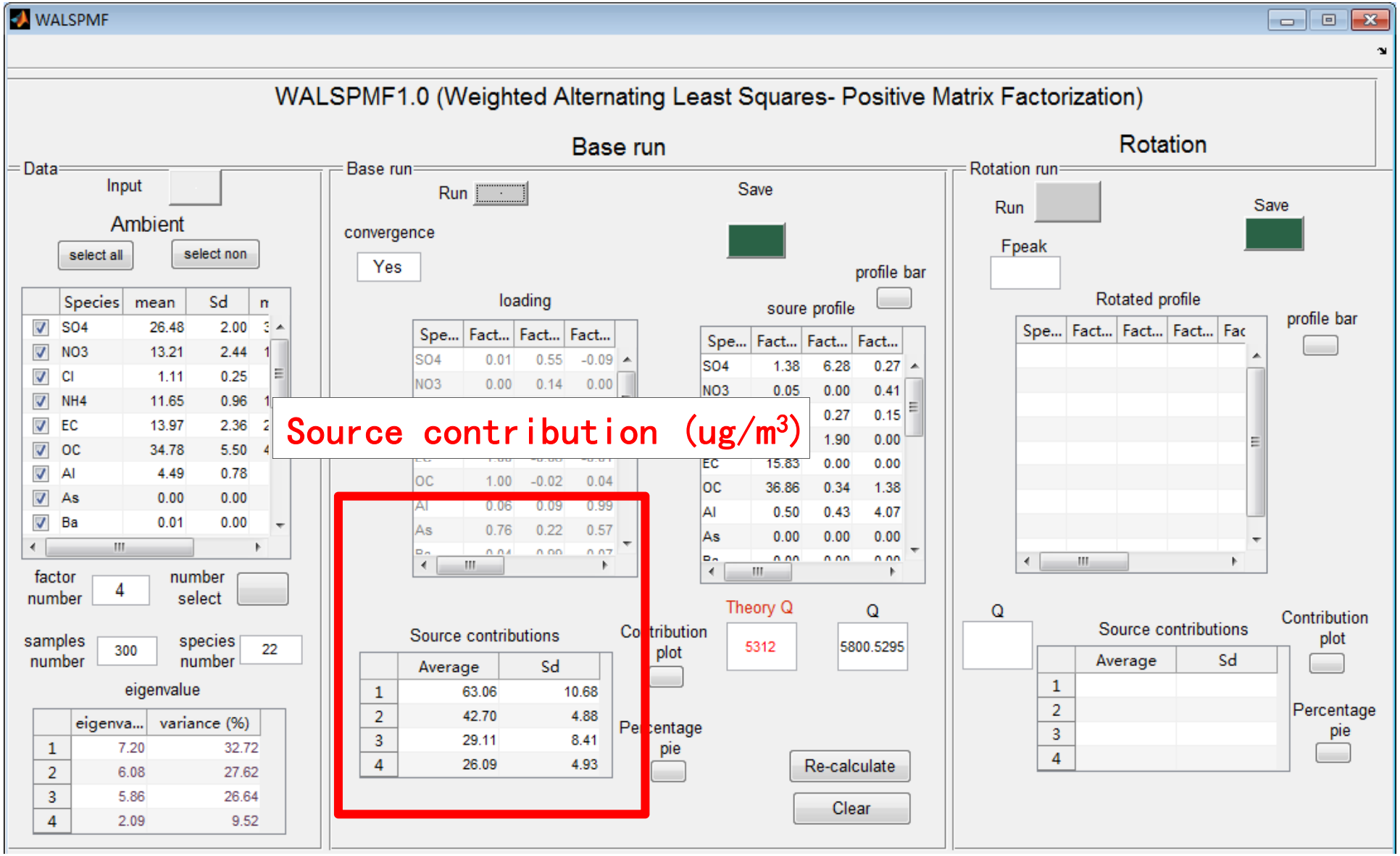
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd n
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
convergence
Yes
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
Cl -0.03 1.00 0.04
NH4 -0.03 0.10 -0.08
EC 1.00 -0.06 -0.01
OC 1.00 -0.02 0.04
Al 0.06 0.09 0.99
As 0.76 0.22 0.57
Source profile (ug/m3)
profile bar
soure profile
Spe... Fact... Fact... Fact...
SO4 1.38 6.28 0.27
NO3 0.05 0.00 0.41
Cl 0.00 0.27 0.15
NH4 0.49 1.90 0.00
EC 15.83 0.00 0.00
OC 36.86 0.34 1.38
Al 0.50 0.43 4.07
As 0.00 0.00 0.00
Source contributions
Average Sd
1 63.06 10.68
4.88
8.41
4.93
Contribution plot
Percentage pie
Theory Q
5312
Q
5800.5295
Theory Q
Rotation run
Save
Fpeak
Rotated profile
Spe... Fact... Fact... Fact... Fac
profile bar
Q
Source contributions
Average Sd
1
2
Contribution plot
Percentage pie
Estimated Q for base run solution

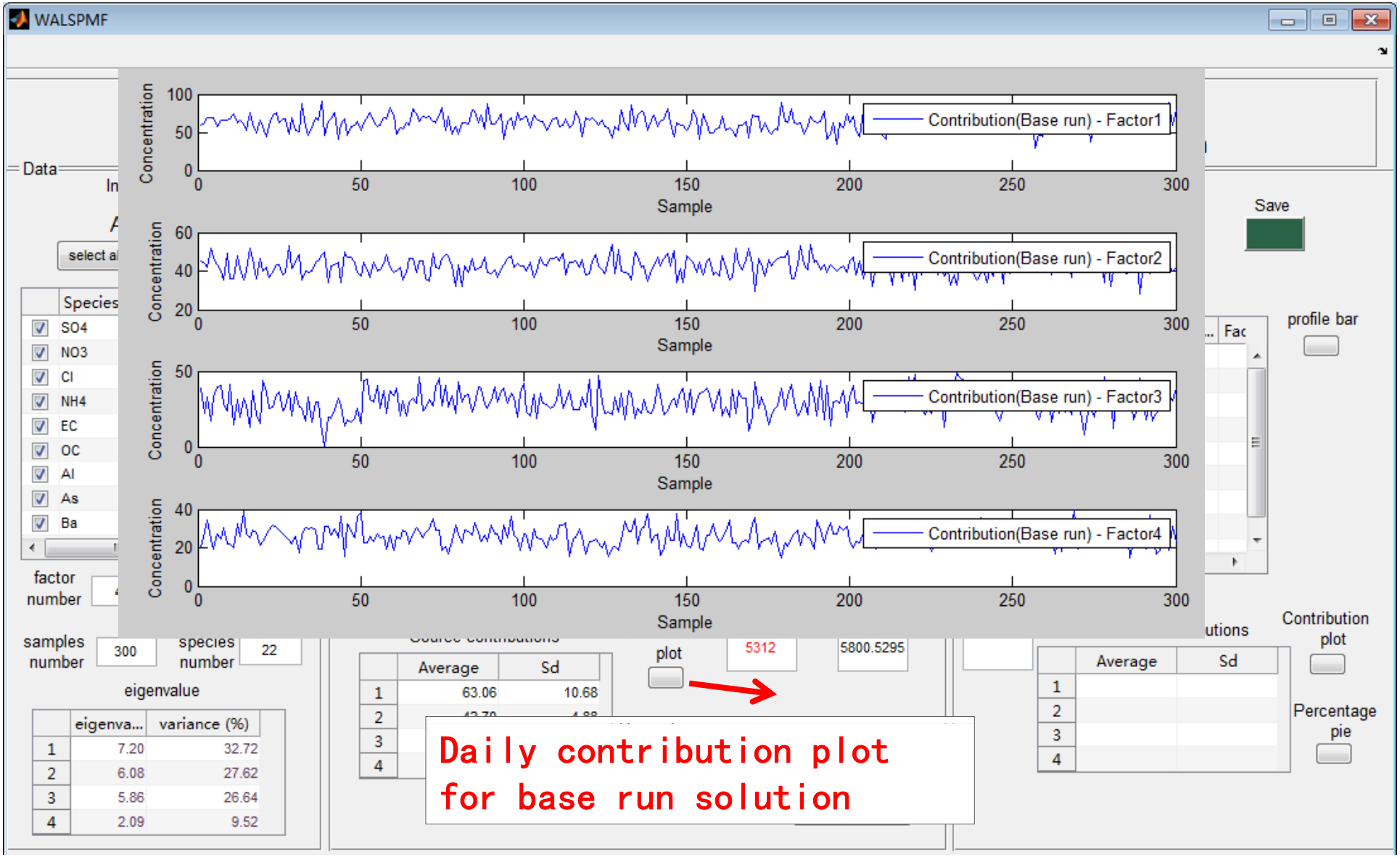
WALSPMF 1.0


WALSPMF
Source profile plot for base run solution
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd n
SO4 26.48
NO3 13.21
Cl 1.11
NH4 11.65
EC 13.97
OC 34.78
Al 4.49
As 0.00
Ba 0.01
factor number 4
samples number 300
eigenvalue
eigenva... varian
1 7.20
2 6.08
3 5.86
4 2.09 9.52
Base run
Run
Save
convergence
Yes
loading
soure profile
profile bar
Rotation run
Run
Save
Fpeak
Rotated profile
profile bar
Contribution plot
Percentage pie
Clear
Concentration
Species
SO4 NO3 Cl NH4 EC OC Al As Ba Br Ca Cu Fe K Mn Pb Db Se Si Sn Ti Zn
Profile(Base run) - Factor1
Profile(Base run) - Factor2
Profile(Base run) - Factor3
Profile(Base run) - Factor4

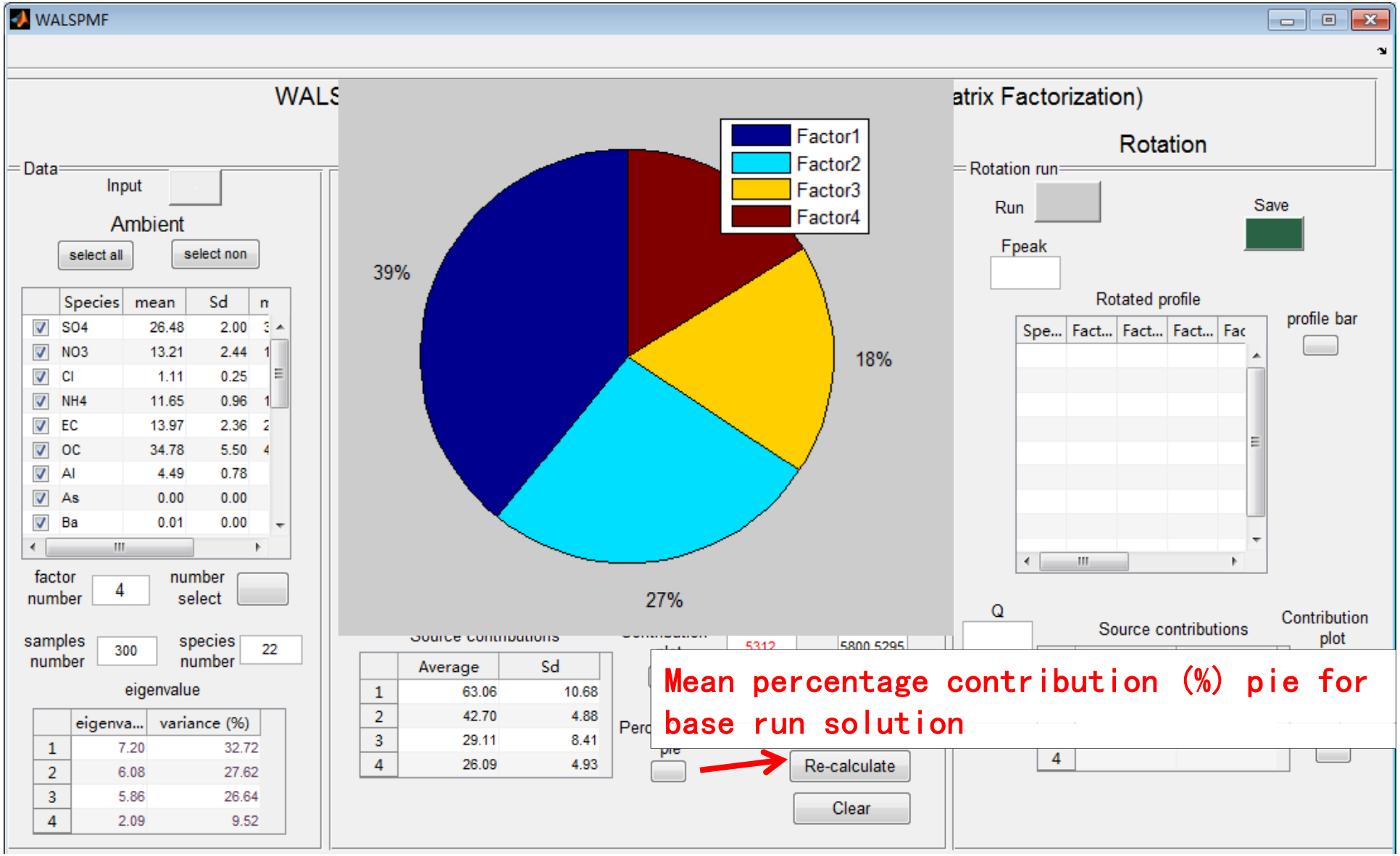
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd n
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
convergence
Yes
Save
profile bar
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
OC 1.00 -0.02 0.04
Al 0.06 0.09 0.99
As 0.76 0.22 0.57
soure profile
Spe... Fact... Fact... Fact...
SO4 1.38 6.28 0.27
NO3 0.05 0.00 0.41
0.27 0.15
1.90 0.00
EC 15.83 0.00 0.00
OC 36.86 0.34 1.38
Al 0.50 0.43 4.07
As 0.00 0.00 0.00
Source contribution (ug/m3)
Source contributions
Average Sd
1 63.06 10.68
2 42.70 4.88
3 29.11 8.41
4 26.09 4.93
Contribution plot
Percentage pie
Theory Q
5312
Q
5800.5295
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
Rotated profile
Spe... Fact... Fact... Fact... Fac
profile bar
Q
Source contributions
Average Sd
1
2
3
4
Contribution plot
Percentage pie

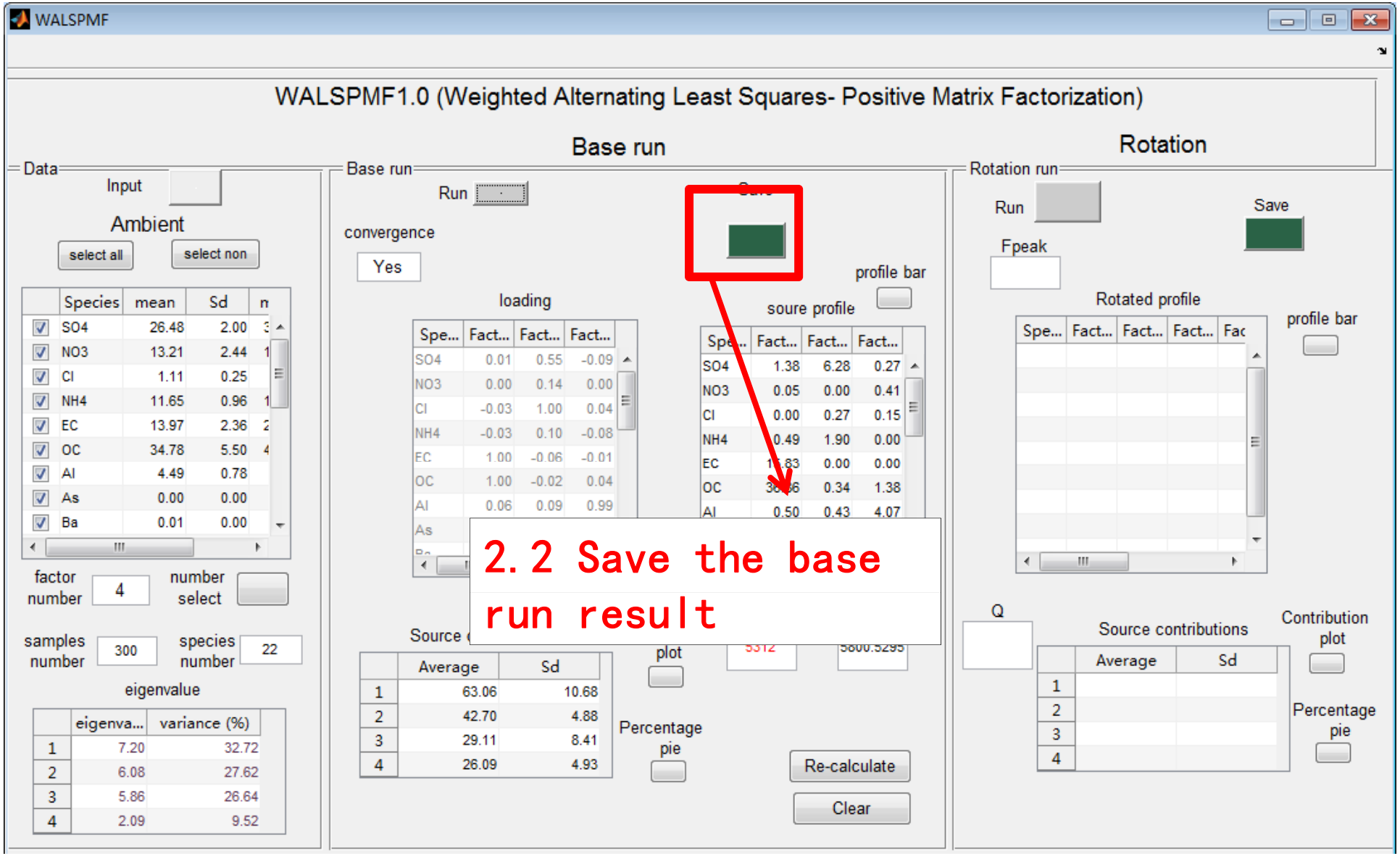
WALSPMF 1.0


WALSPMF
Concentration
Sample
Contribution(Base run) - Factor1
Contribution(Base run) - Factor2
Contribution(Base run) - Factor3
Contribution(Base run) - Factor4
Data
Species
SO4
NO3
Cl
NH4
EC
OC
Al
As
Ba
factor number
samples number
300
species number
22
eigenvalue
eigenva...
variance (%)
7.20
32.72
6.08
27.62
5.86
26.64
2.09
9.52
Average
Sd
63.06
10.68
plot
5312
5800.5295
Save
profile bar
Contribution plot
Percentage pie
Daily contribution plot
for base run solution

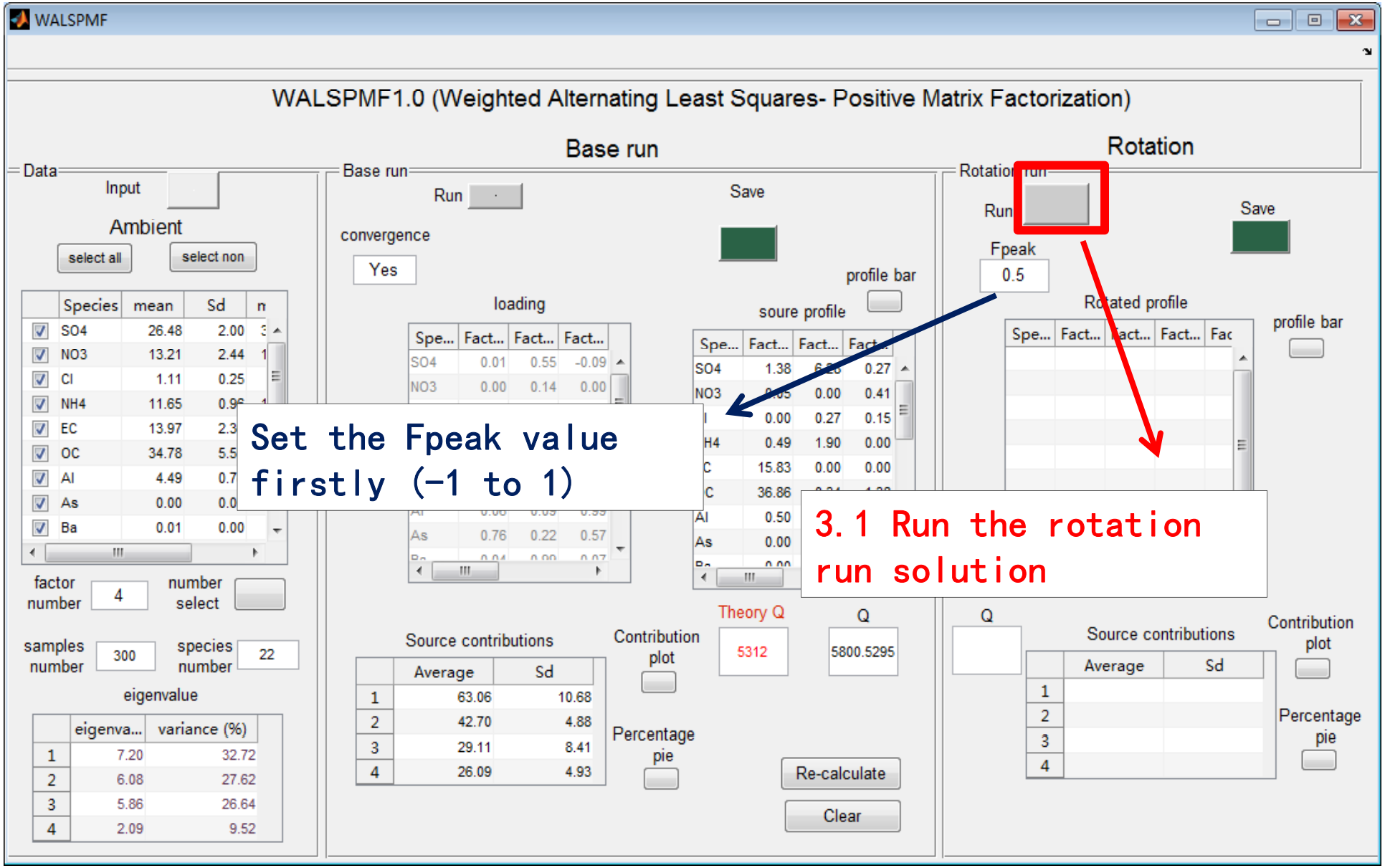
WALSPMF 1.0


WALSPMF
atrix Factorization)
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd n
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Factor1
Factor2
Factor3
Factor4
39%
18%
27%
Average Sd
1 63.06 10.68
2 42.70 4.88
3 29.11 8.41
4 26.09 4.93
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
Rotated profile
Spe... Fact... Fact... Fact... Fac
profile bar
Q
Source contributions
Contribution plot
4
Mean percentage contribution (%) pie for base run solution

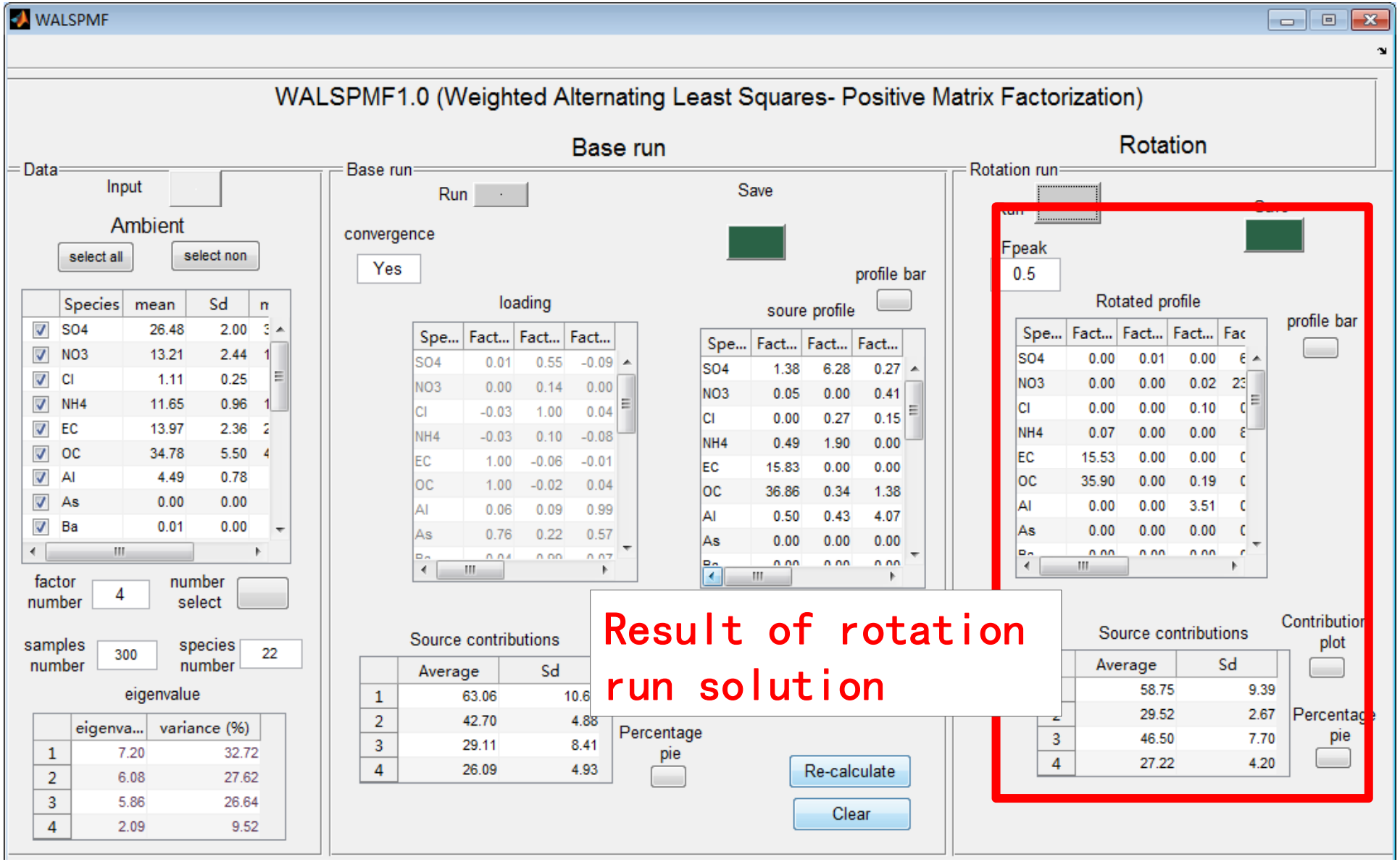
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd n
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
convergence
Yes
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
Cl -0.03 1.00 0.04
NH4 -0.03 0.10 -0.08
EC 1.00 -0.06 -0.01
OC 1.00 -0.02 0.04
Al 0.06 0.09 0.99
As
Save
soure profile
profile bar
Spe... Fact... Fact... Fact...
SO4 1.38 6.28 0.27
NO3 0.05 0.00 0.41
Cl 0.00 0.27 0.15
NH4 0.49 1.90 0.00
EC 0.00 0.00
OC 0.34 1.38
Al 0.50 0.43 4.07
2.2 Save the base run result
Source
Average Sd
1 63.06 10.68
2 42.70 4.88
3 29.11 8.41
4 26.09 4.93
plot
Percentage pie
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
Rotated profile
profile bar
Spe... Fact... Fact... Fact... Fac
Q
Source contributions
Average Sd
1
2
3
4
Contribution plot
Percentage pie

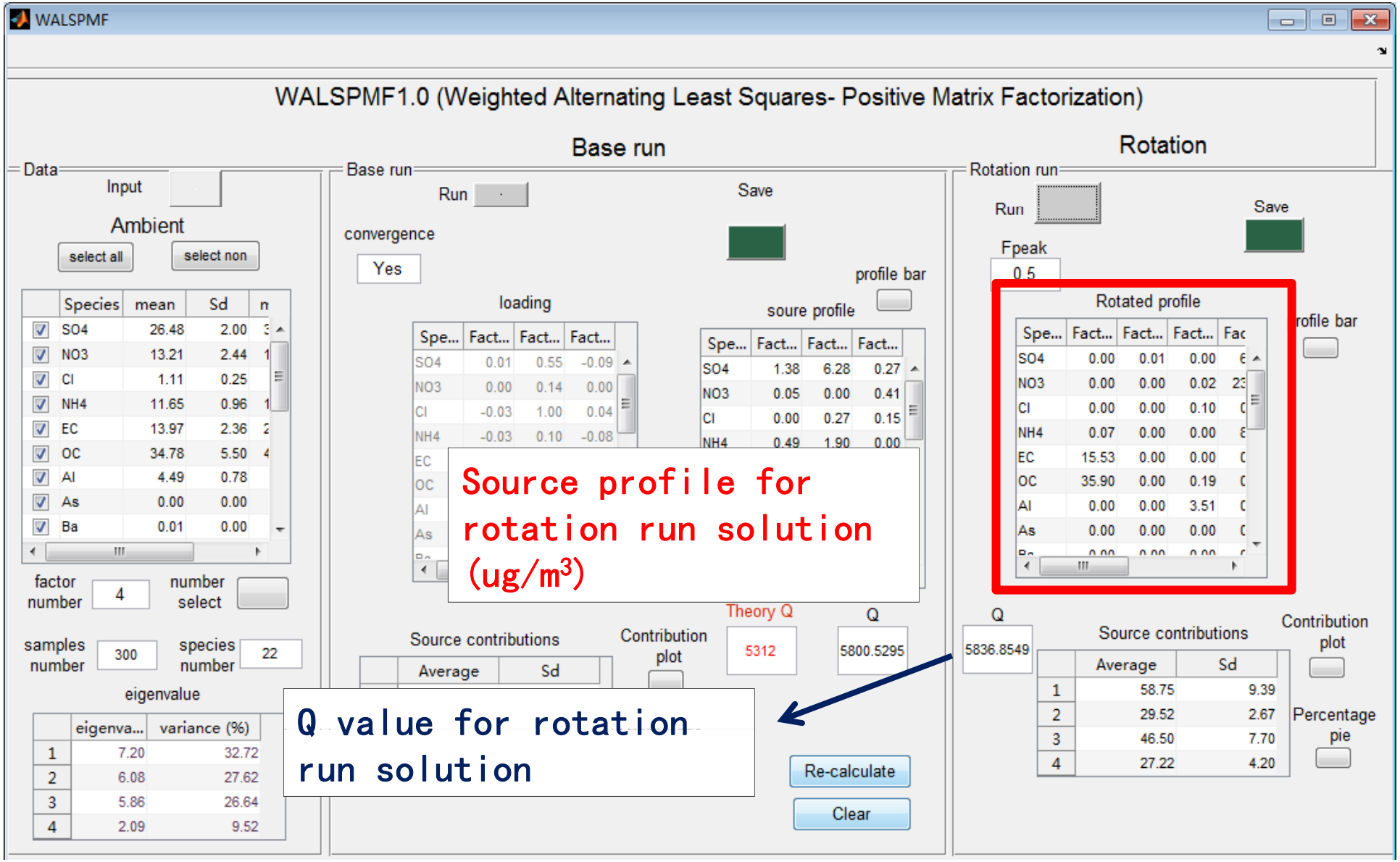
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65
EC 13.97
OC 34.78
Al 4.49
As 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
convergence
Yes
Save
profile bar
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
As 0.76 0.22 0.57
soure profile
SO4 1.38 0.27
NO3 0.00 0.41
0.00 0.27 0.15
H4 0.49 1.90 0.00
C 15.83 0.00 0.00
C 36.86
Al 0.50
As 0.00
Source contributions
Average Sd
1 63.06 10.68
2 42.70 4.88
3 29.11 8.41
4 26.09 4.93
Contribution plot
Percentage pie
Theory Q
5312
Q
5800.5295
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
0.5
Rotated profile
profile bar
Q
Source contributions
Average Sd
1
2
3
4
Contribution plot
Percentage pie
Set the Fpeak value firstly (-1 to 1)
3.1 Run the rotation run solution

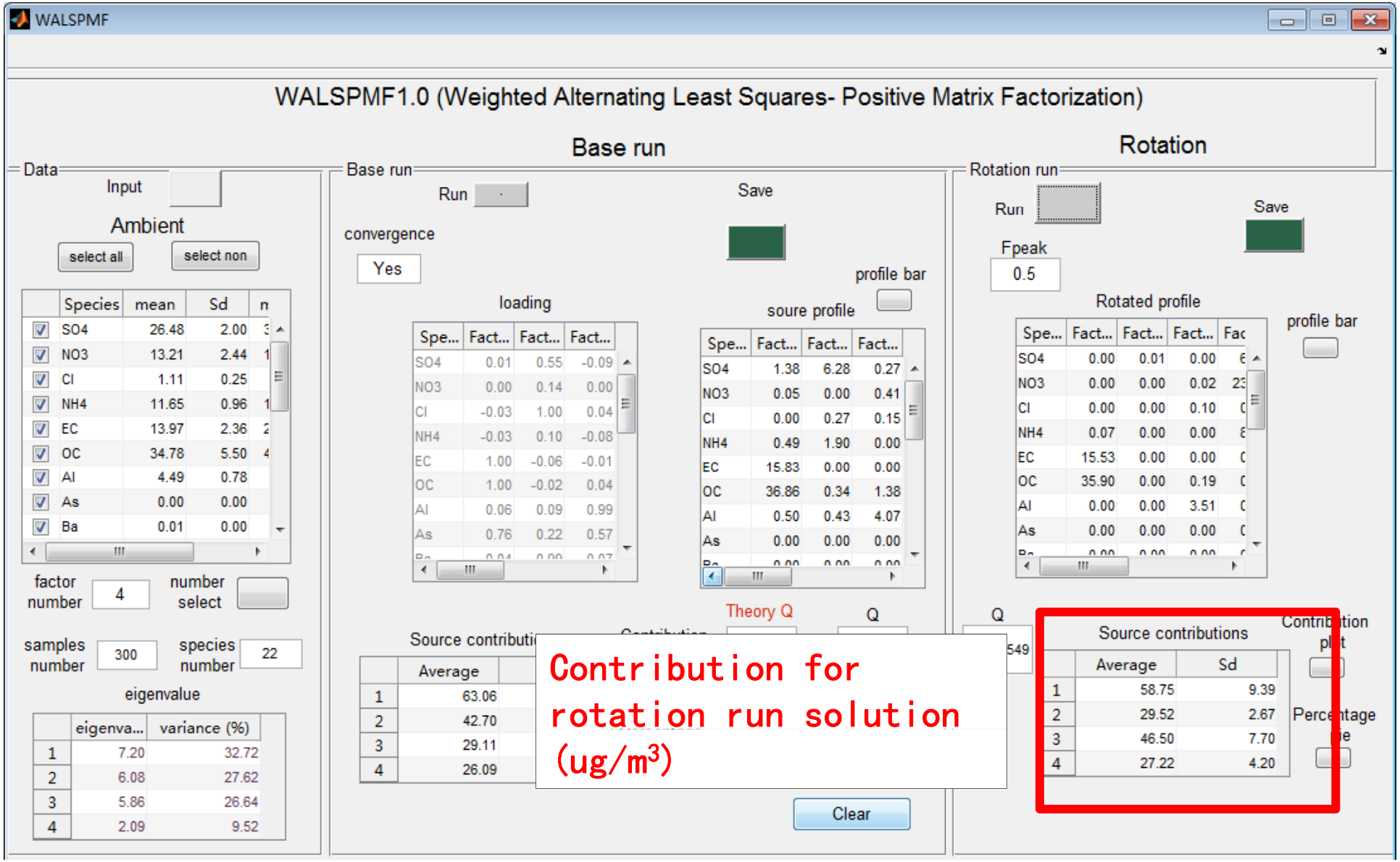
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
convergence
Yes
Save
profile bar
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
Cl -0.03 1.00 0.04
NH4 -0.03 0.10 -0.08
EC 1.00 -0.06 -0.01
OC 1.00 -0.02 0.04
Al 0.06 0.09 0.99
As 0.76 0.22 0.57
soure profile
Spe... Fact... Fact... Fact...
SO4 1.38 6.28 0.27
NO3 0.05 0.00 0.41
Cl 0.00 0.27 0.15
NH4 0.49 1.90 0.00
EC 15.83 0.00 0.00
OC 36.86 0.34 1.38
Al 0.50 0.43 4.07
As 0.00 0.00 0.00
Source contributions
Average Sd
1 63.06 10.6
2 42.70 4.88
3 29.11 8.41
4 26.09 4.93
Percentage pie
Re-calculate
Clear
Result of rotation run solution
Rotation run
Fpeak
0.5
Rotated profile
Spe... Fact... Fact... Fact... Fac
SO4 0.00 0.01 0.00
NO3 0.00 0.00 0.02
Cl 0.00 0.00 0.10
NH4 0.07 0.00 0.00
EC 15.53 0.00 0.00
OC 35.90 0.00 0.19
Al 0.00 0.00 3.51
As 0.00 0.00 0.00
profile bar
Source contributions
Average Sd
58.75 9.39
29.52 2.67
3 46.50 7.70
4 27.22 4.20
Contribution plot
Percentage pie

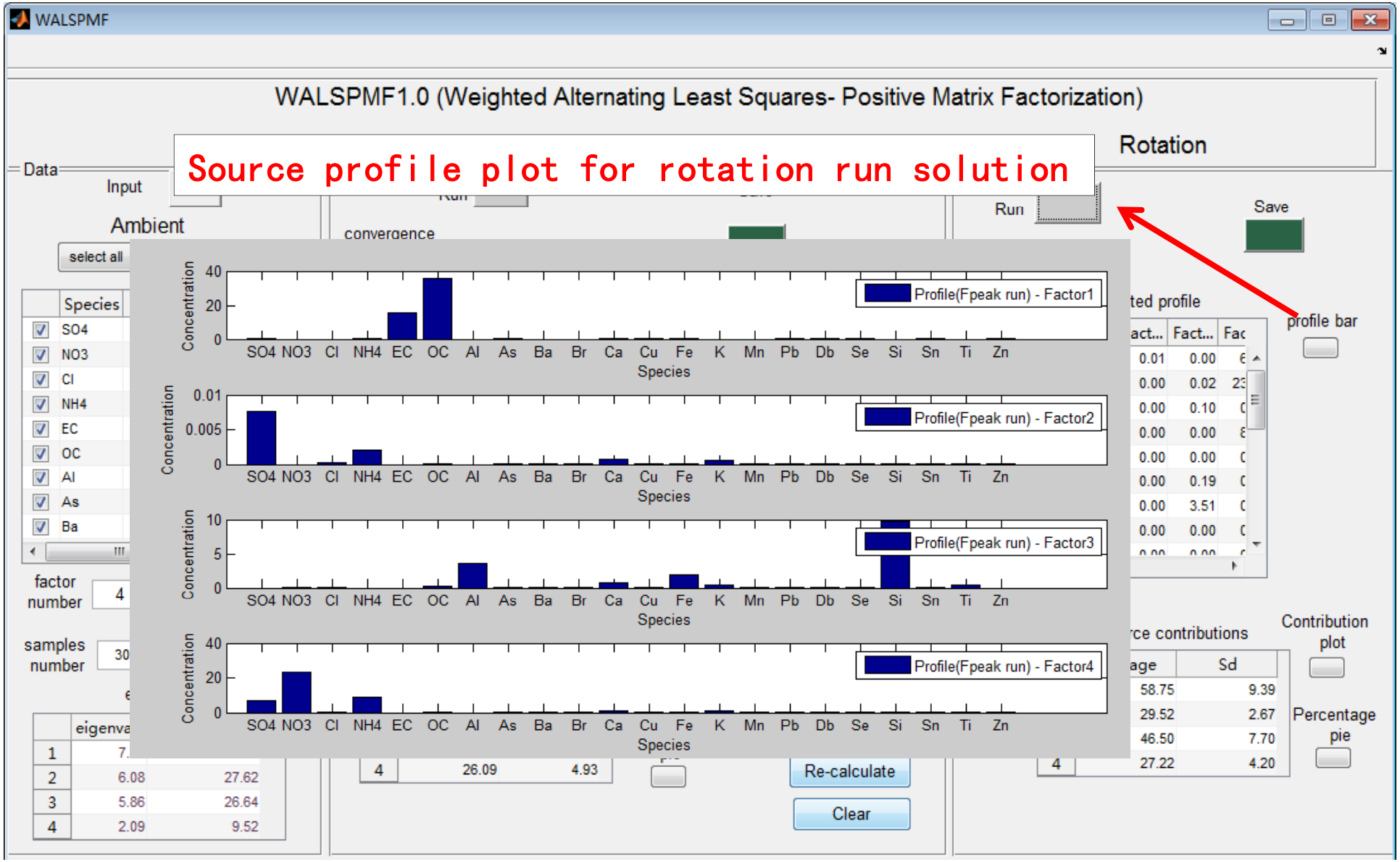
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
Save
convergence
Yes
profile bar
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
Cl -0.03 1.00 0.04
NH4 -0.03 0.10 -0.08
soure profile
Spe... Fact... Fact... Fact...
SO4 1.38 6.28 0.27
NO3 0.05 0.00 0.41
Cl 0.00 0.27 0.15
Source profile for rotation run solution (ug/m3)
Source contributions
Average Sd
Contribution plot
Theory Q
5312
Q
5800.5295
Q value for rotation run solution
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
0.5
Rotated profile
Spe... Fact... Fact... Fact...
SO4 0.00 0.01 0.00
NO3 0.00 0.00 0.02
Cl 0.00 0.00 0.10
NH4 0.07 0.00 0.00
EC 15.53 0.00 0.00
OC 35.90 0.00 0.19
Al 0.00 0.00 3.51
As 0.00 0.00 0.00
profile bar
Q
5836.8549
Source contributions
Average Sd
1 58.75 9.39
2 29.52 2.67
3 46.50 7.70
4 27.22 4.20
Contribution plot
Percentage pie

WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
convergence
Yes
Save
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
Cl -0.03 1.00 0.04
NH4 -0.03 0.10 -0.08
EC 1.00 -0.06 -0.01
OC 1.00 -0.02 0.04
Al 0.06 0.09 0.99
As 0.76 0.22 0.57
soure profile
profile bar
Spe... Fact... Fact... Fact...
SO4 1.38 6.28 0.27
NO3 0.05 0.00 0.41
Cl 0.00 0.27 0.15
NH4 0.49 1.90 0.00
EC 15.83 0.00 0.00
OC 36.86 0.34 1.38
Al 0.50 0.43 4.07
As 0.00 0.00 0.00
Theory Q
Q
Source contributi
Average
1 63.06
2 42.70
3 29.11
4 26.09
Clear
Rotation run
Run
Save
Fpeak
0.5
Rotated profile
profile bar
Spe... Fact... Fact... Fact...
SO4 0.00 0.01 0.00
NO3 0.00 0.00 0.02
Cl 0.00 0.00 0.10
NH4 0.07 0.00 0.00
EC 15.53 0.00 0.00
OC 35.90 0.00 0.19
Al 0.00 0.00 3.51
As 0.00 0.00 0.00
Q
Source contributions
Contribution plot
Average Sd
1 58.75 9.39
2 29.52 2.67
3 46.50 7.70
4 27.22 4.20
Percentage
Contribution for rotation run solution (ug/m3)

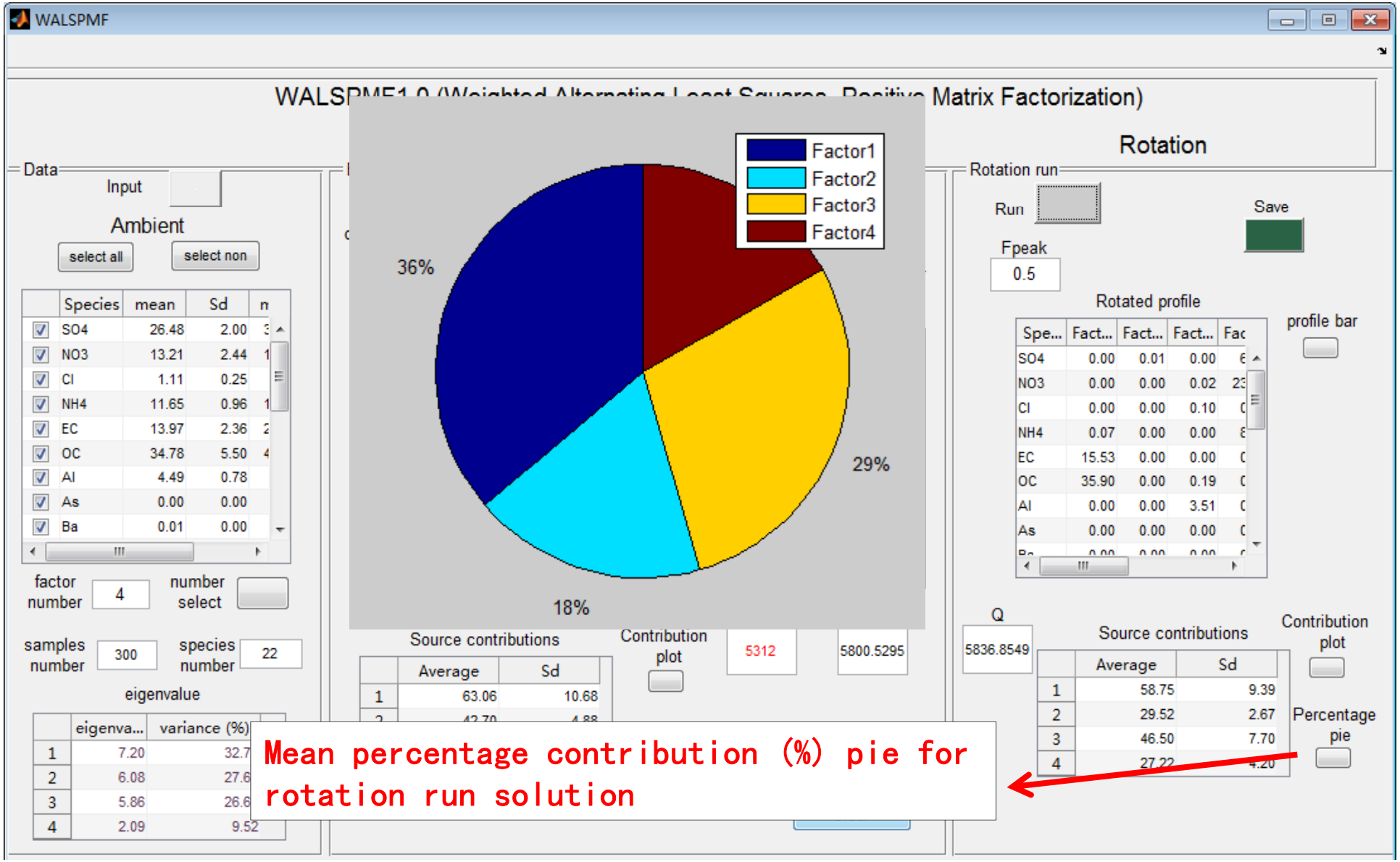
WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Source profile plot for rotation run solution
Data
Input
Ambient
select all
Species
SO4
NO3
Cl
NH4
EC
OC
Al
As
Ba
factor number
4
samples number
30
eigenva
1 7.
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
convergence
Run
Rotation
Save
profile bar
ted profile
act... Fact... Fac
0.01 0.00
0.00 0.02
0.00 0.10
0.00 0.00
0.00 0.00
0.00 0.19
0.00 3.51
0.00 0.00
Contribution plot
Percentage pie
ce contributions
age Sd
58.75 9.39
29.52 2.67
46.50 7.70
4 27.22 4.20
4 26.09 4.93
Re-calculate
Clear
Concentration
Species
SO4 NO3 Cl NH4 EC OC Al As Ba Br Ca Cu Fe K Mn Pb Db Se Si Sn Ti Zn
Profile(Fpeak run) - Factor1
Profile(Fpeak run) - Factor2
Profile(Fpeak run) - Factor3
Profile(Fpeak run) - Factor4

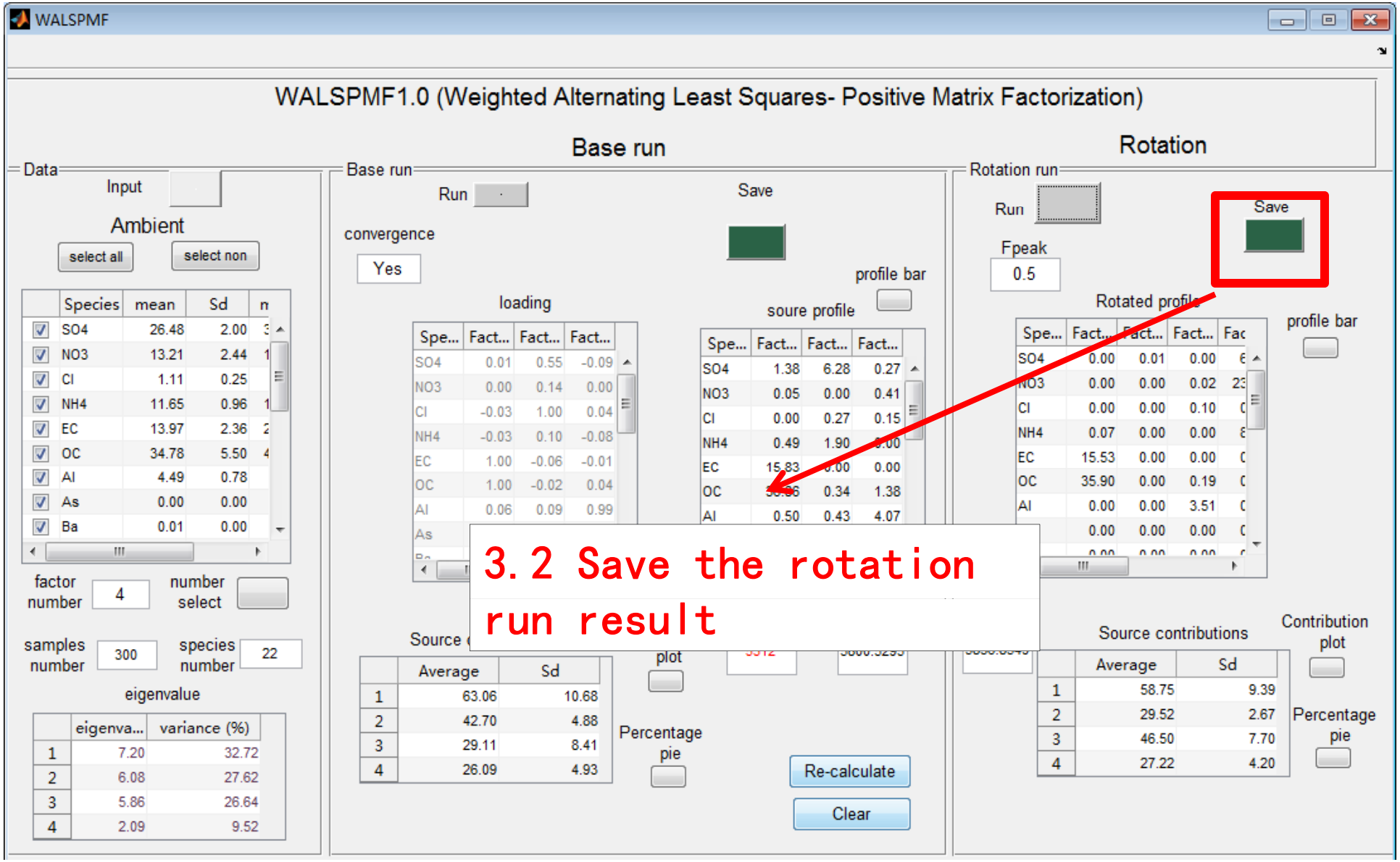
WALSPMF 1.0

WALSPMF
Concentration
Sample
Contribution (Fpeak run) - Factor1
Contribution (Fpeak run) - Factor2
Contribution (Fpeak run) - Factor3
Contribution (Fpeak run) - Factor4
Save
profile bar
samples number
300
species number
22
eigenvalue
eigenva...
variance (%)
7.20
32.72
6.08
27.62
5.86
26.64
2.09
9.52
Source contributions
Average
Sd
63.06
10.68
Contribution plot
Theory Q
5312
Q
5800.5295
Q
5836.8549
Source contributions
Average
Sd
58.75
9.39
29.52
2.67
46.50
7.70
27.22
4.20
Contribution plot
Percentage pie
Daily contribution plot
for rotation run solution

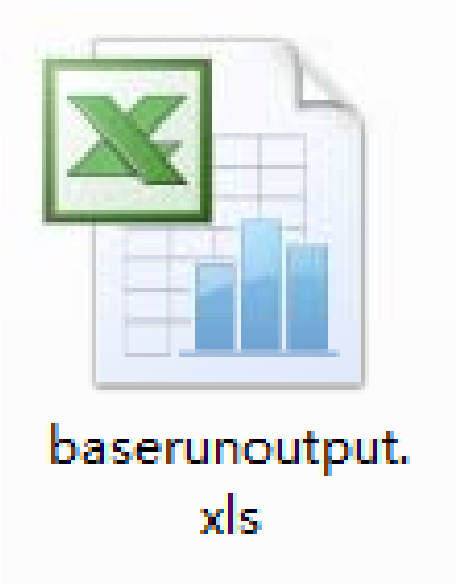
WALSPMF 1.0

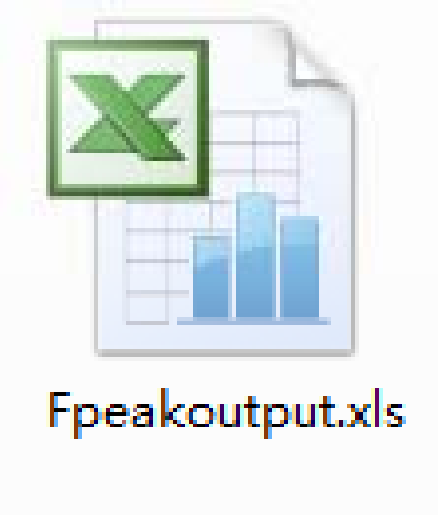

WALSPMF
Matrix Factorization)
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.7
2 6.08 27.6
3 5.86 26.6
4 2.09 9.52
Factor1
Factor2
Factor3
Factor4
36%
29%
18%
Source contributions
Average Sd
1 63.06 10.68
Contribution plot
5312
5800.5295
Rotation run
Run
Save
Fpeak
0.5
Rotated profile
Spe... Fact... Fact... Fact... Fac
SO4 0.00 0.01 0.00
NO3 0.00 0.00 0.02
Cl 0.00 0.00 0.10
NH4 0.07 0.00 0.00
EC 15.53 0.00 0.00
OC 35.90 0.00 0.19
Al 0.00 0.00 3.51
As 0.00 0.00 0.00
profile bar
Q
5836.8549
Source contributions
Average Sd
1 58.75 9.39
2 29.52 2.67
3 46.50 7.70
4 27.22 4.20
Contribution plot
Percentage pie
Mean percentage contribution (%) pie for rotation run solution

WALSPMF 1.0


WALSPMF
WALSPMF1.0 (Weighted Alternating Least Squares- Positive Matrix Factorization)
Base run
Rotation
Data
Input
Ambient
select all
select non
Species mean Sd
SO4 26.48 2.00
NO3 13.21 2.44
Cl 1.11 0.25
NH4 11.65 0.96
EC 13.97 2.36
OC 34.78 5.50
Al 4.49 0.78
As 0.00 0.00
Ba 0.01 0.00
factor number 4
number select
samples number 300
species number 22
eigenvalue
eigenva... variance (%)
1 7.20 32.72
2 6.08 27.62
3 5.86 26.64
4 2.09 9.52
Base run
Run
convergence
Yes
Save
profile bar
loading
Spe... Fact... Fact... Fact...
SO4 0.01 0.55 -0.09
NO3 0.00 0.14 0.00
Cl -0.03 1.00 0.04
NH4 -0.03 0.10 -0.08
EC 1.00 -0.06 -0.01
OC 1.00 -0.02 0.04
Al 0.06 0.09 0.99
As
soure profile
Spe... Fact... Fact... Fact...
SO4 1.38 6.28 0.27
NO3 0.05 0.00 0.41
Cl 0.00 0.27 0.15
NH4 0.49 1.90
EC 0.00 0.00
OC 0.34 1.38
Al 0.50 0.43 4.07
Source
Average Sd
1 63.06 10.68
2 42.70 4.88
3 29.11 8.41
4 26.09 4.93
plot
Percentage pie
Re-calculate
Clear
Rotation run
Run
Save
Fpeak
0.5
Rotated profile
profile bar
Spe... Fact... Fact... Fact... Fac
SO4 0.00 0.01 0.00
NO3 0.00 0.00 0.02
Cl 0.00 0.00 0.10
NH4 0.07 0.00 0.00
EC 15.53 0.00 0.00
OC 35.90 0.00 0.19
Al 0.00 0.00 3.51
0.00 0.00 0.00
Source contributions
Average Sd
1 58.75 9.39
2 29.52 2.67
3 46.50 7.70
4 27.22 4.20
Contribution plot
Percentage pie
3.2 Save the rotation run result

WALSPMF 1.0





Output files for base run and rotation run solutions

User can change the names of the output files

WALSPMF 1.0

- Result (Base Run)

1	SO4	1.37977	6.279031	0.274696	10.88836
2	NO3	0.052566	0	0.406609	23.54702
3	Cl	0	0.272607	0.150419	0.611322
4	NH4	0.494203	1.903178	0	9.899109
5	EC	15.83214	0	0	0
6	OC	36.85931	0.341826	1.377232	0.467558
7	Al	0.497589	0.427227	4.06871	0
8	As	0.000712	0.000139	0.000429	0.000472
9	Ba	0	0.001616	0.00109	0.003822
10	Br	0	0.004267	0.002275	0.009835
11	Ca	0.434336	0.728776	1.048571	1.471502
12	Cu	0.027746	0.001814	0.012615	0.0014
13	Fe	0.996662	0.26031	2.268301	0.05015
14	K	0	0.476594	0.588653	0.986783
15	Mn	0.010936	0.010332	0.069827	0.007304
16	Pb	0.039401	0.002395	0.004498	0.00482
17	Db	0.000712	0.000139	0.000429	0.000472
18	Se	0.000487	0.000479	0.000582	0.001245
19	Si	1.818164	1.241074	11.40541	0.08979
20	Sn	0.000487	0.000479	0.000582	0.001245
21	Ti	0.044694	0.046544	0.429066	0.003275
22	Zn	0.603862	0.010661	0	0.025789
23					
24					
25					
26					
27					

Sheet1 / Sheet2 / Sheet3 / F_profile / G_matrix / Contribution / Mean Contribution / Q value

Output information:

F_profile: source profile

G_matrix: normarlized source contribution

Source contribution

Mean contribution

Q value

WALSPMF 1.0

- Result (Base Run)

1	0.823645	3.239551	0.894801	0.423427
2	0.867549	3.148912	0.519835	0.594412
3	0.970551	2.979411	0.754629	0.726336
4	0.968095	3.689452	0.401344	0.517599
5	0.963948	3.345307	0.765251	0.40733
6	0.805126	3.079103	0.928384	0.577796
7	0.916688	2.874177	0.942883	0.510298
8	0.911361	2.518885	0.666239	0.642813
9	0.931983	3.493461	0.54365	0.4566
10	0.941361	2.579209	0.954687	0.456244
11	1.048108	2.580145	0.333908	0.417797
12	0.87279	3.429446	0.731872	0.674896
13	0.910738	2.926053	0.447751	0.541883
14	0.862274	2.508452	0.735782	0.823623
15	0.742024	2.848123	0.626065	0.577154
16	1.071469	3.715724	0.294873	0.523663
17	0.860578	3.329625	0.865363	0.612017
18	0.678788	2.55787	0.486291	0.585753
19	0.931695	3.298957	0.365912	0.452699
20	0.810113	2.835417	1.017562	0.49524
21	0.607703	2.998487	0.847855	0.553862
22	0.822115	2.622321	0.58649	0.610607
23	1.004482	2.823143	0.61289	0.67248
24	1.067061	3.092719	0.796366	0.63772
25	0.87905	3.087398	0.849146	0.610672
26	0.942924	2.714029	0.558786	0.57652
27	0.953036	2.825586	0.611323	0.5378[illegible]5
28	0.661418	3.777081	0.867938	0.5057[illegible]8

Sheet1 | Sheet2 | Sheet3 | F_profil | G_matrix | Contribution | Mean_Contribution | Q_value

Output information:

F_profile: source profile

G_matrix: normarlized source contribution

Source contribution

Mean contribution

Q value

WALSPMF 1.0

- Result (Base Run)

1	58.81102	45.44126	38.54186	20.17861
2	61.94588	44.16985	22.3909	28.32698
3	69.30063	41.79226	32.50421	34.61389
4	69.12527	51.75202	17.28715	24.66642
5	68.8291	46.92469	32.96175	19.41149
6	57.48871	43.19065	39.98837	27.53512
7	65.45457	40.31615	40.61289	24.31846
8	65.07424	35.33245	28.69698	30.63356
9	66.54668	49.00285	23.41671	21.75948
10	67.21632	36.17862	41.12133	21.74252
11	74.83842	36.19175	14.38247	19.91029
12	62.32015	48.10491	31.52401	32.16247
13	65.02973	41.04381	19.28603	25.82366
14	61.56924	35.18611	31.69242	39.25013
15	52.98299	39.95068	26.96655	27.50452
16	76.50648	52.12054	12.70108	24.95538
17	61.44813	46.70472	37.27387	29.16592
18	48.46773	35.87929	20.94607	27.91432
19	66.52613	46.27454	15.76097	21.57356
20	57.84479	39.77246	43.82955	23.6009
21	43.39202	42.05984	36.51976	26.39454
22	58.70174	36.78335	25.26194	29.09875
23	71.72342	39.60029	26.39907	32.04734
24	76.19177	43.38163	34.30195	30.39084
25	62.76714	43.30699	36.57537	29.10183
26	67.32793	38.06974	24.06867	27.47434
27	68.04996	39.63456	26.33159	25.63362
28	47.22744	52.98119	37.38481	24.10354

Sheet1 Sheet2 Sheet3 F_profile G_matrix Contribution Mean_Contribution Q_value

Output information:

F_profile: source profile

G_matrix: normarlized source contribution

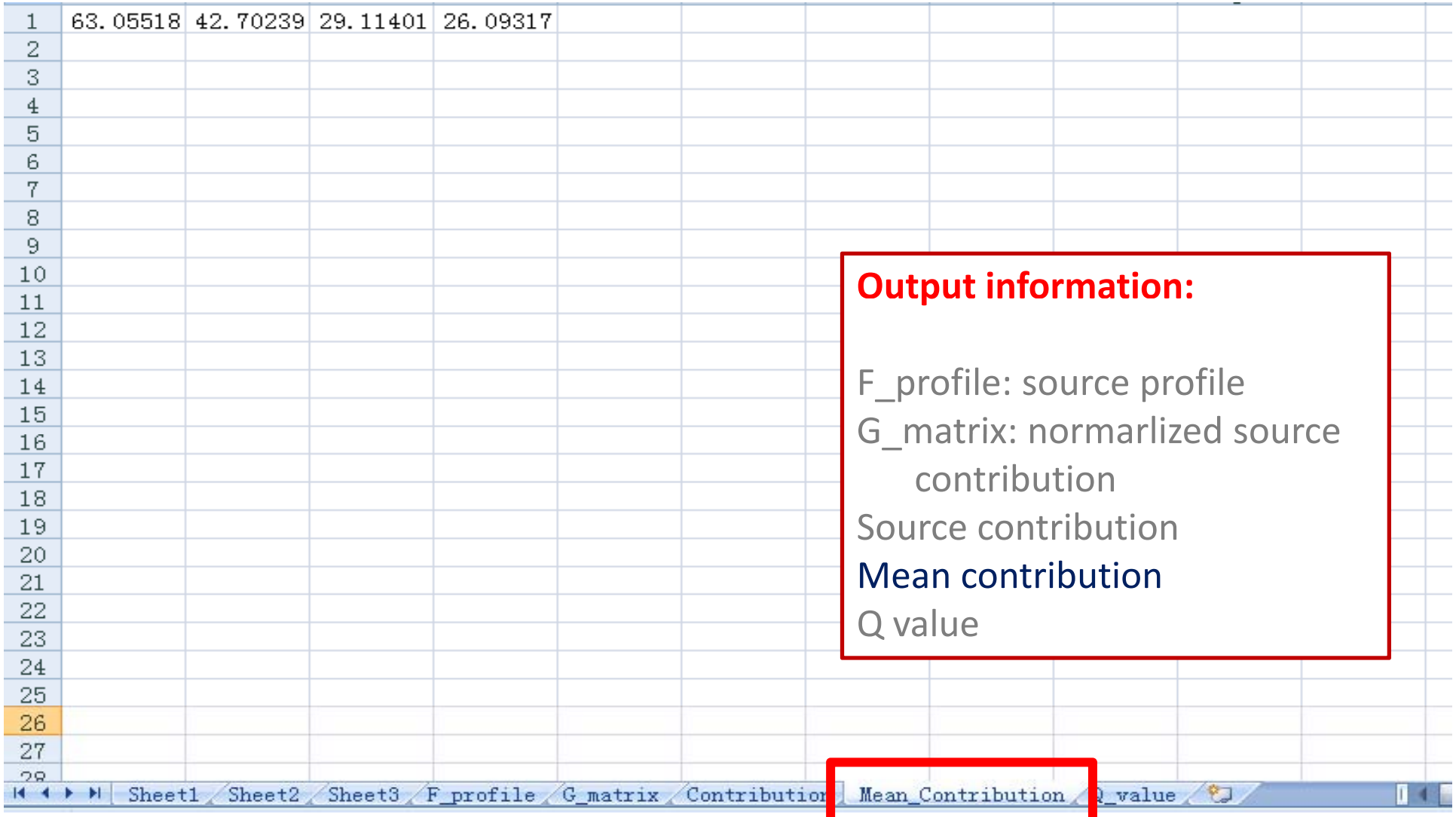
Source contribution

Mean contribution

Q value

WALSPMF 1.0

- Result (Base Run)

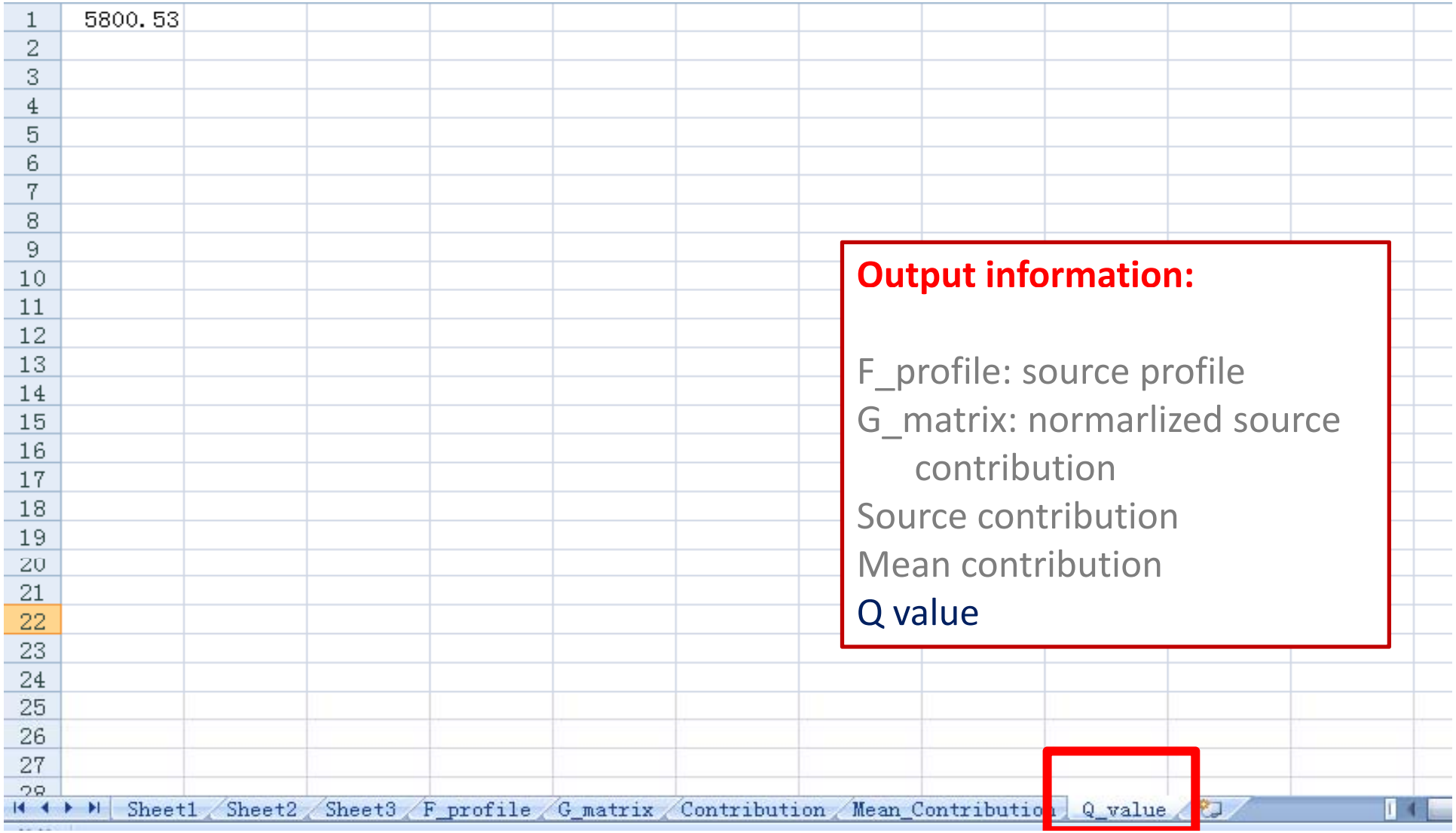


Output information:

F_profile: source profile
G_matrix: normarlized source contribution
Source contribution
Mean contribution
Q value

WALSPMF 1.0

- Result (Base Run)



Output information:

F_profile: source profile
G_matrix: normarlized source contribution
Source contribution
Mean contribution
Q value

WALSPMF 1.0

- Result (Rotation Run)

1	SO4	3.65E-14	0.007617	0	6.921614
2	NO3	0	0	0.023174	23.32303
3	Cl	0	0.000321	0.097522	0.435105
4	NH4	0.068647	0.002089	0	8.642668
5	EC	15.52962	0	0	0
6	OC	35.89983	3.91E-05	0.186458	0.052856
7	Al	0	0	3.507681	0
8	As	0.00061	9.91E-08	0.000345	0.000403
9	Ba	0	1.86E-06	0.000738	0.002787
10	Br	0	5.02E-06	0.001443	0.007068
11	Ca	0.150088	0.000766	0.806106	1.038169
12	Cu	0.025116	4.02E-07	0.010115	0.000812
13	Fe	0.612397	1.41E-05	1.933259	0.019326
14	K	0	0.000517	0.455684	0.700649
15	Mn	0	3.43E-06	0.059705	0.004906
16	Pb	0.037589	2.16E-06	0.002575	0.003188
17	Db	0.00061	9.91E-08	0.000345	0.000403
18	Se	0.000309	5.05E-07	0.000435	0.000953
19	Si	0	3.94E-06	9.8152	0.005245
20	Sn	0.000309	5.05E-07	0.000435	0.000953
21	Ti	0	8.62E-08	0.369897	0.000372
22	Zn	0.590521	1.01E-05	0	0.013911
23					
24					
25					
26					
27					

Sheet1 Sheet2 Sheet3 F_profile G_matrix Contribution Mean_Contribution Q_value Fpeak

Output information:

F_profile: source profile

G_matrix: normarlized source contribution

Source contribution

Mean contribution

Q value

Fpeak value

WALSPMF 1.0

- Result (Rotation Run)

1	0.903938	2960.503	1.609047	0.546455
2	0.938041	2972.671	1.171549	0.713719
3	1.051375	2927.678	1.439435	0.848579
4	1.040738	3378.312	1.12653	0.649707
5	1.044324	3058.465	1.498498	0.53201
6	0.886274	2900.517	1.637116	0.70266
7	0.998903	2727.39	1.639815	0.627551
8	0.983115	2501.133	1.27618	0.749582
9	1.006034	3187.425	1.261205	0.583886
10	1.021665	2470.134	1.61895	0.564063
11	1.110805	2459.027	0.913865	0.514819
12	0.953318	3240.848	1.457745	0.808052
13	0.977559	2770.391	1.075226	0.654036
14	0.937133	2584.483	1.330568	0.932942
15	0.810124	2703.689	1.234156	0.688465
16	1.14378	3424.656	1.01274	0.653819
17	0.943619	3131.037	1.596496	0.74267
18	0.738398	2456.162	1.034685	0.688186
19	0.998379	3024.467	1.033437	0.572111
20	0.891555	2672.896	1.699784	0.611049
21	0.680451	2793.705	1.485304	0.671168
22	0.889568	2553.437	1.174006	0.71645
23	1.079696	2775.766	1.267088	0.787888
24	1.151677	2993.51	1.516483	0.76177
25	0.960295	2947.26	1.535745	0.73219
26	1.012784	2624.427	1.187062	0.686325
27	1.025475	2703.424	1.251821	0.64885
28	0.741933	3404.175	1.612101	0.64345

Sheet1 Sheet2 Sheet3 F_profile G_matrix Contribution Mean_Contribution Q_value Fpeak

Output information:

F_profile: source profile

G_matrix: normarlized source contribution

Source contribution

Mean contribution

Q value

Fpeak value

WALSPMF 1.0

- Result (Rotation Run)

1	55.45161	30.43002	55.77308	22.35769
2	57.54368	30.55509	40.60843	29.20114
3	64.49607	30.09261	49.89397	34.71884
4	63.84357	34.72454	39.04797	26.58215
5	64.06351	31.43693	51.94121	21.7667
6	54.36805	29.81343	56.74602	28.74868
7	61.27719	28.03392	56.83956	25.67566
8	60.3087	25.7083	44.23519	30.66845
9	61.71463	32.76247	43.71613	23.88916
10	62.67355	25.38967	56.11635	23.07813
11	68.1418	25.27551	31.67656	21.06333
12	58.48083	33.31159	50.52862	33.06069
13	59.96786	28.47591	37.26969	26.75928
14	57.48795	26.56503	46.12039	38.17044
15	49.69667	27.79031	42.77853	28.16789
16	70.1646	35.20088	35.10378	26.7504
17	57.88585	32.18287	55.33804	30.38564
18	45.29665	25.24606	35.86443	28.15651
19	61.24509	31.08747	35.82117	23.40738
20	54.692	27.4738	58.91821	25.00051
21	41.7419	28.71555	51.48387	27.46021
22	54.57008	26.24592	40.69361	29.31287
23	66.23343	28.53116	43.92002	32.23569
24	70.64903	30.76929	52.56461	31.16713
25	58.90884	30.2939	53.23227	29.95689
26	62.12873	26.9756	41.14615	28.08035
27	62.90725	27.78759	43.39086	26.54743
28	45.5135	34.99037	55.87895	26.32652

Sheet1 Sheet2 Sheet3 F_profile G_matrix Contribution Mean_Contribution Q_value Fpeak

Output information:

F_profile: source profile

G_matrix: normarlized source contribution

Source contribution

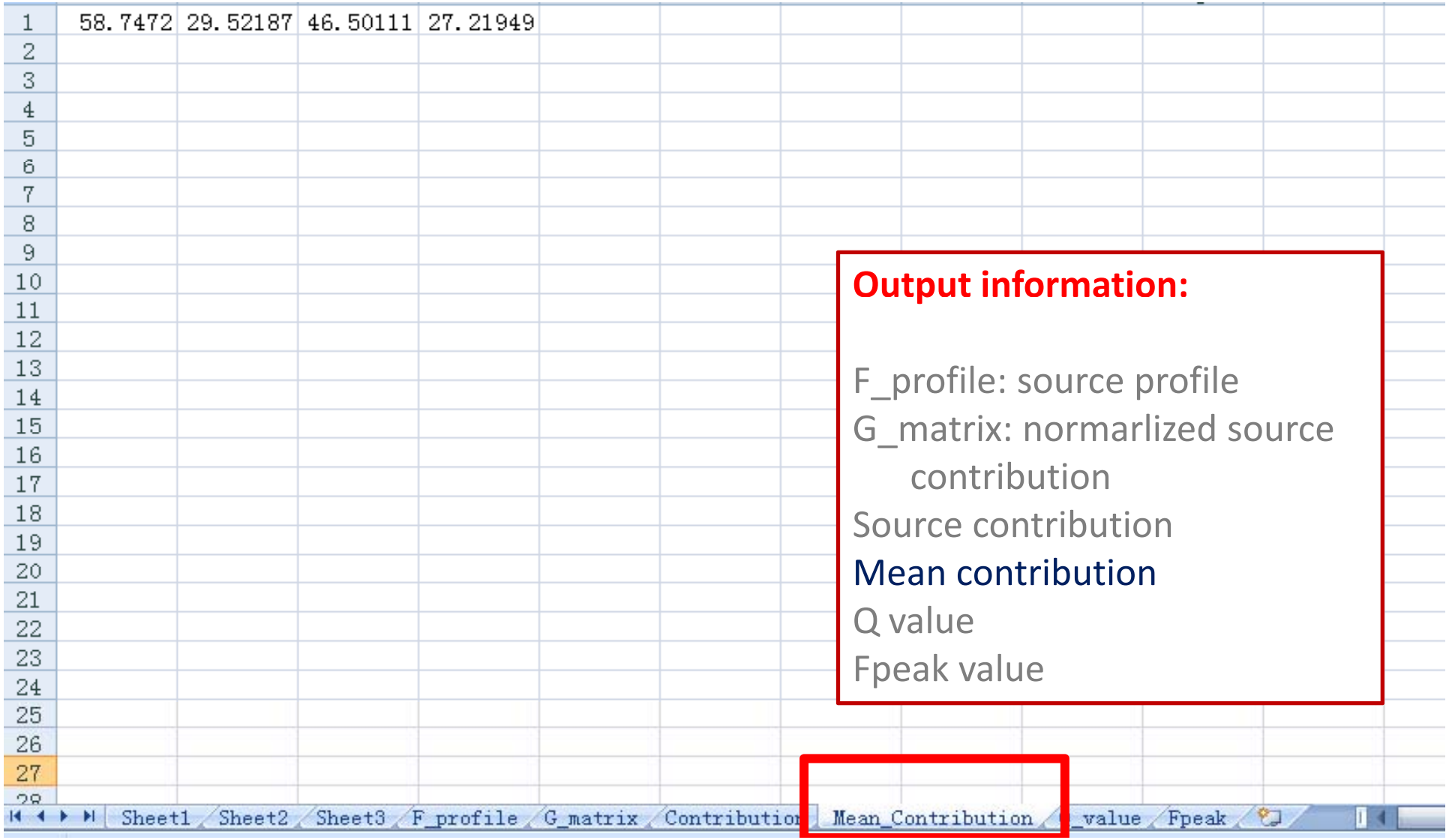
Mean contribution

Q value

Fpeak value

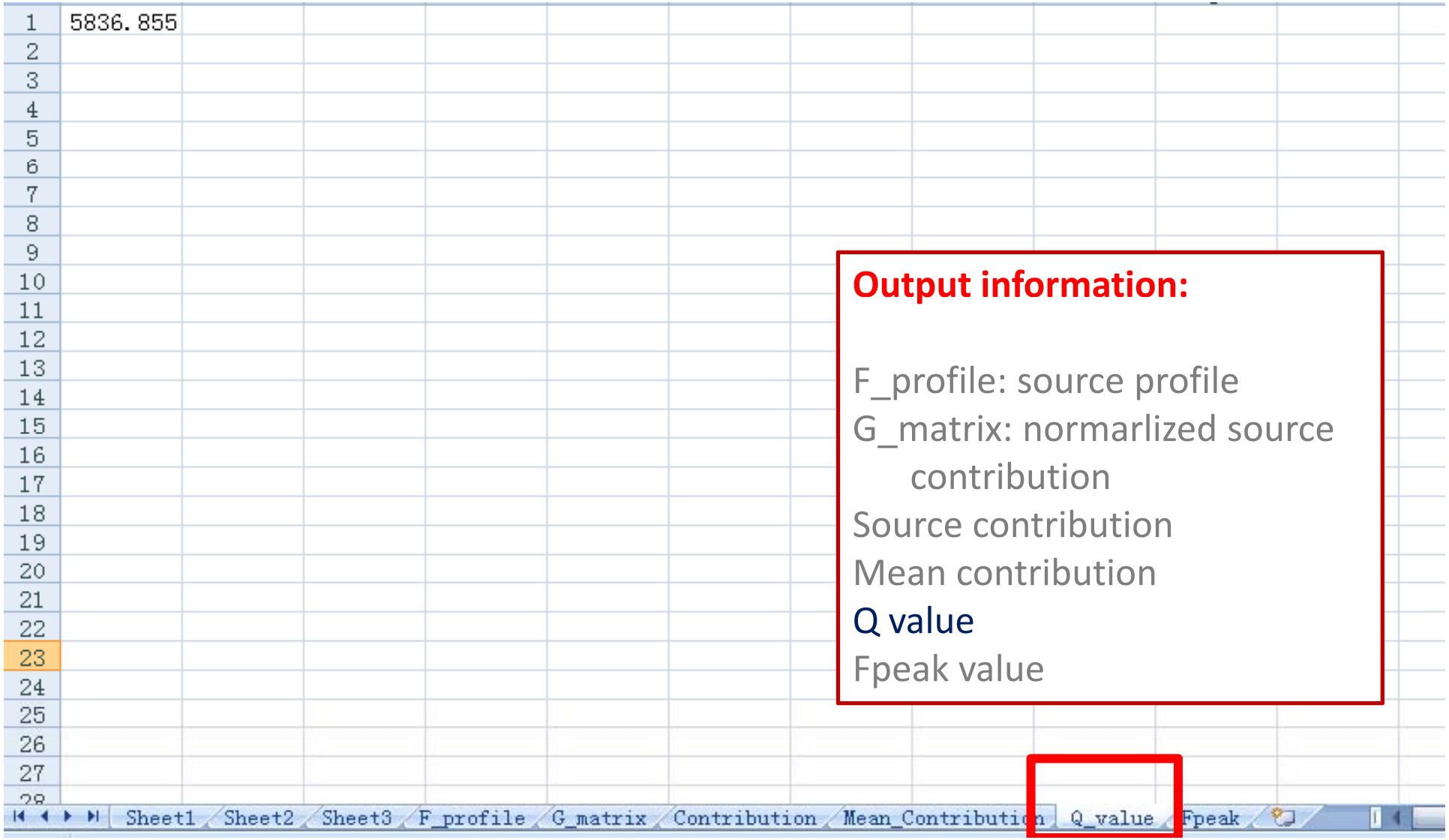
WALSPMF 1.0

- Result (Rotation Run)



WALSPMF 1.0

- Result (Rotation Run)

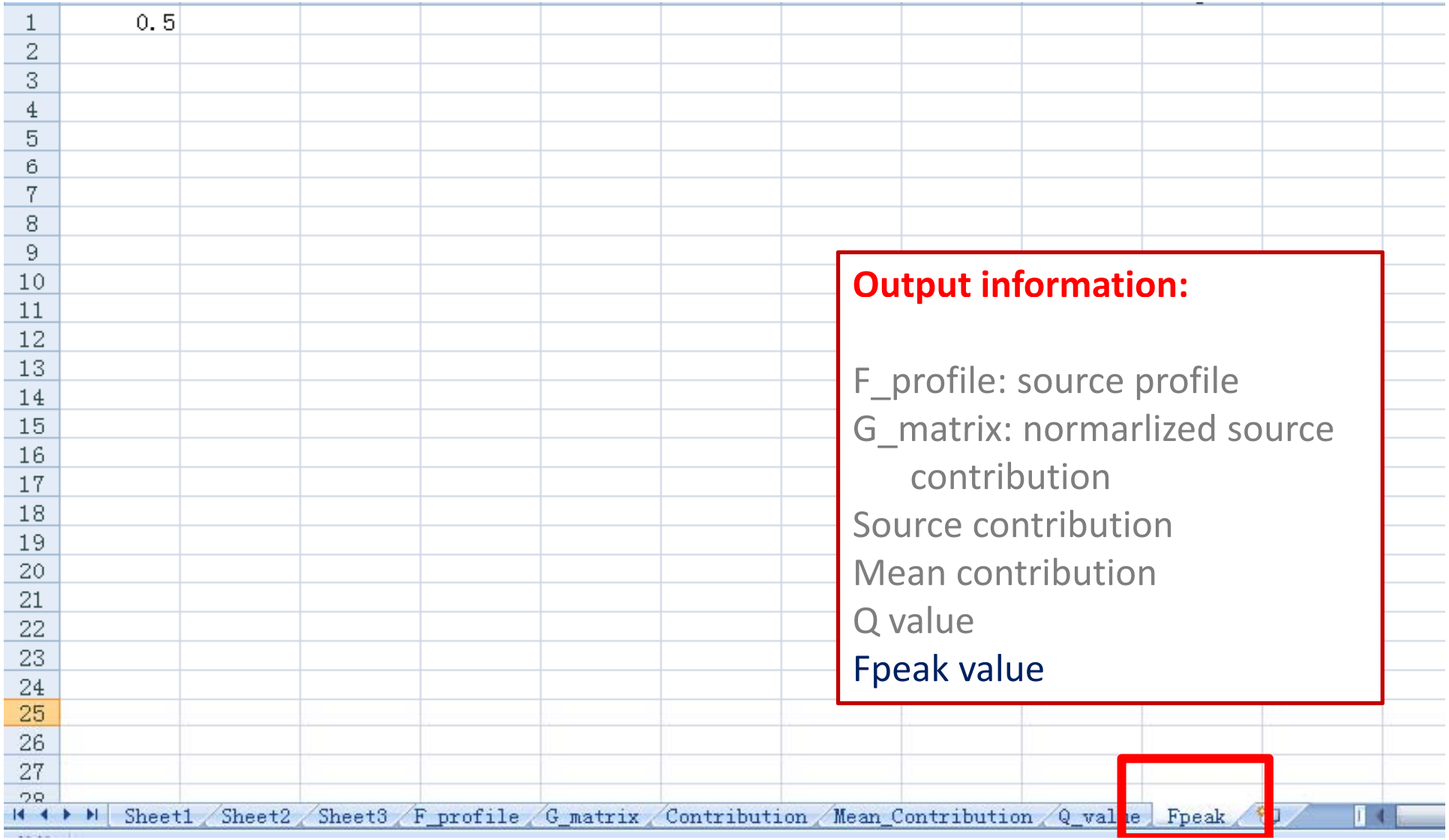


Output information:

F_profile: source profile
G_matrix: normarlized source contribution
Source contribution
Mean contribution
Q value
Fpeak value

WALSPMF 1.0

- Result (Rotation Run)



References

- Shi, G.L., Xu, J., Peng, X., Tian, Y.Z., Wang, W., Han, B., Zhang, Y.F., Feng, Y.C., Russell, A.G. Using a new WALSPMF model to quantify the source contributions to PM2.5 at a harbour site in China. Atmos. Environ. 2016, 126, 66-75.
- Shi, G.L., Zeng, F., Li, X., Feng, Y.C., Wang, Y.Q., Liu, G.X., Zhu, T. Estimated contributions and uncertainties of PCA/MLR-CMB results: Source apportionment for synthetic and ambient datasets. Atmos. Environ. 2011, 45, 2811–2819.
- Maier, M.L., Balachandran, S., Sarnat, S.E., Turner, J.R., Mulholland, J.A., Russell, A.G. Application of an Ensemble-Trained Source Apportionment Approach at a Site Impacted by Multiple Point Sources. Environ. Sci. Technol. 2013, 47, 3743−3751.
- Shi, G.L., Feng, Y.C., Zeng, F., Li, X., Zhang, Y.F., Wang, Y.Q., Zhu, T. Use of a Nonnegative Constrained Principal Component Regression Chemical Mass Balance Model to Study the Contributions of Nearly Collinear Sources Environ. Sci. Technol., 2009, 43, 8867-8873.
- Shi, G.L., Li, X., Feng, Y.C., Wang, Y.Q., Wu, J.H., Li, J., Zhu, T. Combined source apportionment, using positive matrix factorization–chemical mass balance and principal component analysis/multiplelinear regression–chemical mass balance models. Atmos. Environ. 2009, 43, 2929–2937.
- EPA Positive matrix factorization (PMF) 5.0 fundamentals and user guide, 2014.