Excalibur Tutorial

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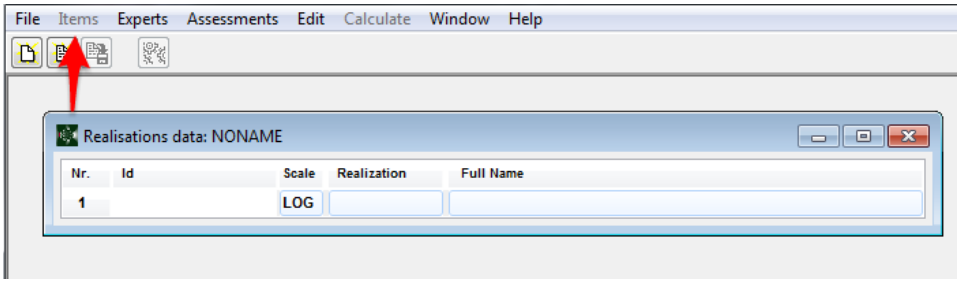
Downloading Excalibur

Excalibur can be downloaded and installed from http://www.lighttwist.net/wp/excalibur. It is only available for PC.

Creating a new case

Click on **File > New Case**. The Realisations window of the new case automatically opens. If the window does not open, click on **Items** for the window to appear.

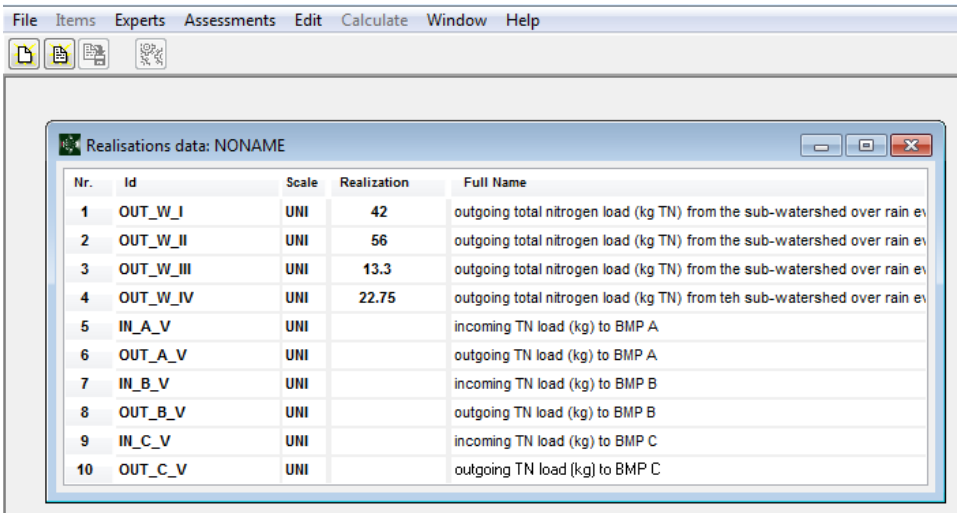


Adding items

Type the item's *ID*, *Scale* (either LOG or UNI; see **Help > Excalibur Glossary** for more information), and *Full Name*. If the item is a calibration variable, also type the *Realization*. Leave *Realization* blank if the item is not a calibration variable. TAB moves between an item's fields. Press ENTER (once or twice, depending on which cell or row is active) to add a new item.

ID and *Scale* are required fields. *Realization* is required for calibration variables. *Full Name* is optional.

Adding the first 10 items from the Nremoval study looks like this:

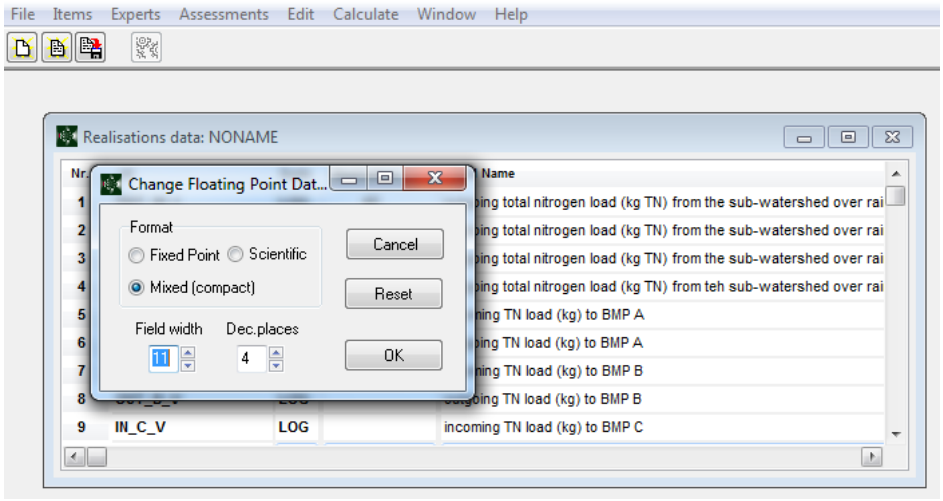


The **Edit** menu allows you to make some changes to all of the items in a case.

Edit > Change all scales to UNI assigns all items in the case a uniform (UNI) scale.

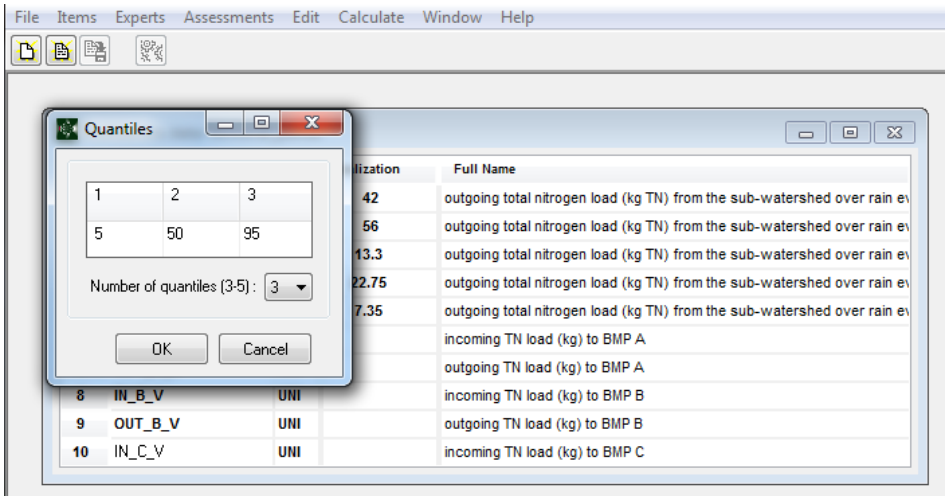
Edit > Change all scales to LOG assigns all items in the case a logarithmic (LOG) scale.

Edit > Change floating point format provides options for the number of decimal places and digits stored for realizations in the case.



Adding experts

Click **Experts**. When adding experts to a case for the first time, the Quantiles menu appears. This enables specification of the number of quantiles (typically 3 or 5) and the relevant percentiles (typically 5, 50, and 95 for 3 quantiles or 5, 25, 50, 75, and 95 for 5 quantiles).

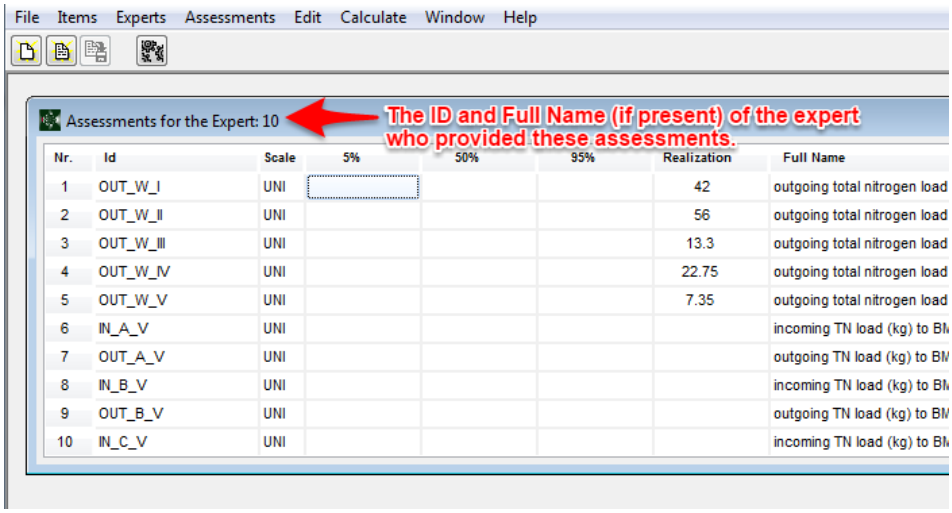


After confirming the quantiles, the Experts data window appears. Experts are added in the same way as items. *ID* is mandatory, and *Full Name* is optional.

Adding assessments

An expert's assessments can be viewed in two ways:

1. Double-click the expert's row in the Expert window.
2. Single click on the expert's row (column Nr.) in the Expert window to highlight it and click **Assessments**.



Type the expert assessment data in this table.

Save the case

Click **File > Save As…** or **File > Save Case** to save the case. This creates two files in the specified directory:

- a .dtt file containing the expert assessment data
- an .rls file containing the realization data.

Excalibur requires both files to calculate performance scores and combined weights.

The .dtt and .rls files are ascii files. They can be viewed in text editors and other programs. Be careful editing the files outside of Excalibur, though, as Excalibur depends on the exact spacing it sets in the files.

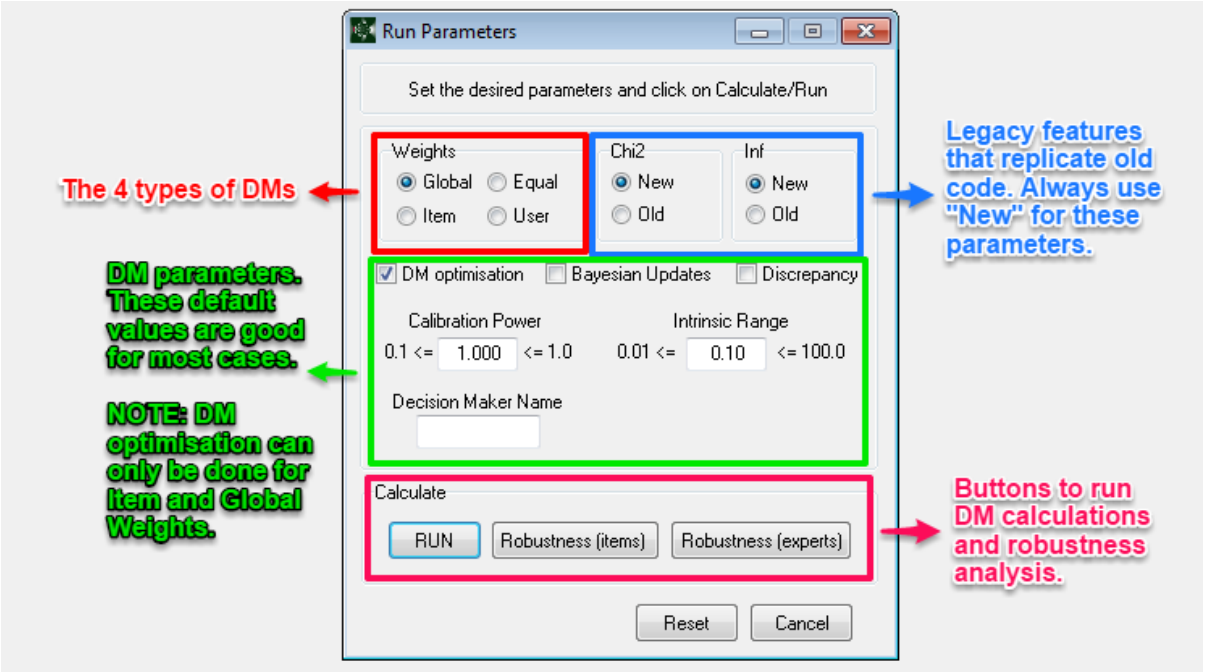
Opening a case

Click **File > Open Case** to open a previously saved case file. Note that you only select the .dtt file to open a case. If the accompanying .rls file is not in the same directory, though, the realizations data will not properly load.

Calculating expert scores and combinations

The following examples use the Nremoval case files.

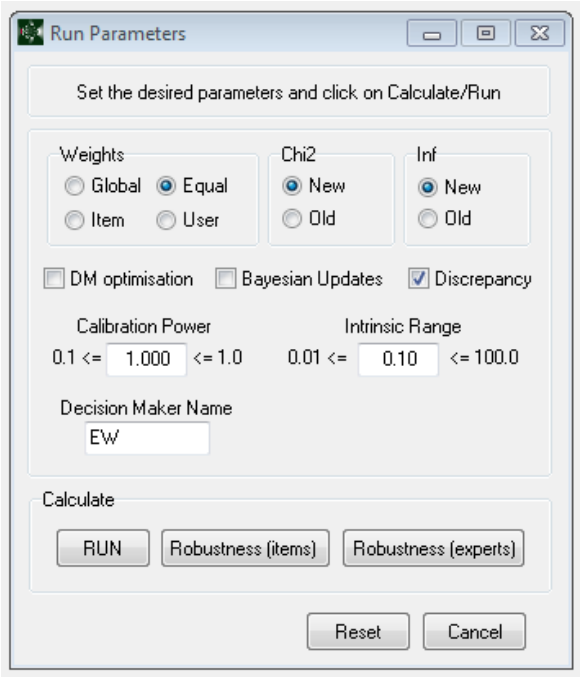
Click **Calculate** to bring up the Run Parameters window, which looks like:



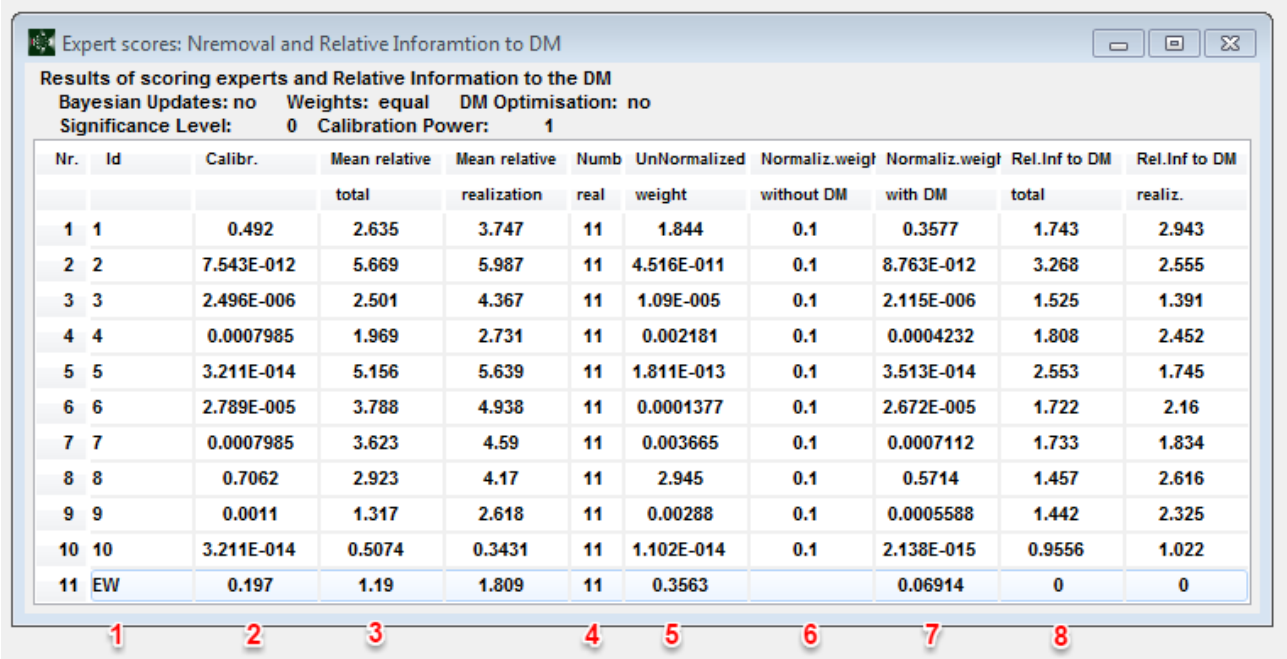
More information on these parameters is available in the Excalibur Help file and Glossary (found at **Help > Excalibur Help** and **Help > Excalibur Glossary**).

Calculating Equal Weight Decision Makers

To create an Equal Weight Decision Maker named “EW”, use the following Run Parameters:



Click Run and produce a table of outputs:



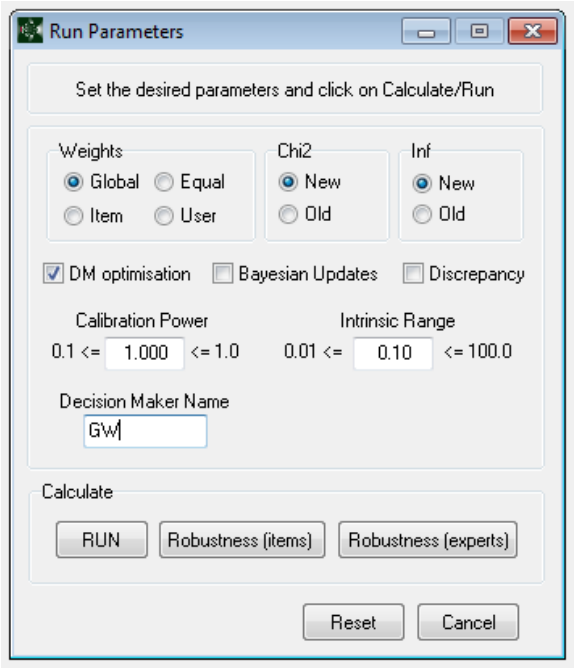
Nr.	Id	Calibr.	Mean relative total	Mean relative realization	Numb real	UnNormalized weight	Normaliz.weigt without DM	Normaliz.weigt with DM	Rel.Inf to DM total	Rel.Inf to DM realiz.
1	1	0.492	2.635	3.747	11	1.844	0.1	0.3577	1.743	2.943
2	2	7.543E-012	5.669	5.987	11	4.516E-011	0.1	8.763E-012	3.268	2.555
3	3	2.496E-006	2.501	4.367	11	1.09E-005	0.1	2.115E-006	1.525	1.391
4	4	0.0007985	1.969	2.731	11	0.002181	0.1	0.0004232	1.808	2.452
5	5	3.211E-014	5.156	5.639	11	1.811E-013	0.1	3.513E-014	2.553	1.745
6	6	2.789E-005	3.788	4.938	11	0.0001377	0.1	2.672E-005	1.722	2.16
7	7	0.0007985	3.623	4.59	11	0.003665	0.1	0.0007112	1.733	1.834
8	8	0.7062	2.923	4.17	11	2.945	0.1	0.5714	1.457	2.616
9	9	0.0011	1.317	2.618	11	0.00288	0.1	0.0005588	1.442	2.325
10	10	3.211E-014	0.5074	0.3431	11	1.102E-014	0.1	2.138E-015	0.9556	1.022
11	EW	0.197	1.19	1.809	11	0.3563		0.06914	0	0

The columns in the table display (again, more information is available in **Help > Excalibur Help** and **Help > Excalibur Glossary**):

1. The expert ID (including any decision makers created by the analyst in this session)
2. The calibration score
3. The information score. The first column is averaged over all items; the second column is averaged over only the seed questions (i.e., the questions with realizations).
4. The number of seed questions.
5. The combined score (i.e., the product of calibration and information on the seed questions).
6. The normalized expert weight for the most recently calculated decision maker, excluding the decision maker.
7. The normalized expert weight for the most recently calculated decision maker, including the decision maker.
8. The discrepancy analysis, comparing the information of the expert to that of the active decision maker. Note that this is typically used with the Equal Weight Decision Maker. The first column is averaged over all items; the second column is averaged over only the seed questions (i.e., the questions with realizations). These columns only appear when Discrepancy is checked.

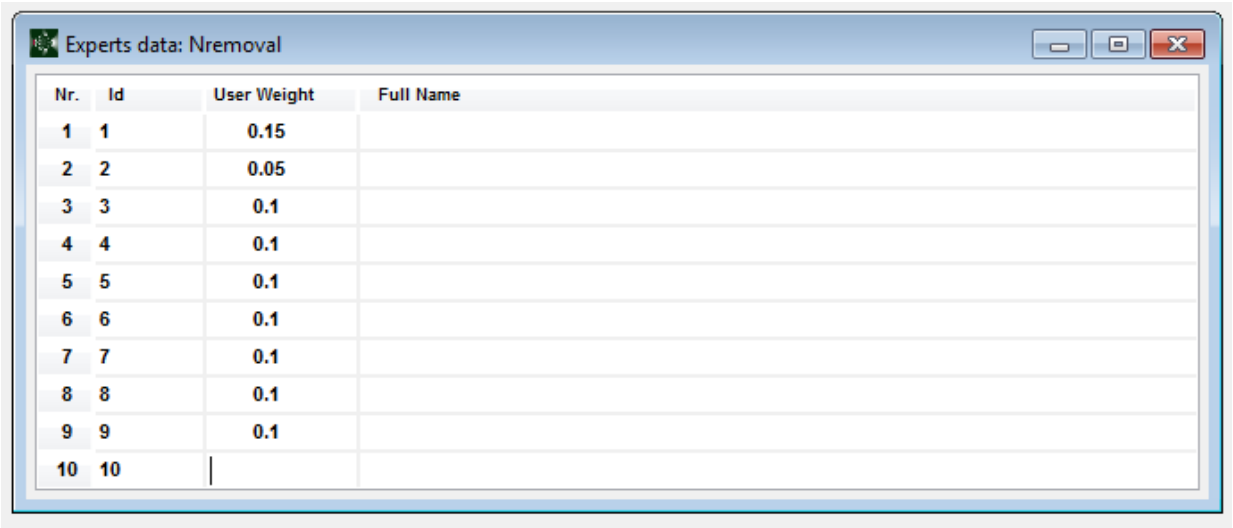
Calculating Performance Weight Decision Makers

To calculate an optimised performance weight decision maker, check DM optimisation. Select Global or Item Weights, depending on the weighting scheme desired.



Calculating User Weight Decision Makers

To create a User Weight Decision Maker, make sure DM optimisation is unchecked. Select User Weights in the Run Parameters window, and the following window pops up:



Manually enter the weight desired for each expert. Leave the User Weight blank for one expert, and Excalibur calculates it so that all the user weights sum to 1. After entering the user weights, click Run to see the expert and decision maker scores.

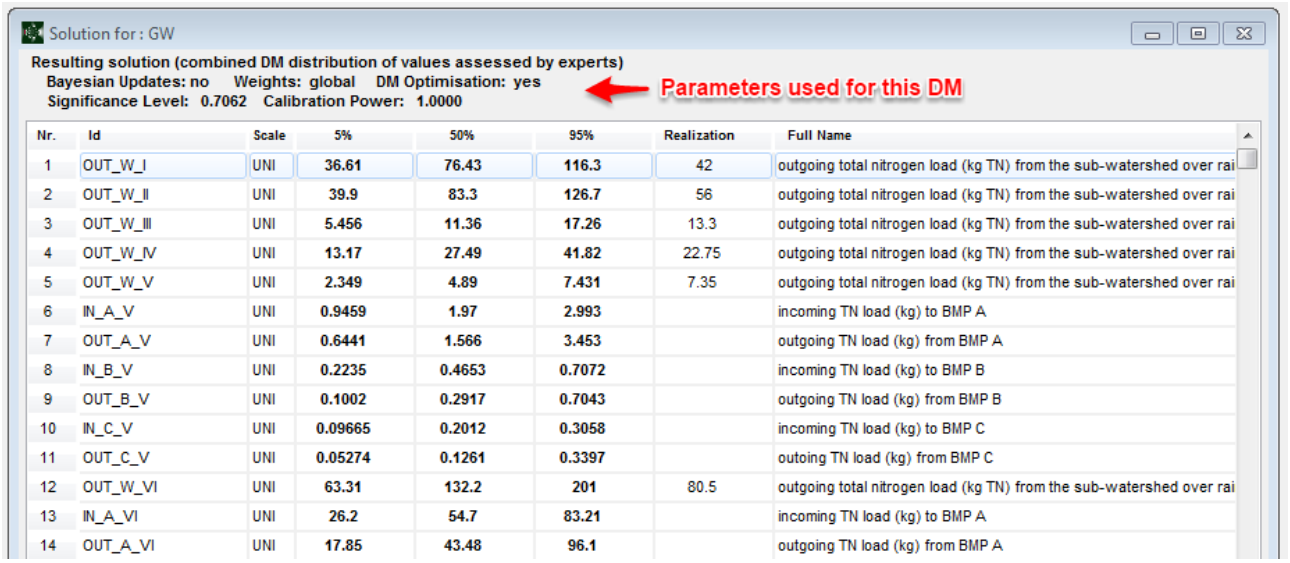
Creating multiple decision makers

Excalibur allows you to create and compare several decision makers. For example, you can create Equal Weight, Global Weight, and Item Weight decision makers and compare their scores. To remove the decision makers you've created, click Reset on the Run Parameters window. Note: This removes all decision makers; you cannot selectively remove decision makers.

Displaying results

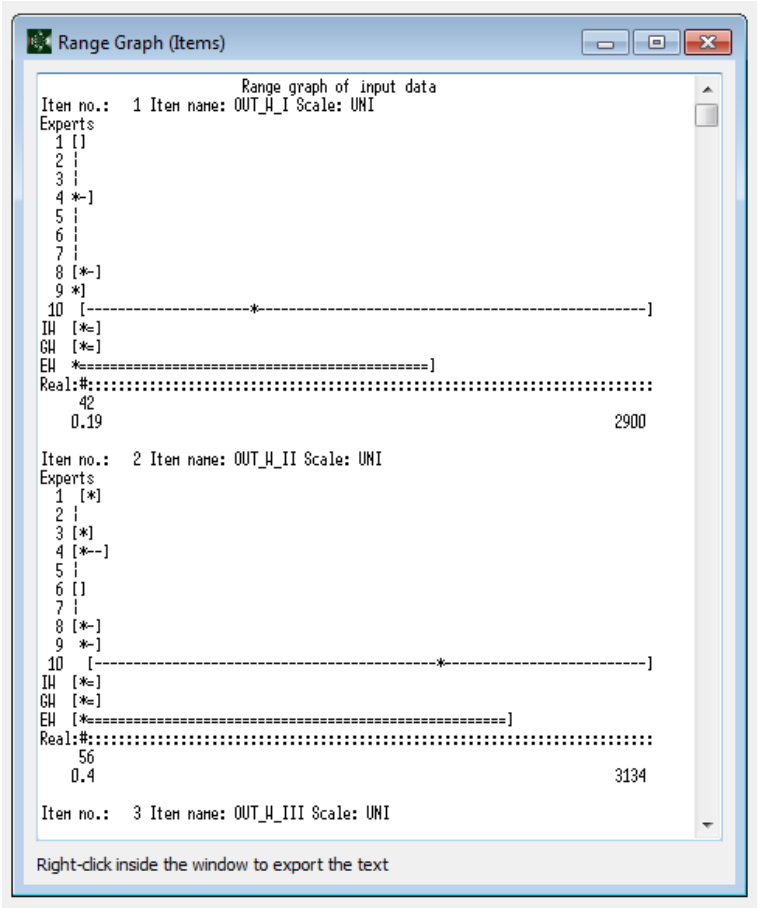
Excalibur has several built-in options for displaying results.

Double-clicking a decision maker in the Expert scores window brings up its assessments:



Nr.	Id	Scale	5%	50%	95%	Realization	Full Name
1	OUT_W_I	UNI	36.61	76.43	116.3	42	outgoing total nitrogen load (kg TN) from the sub-watershed over rai
2	OUT_W_II	UNI	39.9	83.3	126.7	56	outgoing total nitrogen load (kg TN) from the sub-watershed over rai
3	OUT_W_III	UNI	5.456	11.36	17.26	13.3	outgoing total nitrogen load (kg TN) from the sub-watershed over rai
4	OUT_W_IV	UNI	13.17	27.49	41.82	22.75	outgoing total nitrogen load (kg TN) from the sub-watershed over rai
5	OUT_W_V	UNI	2.349	4.89	7.431	7.35	outgoing total nitrogen load (kg TN) from the sub-watershed over rai
6	IN_A_V	UNI	0.9459	1.97	2.993		incoming TN load (kg) to BMP A
7	OUT_A_V	UNI	0.6441	1.566	3.453		outgoing TN load (kg) from BMP A
8	IN_B_V	UNI	0.2235	0.4653	0.7072		incoming TN load (kg) to BMP B
9	OUT_B_V	UNI	0.1002	0.2917	0.7043		outgoing TN load (kg) from BMP B
10	IN_C_V	UNI	0.09665	0.2012	0.3058		incoming TN load (kg) to BMP C
11	OUT_C_V	UNI	0.05274	0.1261	0.3397		outoing TN load (kg) from BMP C
12	OUT_W_VI	UNI	63.31	132.2	201	80.5	outgoing total nitrogen load (kg TN) from the sub-watershed over rai
13	IN_A_VI	UNI	26.2	54.7	83.21		incoming TN load (kg) to BMP A
14	OUT_A_VI	UNI	17.85	43.48	96.1		outgoing TN load (kg) from BMP A

Clicking the Range Graph (expertswise) or Range Graph (itemwise) buttons in the Run Parameters window creates text range graphs of the experts' and decision makers' assessments, ordered either by expert or item. The itemwise range graphs for the Nremoval study look like:



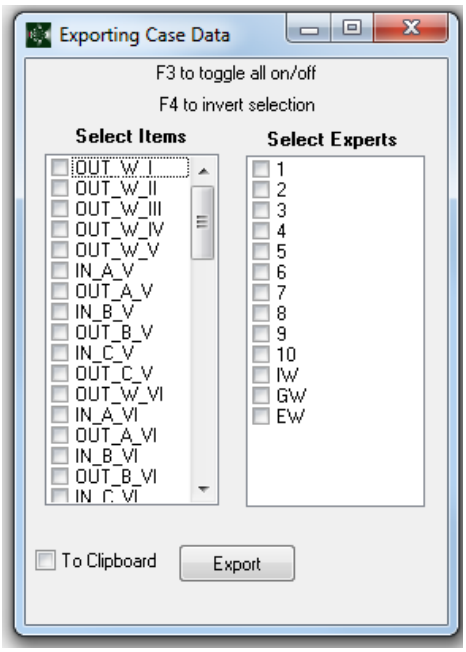
In these text figures, the brackets ([,]) indicate the range of the assessment, the asterisk (*) indicates the median, and the hashtag (#) is the realization for the seed items.

These text graphics can be copy/pasted into another program. However, to display properly, they need a monospace font (e.g., Courier) sized small enough that the assessments are shown on one line of text.

Exporting results

The decision maker assessments can also be exported for use with other programs, such as Excel or R. This gives more flexibility in displaying results or conducting additional analysis.

To export the quantiles (i.e., the percentiles elicited) or full distributions, go to **File > Export as space delimited** and choose **Quantiles** or **Distributions** (the latter extrapolates the full distribution based on the elicited percentiles and the uniform or log uniform distribution). A window appears that lets you select which items and experts/decision makers to export. Click Export to save the file. This creates an ascii file with the extension .dis that can be read in a text editor or imported into Excel, R, or the program of your choice.



You can also export most windows (e.g., DM Solution, Export Scores, etc) to text files by selecting the window and then clicking **File > Export as text** and selecting the window type. Note that only the active window will be available to export as text.

Robustness analysis

Excalibur features two built-in options for robustness analysis: robustness on items and on experts.

To run the robustness analysis, go to the Run Parameters window (if it isn't visible, click **Calculate**). Click Robustness (items) or Robustness (experts). Robustness on items removes seed items one at a time and recalculates the decision maker (using the settings in the Run Parameters window). Robustness on experts removes experts one at a time and recalculates the decision maker. More information is available in **Help > Excalibur Help**.

Filtering items and experts

In addition to the simple built-in robustness analysis, Excalibur allows you to filter out experts and/or items and recalculate decision makers, getting more information than the robustness analysis provides. For example, you can remove an expert, create the Global Weight Decision Maker, and then export the quantile assessments of this decision maker to explore the results if one expert had been excluded.

WARNING! Always store a safe copy of your data before filtering items and/or experts. NEVER click Reset on the Run Parameters window while items or experts are filtered. This will delete the filtered items/experts. Instead, undo the filtering so the experts/items are active again, and then Reset.

To filter items, click **Items** to bring up the items window. Click on the row to highlight the item you'd like to filter (i.e., remove from the subsequent calculations) and then press F4 or click **Edit > Filter Experts/Items**. To undo the filtering, highlight the row and press F4 or click **Edit > Filter Experts/Items** again. To undo all filtering, press F5 or click **Edit > Disable Filtering**. This makes everything active. To re-enable filtering, press F5 again or click **Edit > Enable Filtering.**

To filter experts, click **Experts** to bring up the experts window and follow the same instructions as for filtering items.

Filtered experts/items appear in grey rather than black, but that can be tough to see on some displays.