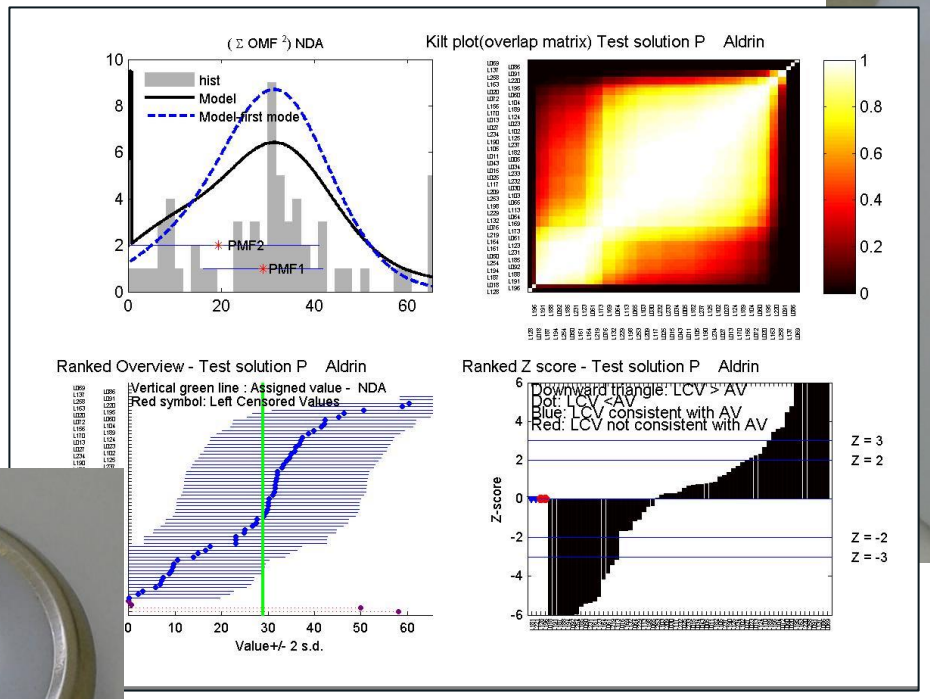
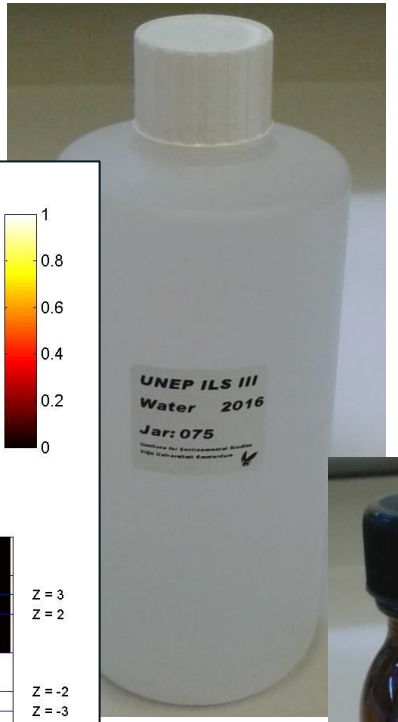
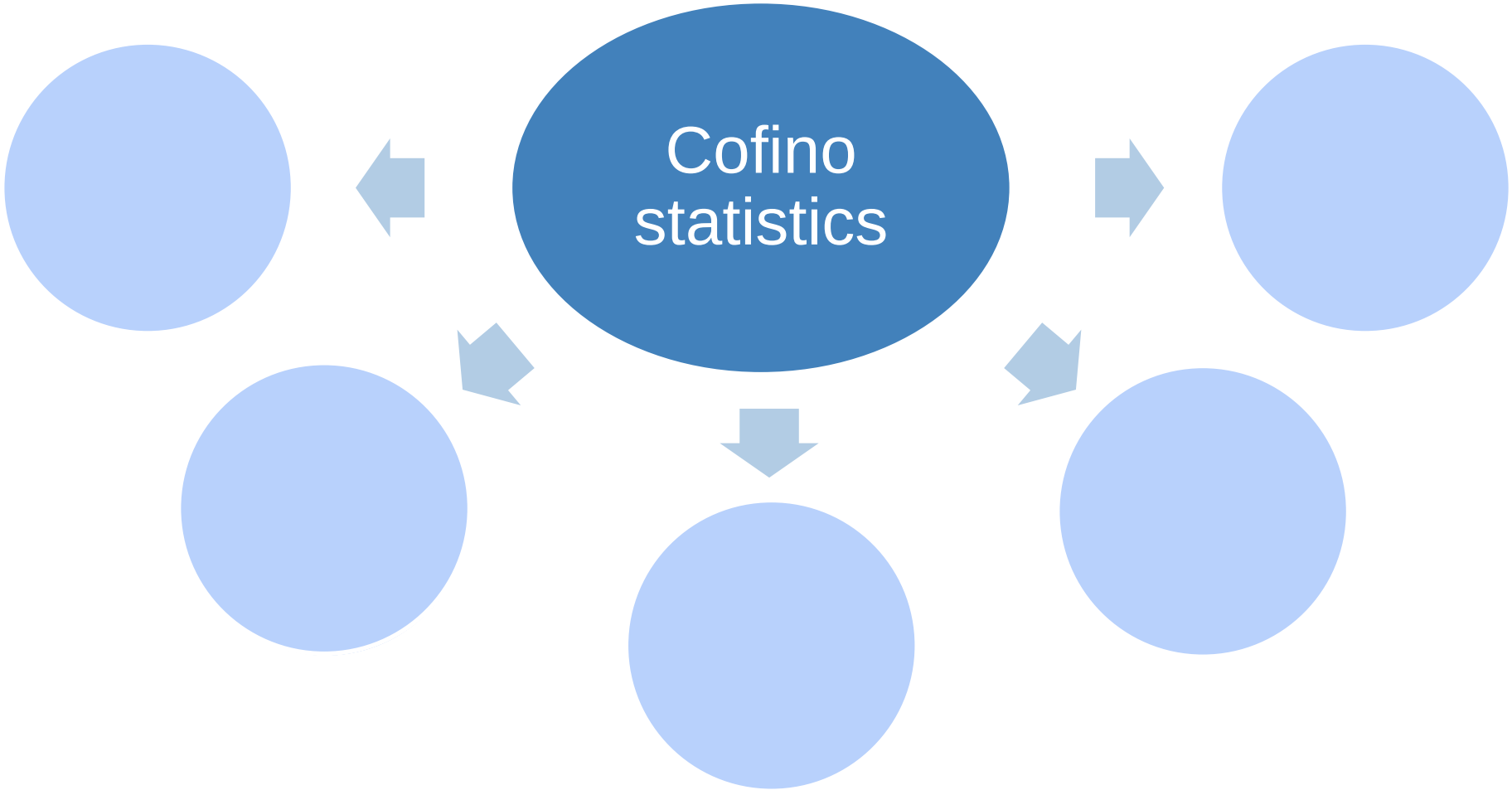
Aspects of results assessment and interpretation

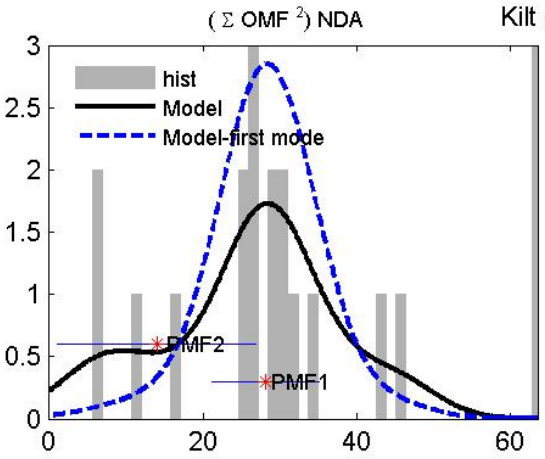


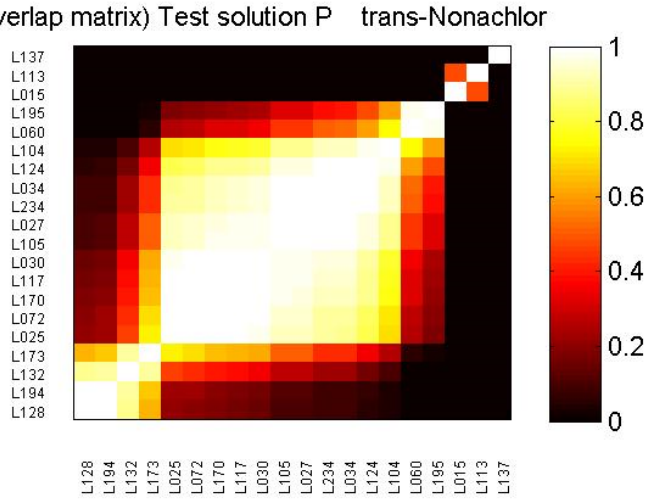


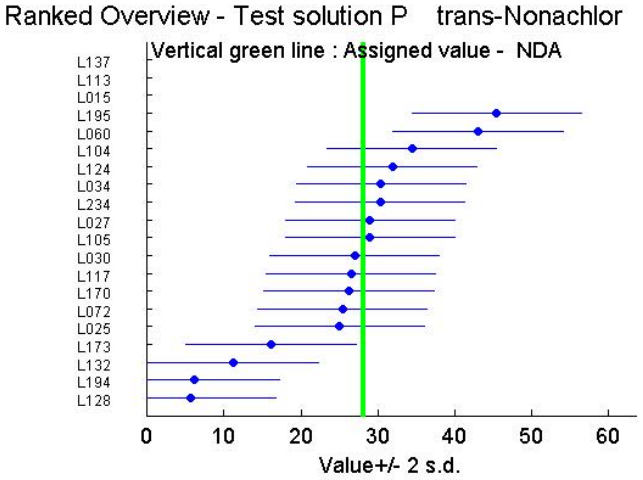
Aspects of results assessment and interpretation

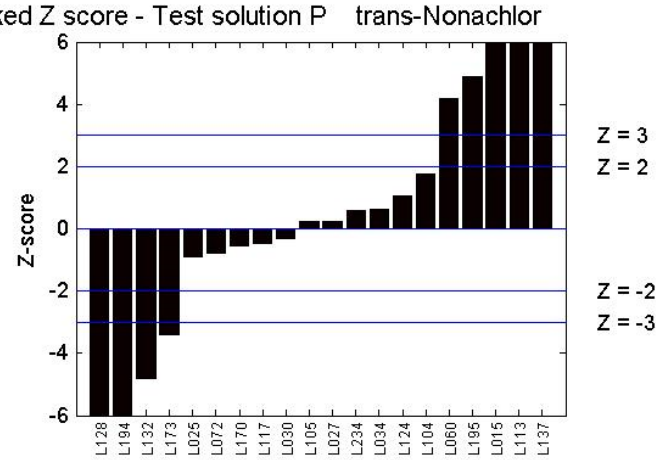


Cofino model









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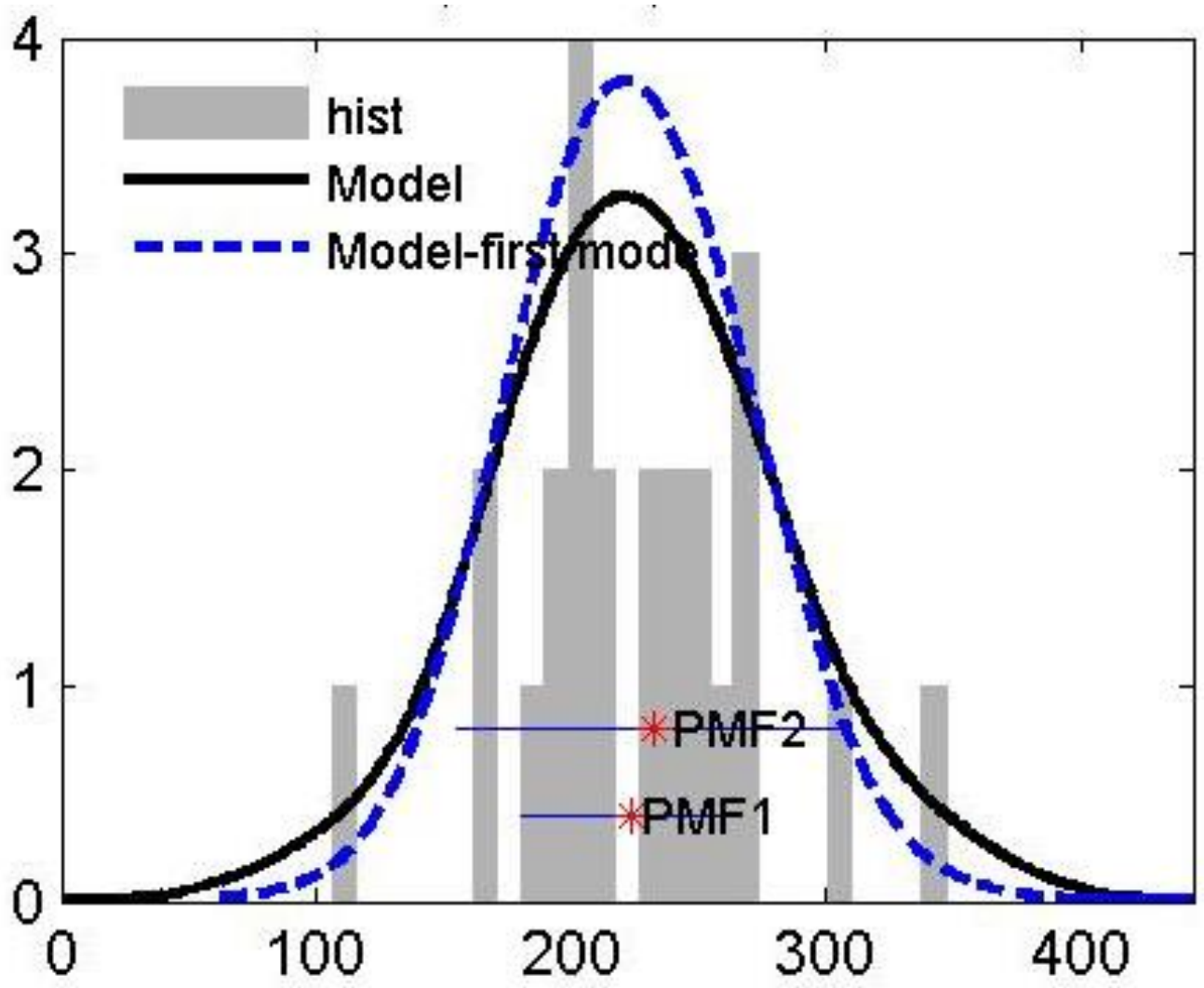

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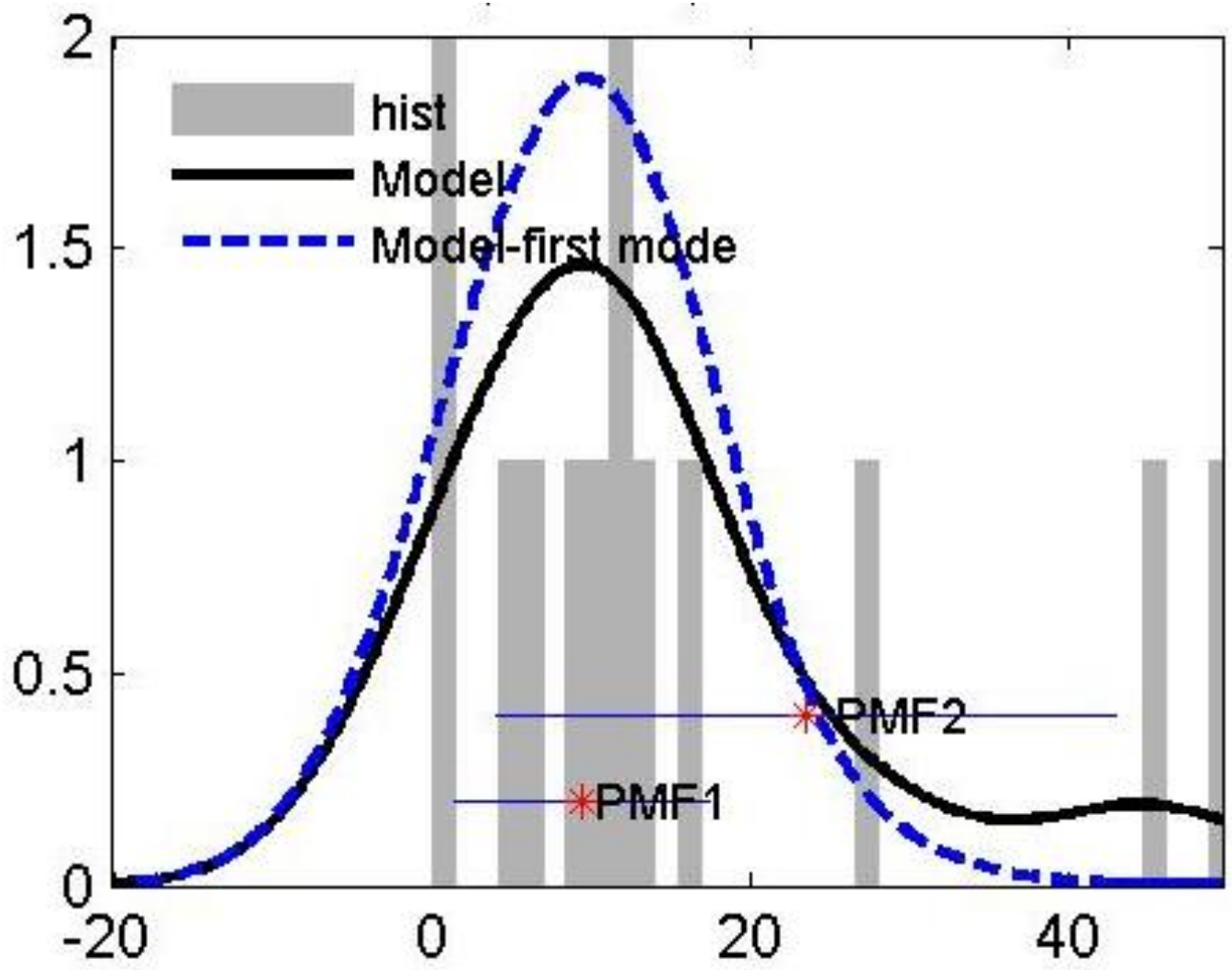

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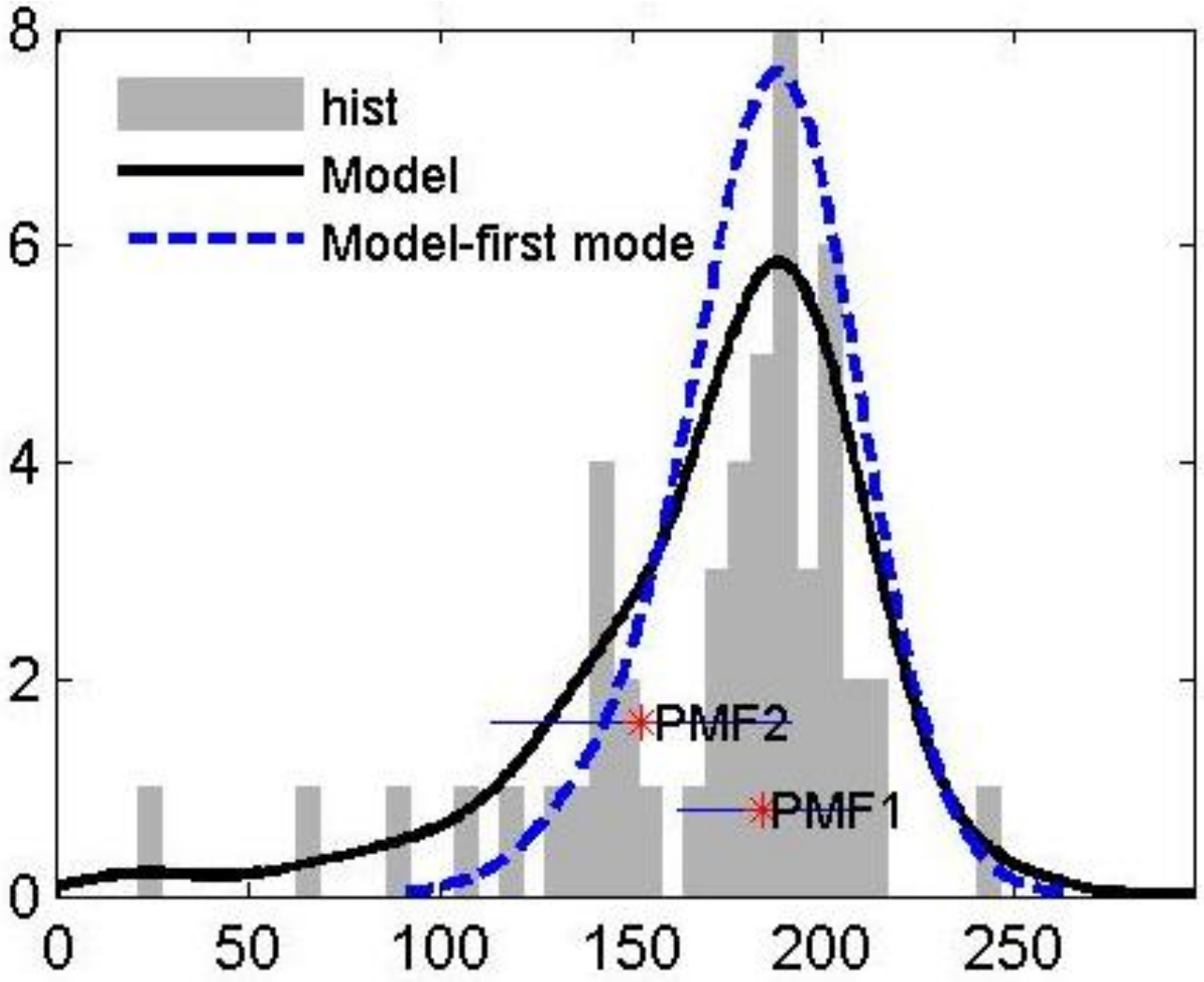

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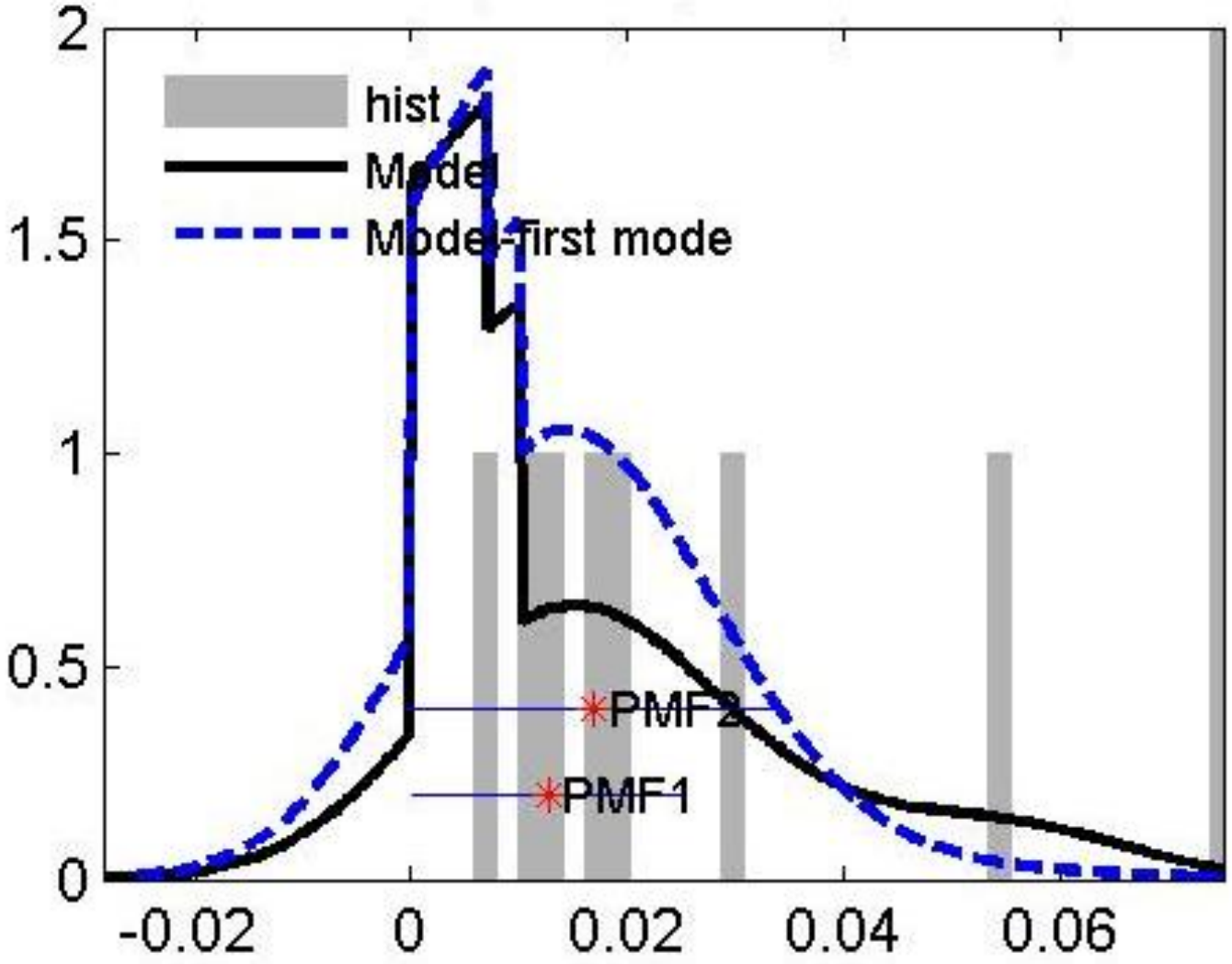

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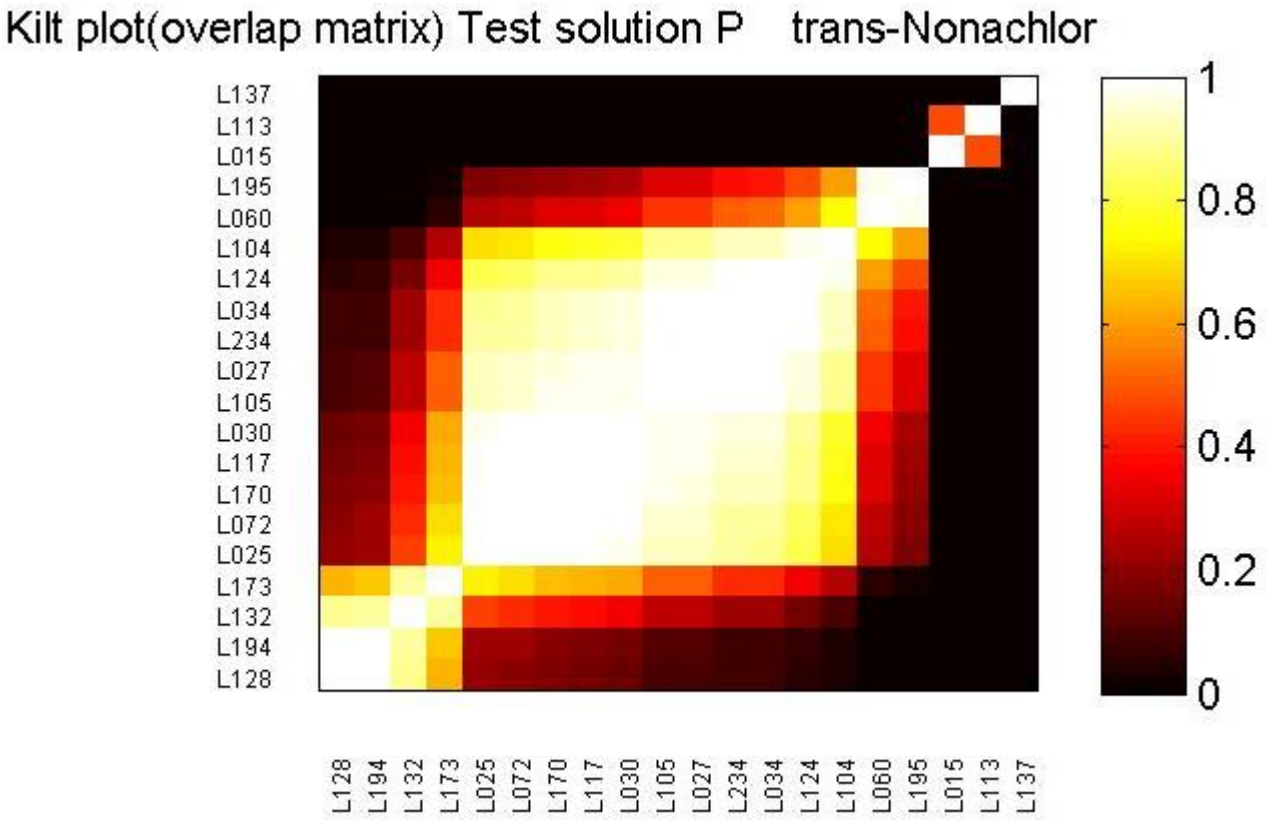

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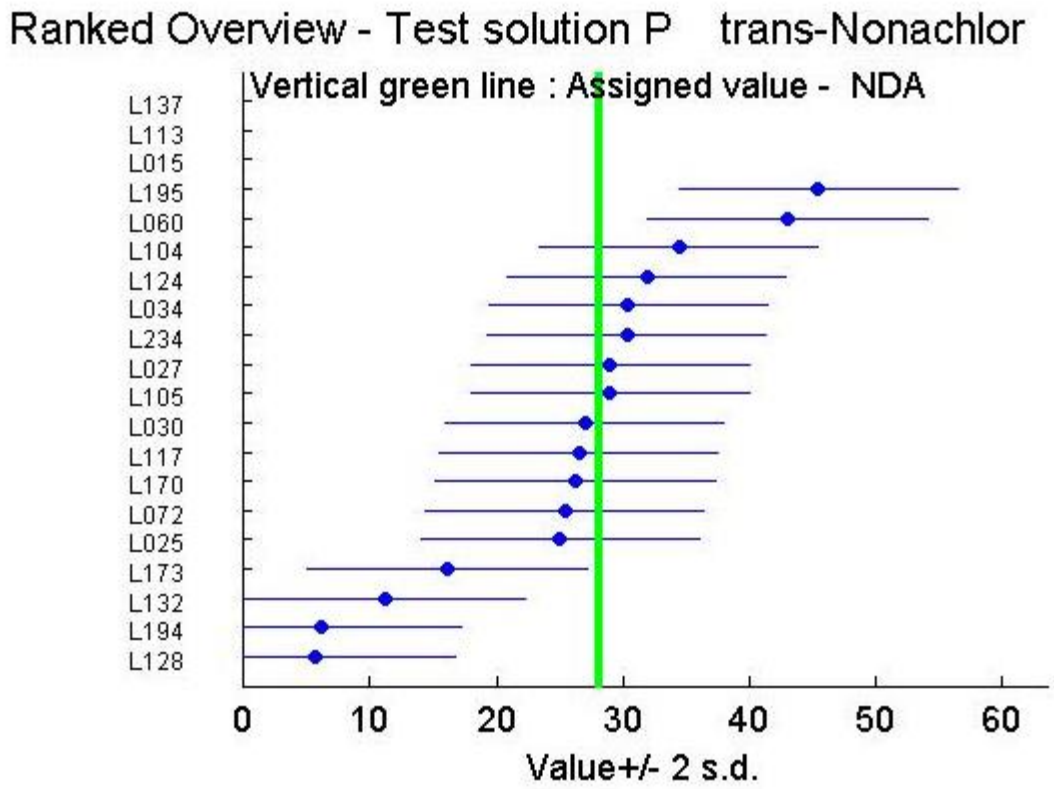

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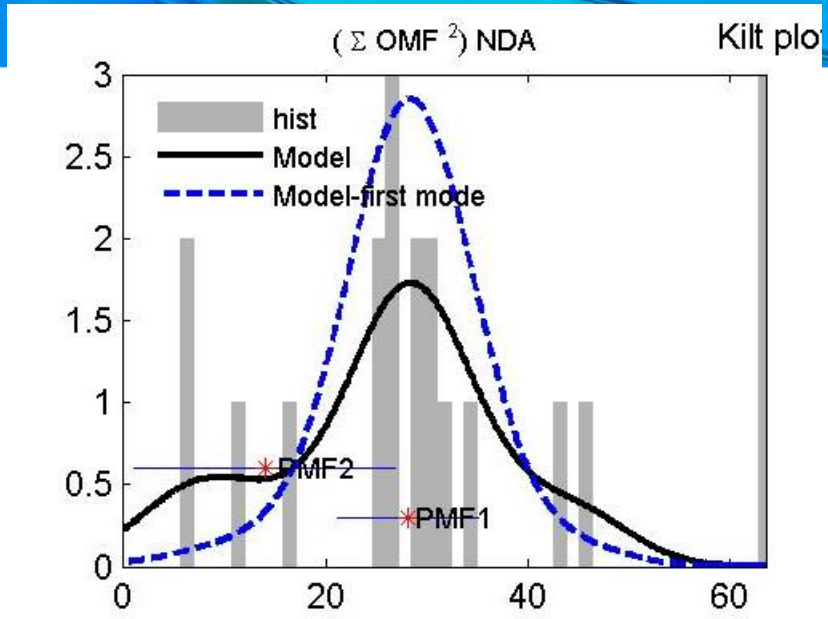

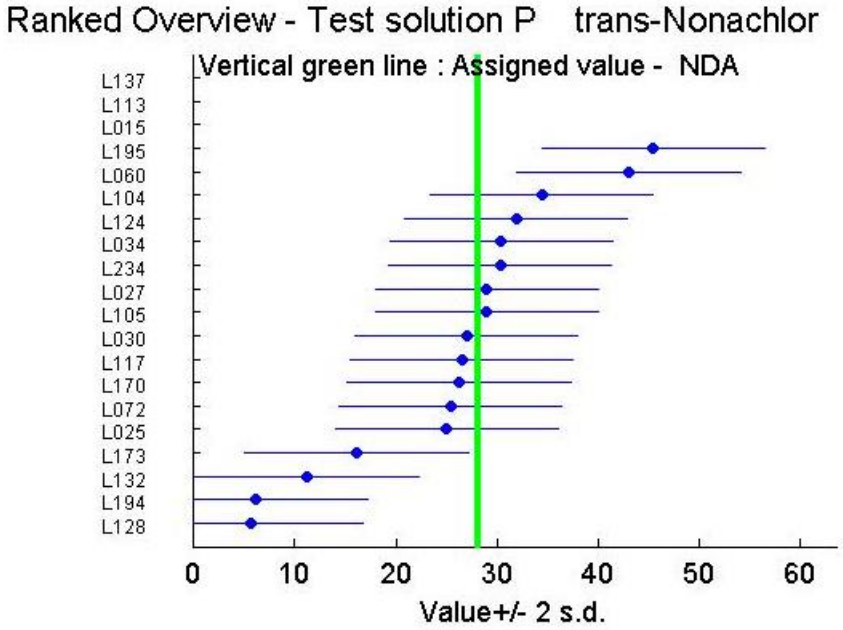

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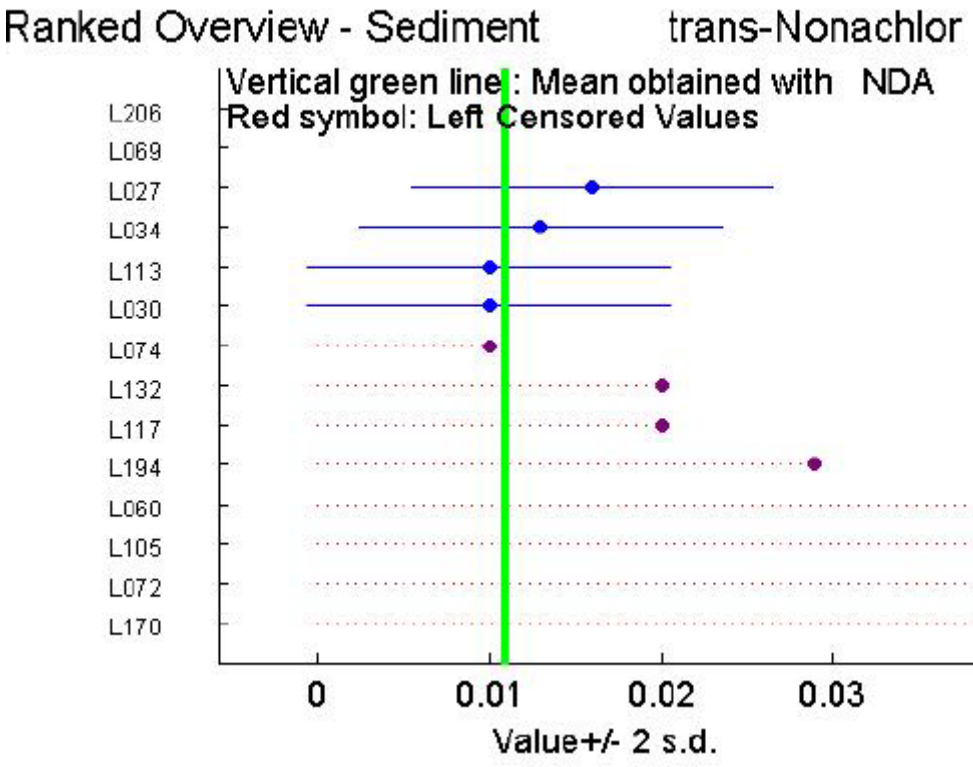

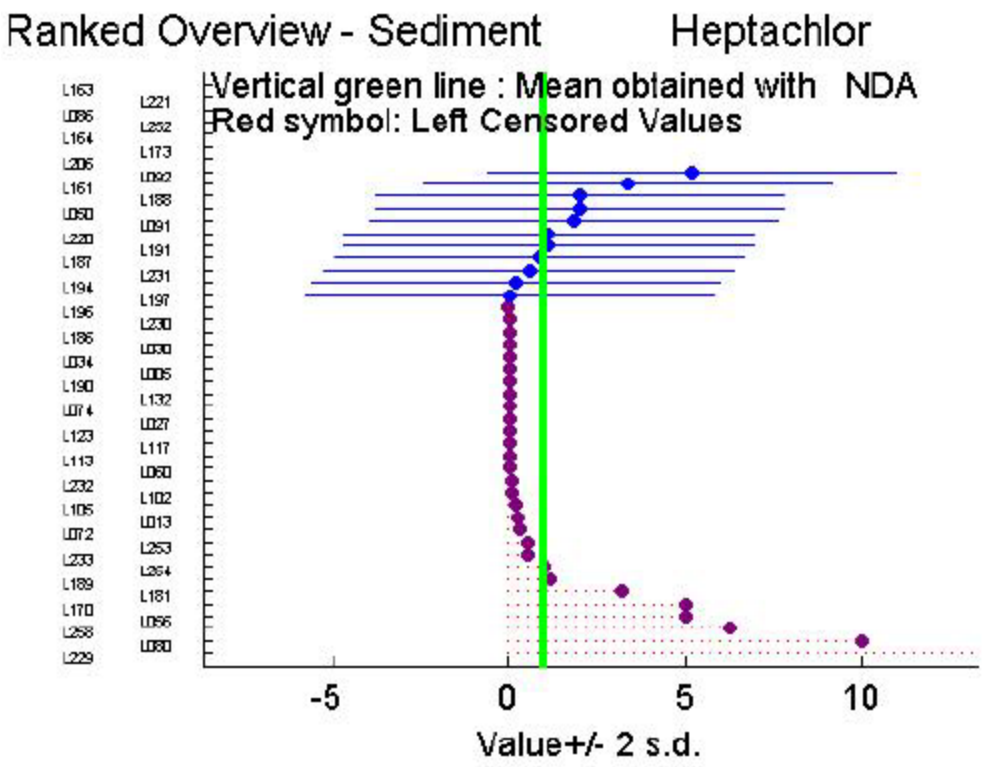

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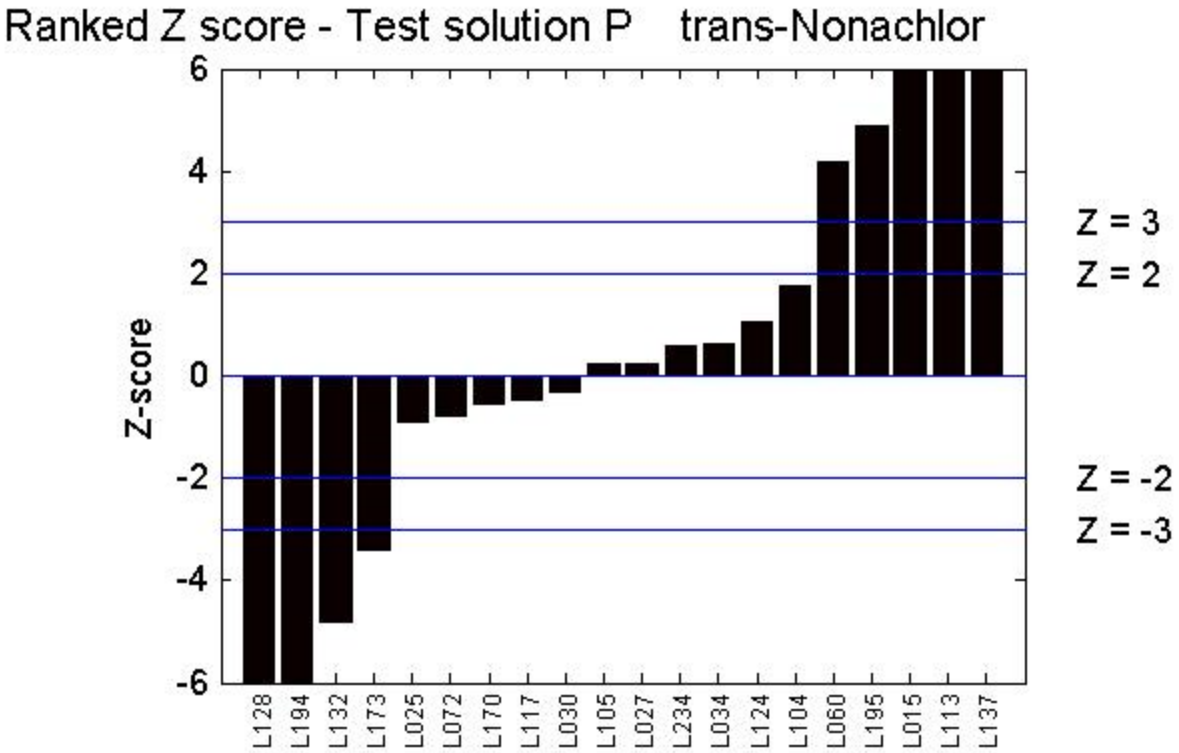
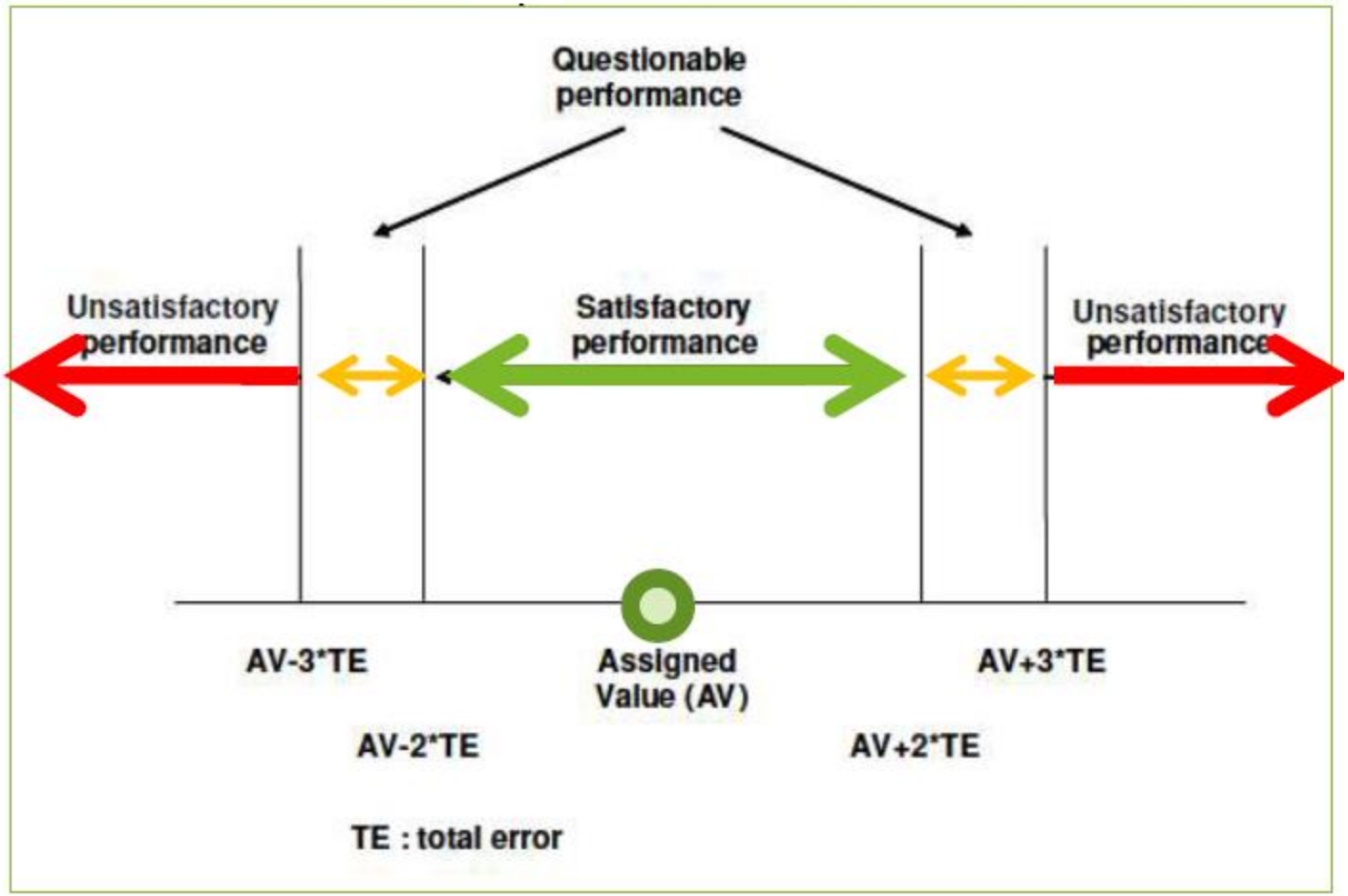


Calculation of z-scores

$$z\text{-score} = \frac{\text{Mean from Laboratory} - \text{Assigned Value}}{\text{Total Error}}$$

$$\text{Total Error} = \frac{\text{Assigned Value} \times \text{Proportional Error (\%)}}{100} + 0.5 \times \text{Constant Error}$$

Interpretation of z-scores



Interpretation of z-scores

Interpretation

- |z| < 2 Satisfactory performance
- 2 < |z| < 3 Questionable performance
- |z| > 3 Unsatisfactory performance
- |z| > 6 Extreme performance, frequently points to gross errors (mistakes with units during reporting, calculation or dilution errors, *etc.*).

Z score Key

→ S - Satisfactory

→ Q - Questionable

→ U - Unsatisfactory

→ U - Unsatisfactory

Left-censored values (LCVs)

Interpretation

- LCV/2 < concentration corresponding to |z| = 3
  → LCV consistent with assigned value

- LCV/2 > concentration corresponding to |z| = 3
  → LCV inconsistent with assigned value,
  i.e., LCV reported by laboratory much higher than numerical values reported by other laboratories

- No AV could be calculated or no results are reported

Z score Key

→ C - Consistant

→ I - Inconsitant

→ B - Blank

Appendix 3 and 4: z-scores and assessment

Appendix 3: z-scores

Region	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia
Air extract	**L004**	**L005**	**L007**	**L008**	**L009**	**L011**	**L012**	**L013**	**L015**	**L016**	**L017**	**L018**	L020	L022	L023	L025	L027	L030
dl-PCB																		
PCB 77	0.80	2.19	-1.94	2.36	NA	2.42	17.9	NA	NA	-7.99	NA	NA	NA	8.66	NA	-0.30	-0.75	NA
PCB 81	8.60	-1.50	-2.27	9.49	NA	2.38	7.43	NA	NA	-7.98	NA	NA	NA	-0.85	NA	-0.30	-0.12	NA
PCB 126	-0.17	0.17	-1.94	5.87	NA	-0.22	3.91	NA	NA	-7.54	NA	NA	NA	-3.00	NA	0.60	0.19	NA
PCB 169	-0.62	-0.30	0.19	12.5	NA	1.25	4.06	NA	NA	-7.81	NA	NA	NA	-2.94	NA	-0.96	0.24	NA
PCB 105	-1.21	0.57	-0.73	1.31	NA	0.83	3.36	-1.67	NA	-8.00	NA	NA	NA	-0.81	NA	-0.19	0.15	NA
PCB 114	2.86	0.27	-0.93	6.80	NA	0.66	4.75	-1.55	NA	-8.00	NA	NA	NA	-2.13	413.	0.18	0.66	NA
PCB 118	0.42	0.47	-0.75	1.43	NA	0.94	10.1	-1.31	NA	-8.00	NA	NA	NA	1.68	NA	0.02	0.15	NA
PCB 123	40.4	-0.03	-3.13	-2.42	NA	1.05	4.11	3.59	NA	-7.99	NA	NA	NA	0.59	181.	-0.15	1.65	NA
PCB 156	-0.49	-0.82	-0.47	1.52	NA	0.54	2.29	-2.63	NA	-8.00	NA	NA	NA	2.54	14.1	-0.40	0.54	NA
PCB 157	-0.37	8.51	-0.93	2.03	NA	-0.77	1.81	NA	NA	-7.99	NA	NA	NA	0.83	NA	-0.77	0.44	NA
PCB 167	-1.11	-0.49	-0.46	30.9	NA	-0.59	1.84	NA	NA	-8.00	NA	NA	NA	-0.47	NA	0.42	0.42	NA
PCB 189	0.64	-0.85	-1.15	1.30	NA	1.14	0.48	NA	NA	-7.98	NA	NA	NA	-1.12	NA	-0.99	0.53	NA

Appendix 4: z-score assessment

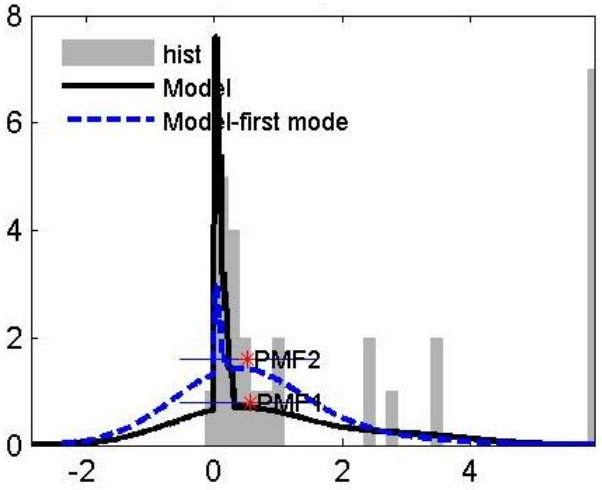
Region	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia	Asia
Air extract	**L004**	**L005**	**L007**	**L008**	**L009**	**L011**	**L012**	**L013**	**L015**	**L016**	**L017**	**L018**	**L020**	**L022**	**L023**	**L025**	**L027**	**L030**
dl-PCB																		
PCB 77	S	Q	S	Q	B	Q	U	C	B	U	B	B	B	U	I	S	S	B
PCB 81	U	S	Q	U	B	Q	U	I	B	U	B	B	B	S	I	S	S	B
PCB 126	S	S	S	U	B	S	U	I	B	U	B	B	B	Q	I	S	S	B
PCB 169	S	S	S	U	B	S	U	I	B	U	B	B	B	Q	I	S	S	B
PCB 105	S	S	S	S	B	S	U	S	B	U	B	B	B	S	I	S	S	B
PCB 114	Q	S	S	U	B	S	U	S	B	U	B	B	B	Q	U	S	S	B
PCB 118	S	S	S	S	B	S	U	S	B	U	B	B	B	S	I	S	S	B
PCB 123	U	S	U	Q	B	S	U	U	B	U	B	B	B	S	U	S	S	B
PCB 156	S	S	S	S	B	S	Q	Q	B	U	B	B	B	Q	U	S	S	B
PCB 157	S	U	S	Q	B	S	S	I	B	U	B	B	B	S	I	S	S	B
PCB 167	S	S	S	U	B	S	S	I	B	U	B	B	B	S	I	S	S	B
PCB 189	S	S	S	S	B	S	S	C	B	U	B	B	B	S	I	S	S	B

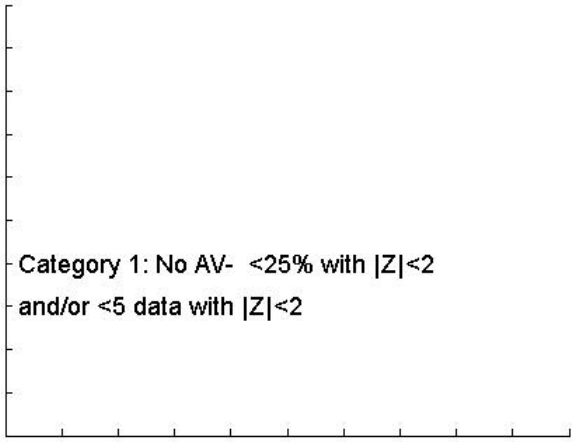
Assigned value

Category 1

- For data where the number of numerical observations is ≥ 7
- An assigned value is based on the mean when ≥ 25% of values have a z-score of |z| < 2.
- Where < 25% of the data have |z| < 2, the value is indicative, *i.e.,* at least 25% must be in good agreement.

Sediment Dieldrin





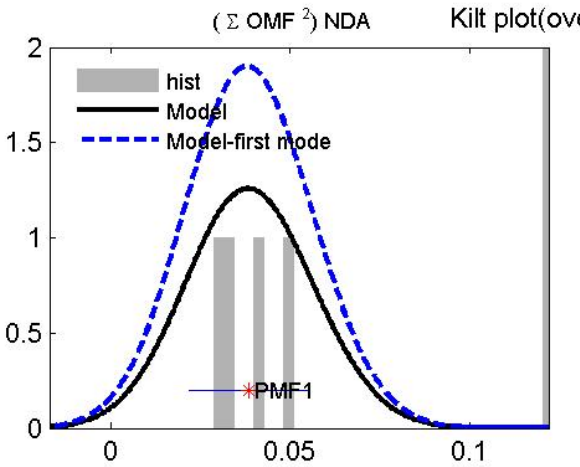
Assigned value

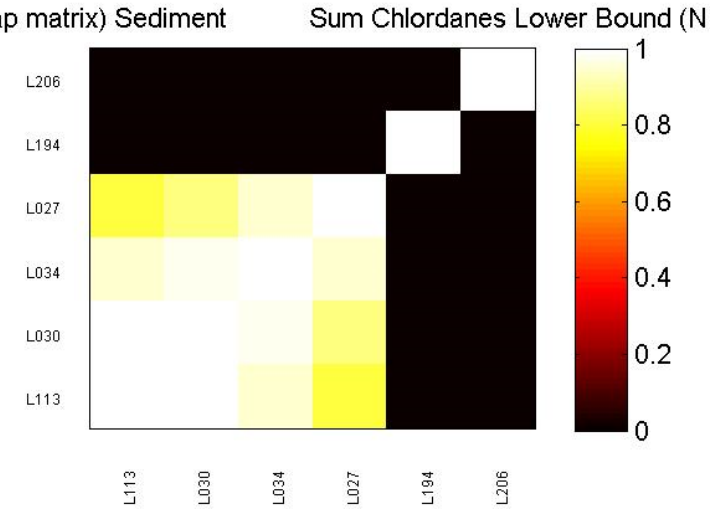
Category 2

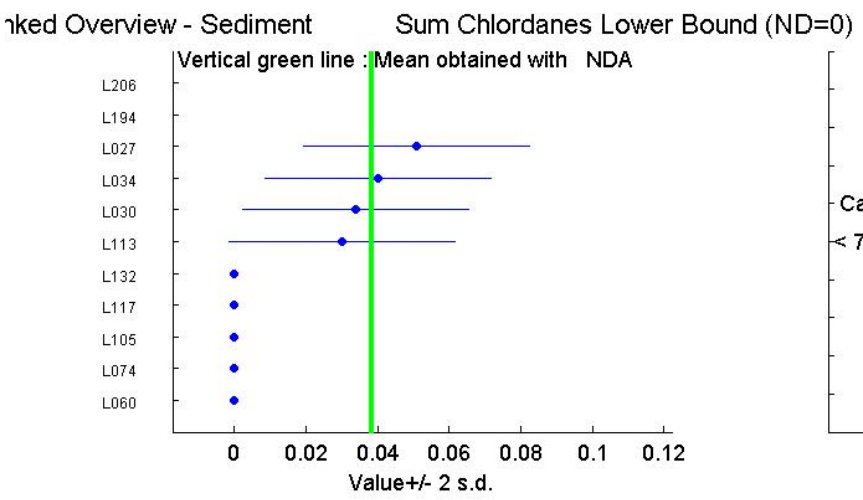
- For data where the number of numerical observations is > 3 and < 7.
- An assigned value is based on the mean when ≥ 70% of values have a z-score of |z| < 3 and a minimum of 4 observations have |z| < 2.
- Otherwise, the value is indicative,. *i.e.,* for small data sets, n > 3 and n < 7, there needs to be very good agreement and a maximum of one extreme value before an assigned value can be given.

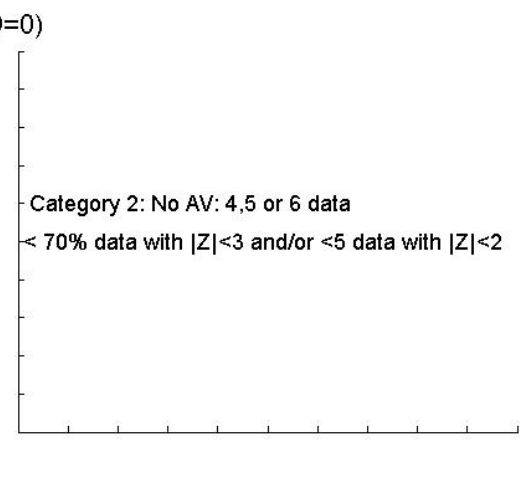
Assigned value

Category 2







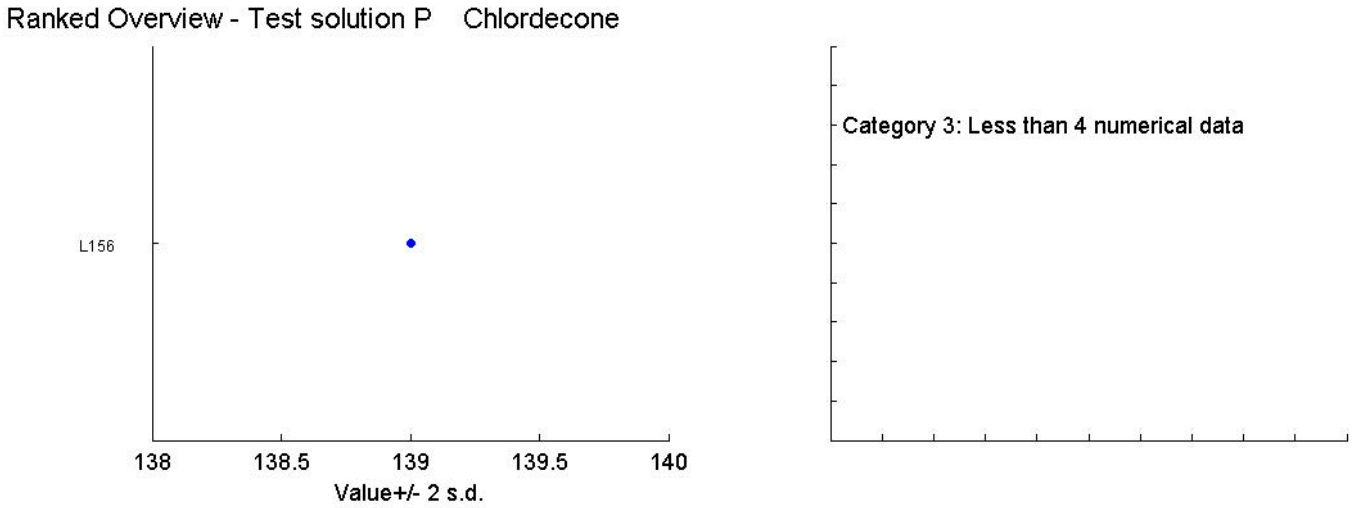


Assigned value

Category 3

- For data where the number of numerical observations is < 4.

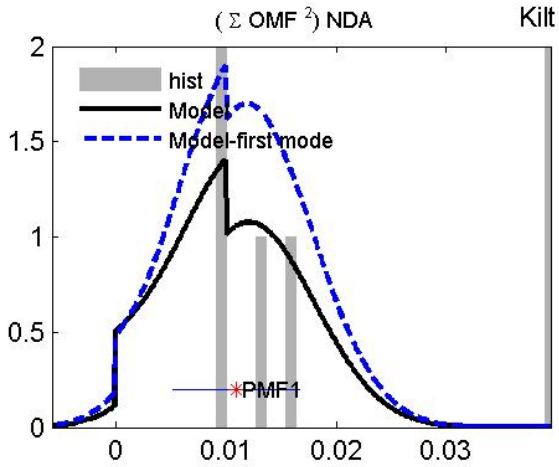
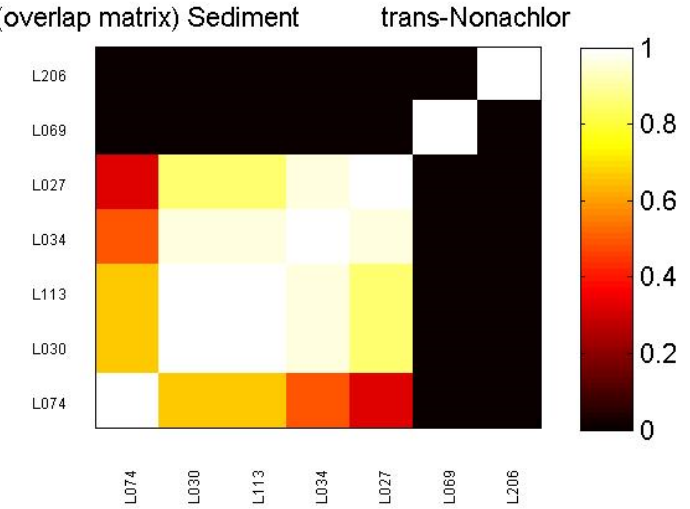
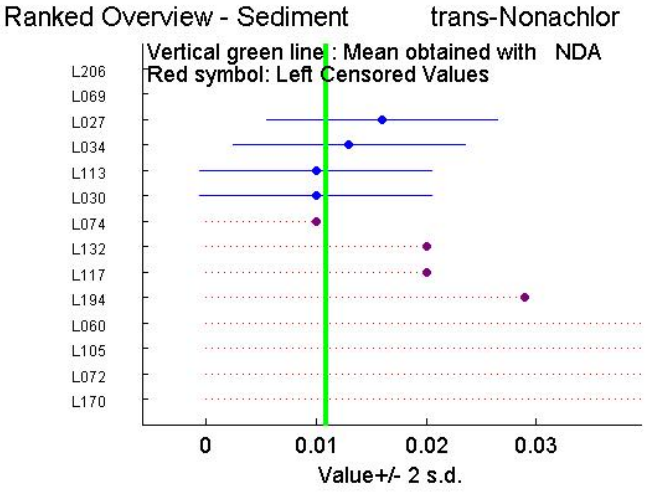
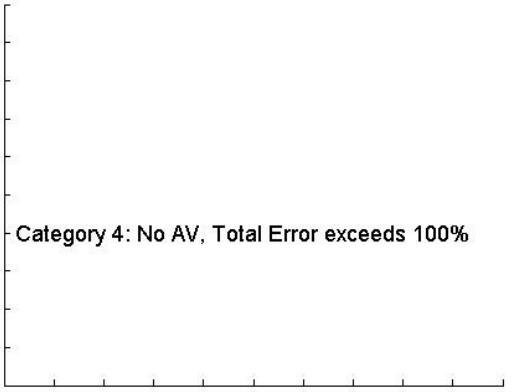
- No assigned value is given. Normally, the median value is given as an indicative value.



Assigned value

Category 4

- For data where the high total error > 100% in combination with bad performance, no assigned value is given

Assigned value

Category 4