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Certificate of Participation

This is to certify that

Zarazma Minerals Studies Company

has participated in the October 2017
Geostats Survey of International Laboratories

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Geostats Laboratory Survey
October 2017

Prepared for
Zarazma Minerals Studies Company

Confidential

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To the reader,

This survey of laboratories undertaken by Geostats is performed as a service to both the Mining Industry and the Analytical Industry. It is envisaged that it can be used as a tool for the maintenance of high standards in both industries.

The report to the Mining Houses identifies most commercial laboratories and should be treated as confidential information. Some commercial facilities prefer to pay for the inclusion of their sites and these are not identified to the Mining Houses. This report should not be circulated outside of the Client Company or reproduced for the benefit of other mining groups.

It is not the intent of this survey to provide marketing tools for the analytical industry. A laboratory report is available which identifies only the laboratory or group requesting the report. This allows the laboratory to assess their performance in relation to the rest of the analytical industry. All the laboratories identified have taken advantage of this report and included it as part of their ongoing quality control procedures. Participation in these surveys is an indication of the laboratory's interest in quality and should be regarded as a positive sign regardless of the outcome.

Many thanks to both the laboratories and the Mining Houses for their ongoing support of this survey.

Kind regards,

Stuart Romero BSc, BEng

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REPORT ON LABORATORY SURVEY – October 2017

A round robin to measure the accuracy of gold, silver, sulphur and base metal analyses from 222 laboratories was conducted during October 2017. The results of this survey are a measure of the ability of a laboratory to accurately analyse a pre-prepared pulp.

The ability of a laboratory to crush, split and prepare the sample without contamination is not measured by this survey. Knowledge of sampling machinery and the ability to design efficient flow systems with in-built homogeneity checks is required in order to develop confidence in the sample preparation.

The samples submitted to the laboratories consisted of:

- 10 gold samples
- 5 low level gold samples
- 6 gold and silver on carbon samples
- 10 geochemical base metal samples
- 6 ore-grade base metal samples
- 10 sulphur and carbon samples

Companies operating more than one laboratory have received extra filler samples, which are not used in the calculations. The Geostats numbering system makes it extremely difficult for any comparison of results from one laboratory to the next. This provides a level playing field for all laboratories, whether they are sole operators or members of a large laboratory group.

We use a double entry system to build an accurate database. Two individuals enter all the data and when complete these two files are cross-checked and the source data is consulted to rectify any errors. The mean values used for calculations in this study are checked visually by preparing histograms. Outliers are removed and the remaining population distributions are tested for normality. All outliers are checked back to the original assay report for a third and final time.

GOLD SAMPLES

Three lots of gold samples were submitted to the laboratories, one lot for fire assay, one for aqua regia digest (or similar) and one for low-level gold. Becquerel Canada performed Neutron Activation Analysis on all samples, reporting a gold + 33 element analysis which has been included at the end of this report. Maxxam Ontario can be contacted through Salima Haniff at SHaniff@maxxam.ca

GOLD AND SILVER ON CARBON SAMPLES

Six gold and silver on carbon samples were included in this survey, both loaded and barren. The method of analysis for these samples was left up to the individual laboratories.

GEOCHEM BASE METAL SAMPLES

The base metal samples were analysed for copper, lead, zinc, nickel, arsenic, silver and cobalt. The method of analysis for base metal samples was left to the discretion of the laboratory manager. However, the report groups them into Total (typically 4 acid digest or fusion) and Partial (all others, mainly aqua regia) methods. Becquerel Canada performed Neutron Activation Analysis and these have been included in the Total digest group. Methods are listed in the results page for the respective analyte.

ORE GRADE BASE METAL SAMPLES

Six ore-grade and/or concentrate samples are included in the survey. These are assayed primarily for copper, lead, zinc, nickel, silver and sulphur. Other elements are reported but not in sufficient numbers for inclusion in the report. These high-grade materials are analysed at the chemist's discretion but almost always using ore-grade techniques. Some use classical analyses while others use XRF or other methods. However, some of these products have, for example, high lead but low copper and the method for copper analysis may be inappropriate for low levels. Owing to this characteristic, only higher grade analyses are plotted in the related charts.

SULPHUR SAMPLES

Ten samples for sulphur and carbon analysis were prepared for the survey. These ten new samples are a good mix of values with sulphur values up to 22% and carbon values up to 5.8%.

All of the certified reference materials used in this survey are available for purchase.

RESULTS

The results of the analyses are presented in three forms:

1. A table showing values as reported from the laboratories. These are presented in columns according to their respective sample identifiers, with each result's standardised Z value also displayed. Outliers are highlighted and assigned a Z value of 3.00 or -3.00. General statistics are listed at the top of each table.
2. Bar chart for each element showing the sum of absolute standardised values divided by the count of absolute standardised values.
3. Bar chart for the mean of standardised values.

EXAMINATION OF RESULTS - METHODOLOGY

1. Double entry of all data and validation by cross-checking. Confirm any anomalous values.
2. Produce basic statistics on results, including:
 - a. count
 - b. mean
 - c. median
 - d. standard deviation
 - e. minimum
 - f. maximum
 - g. error (95% Confidence Interval)
 - h. percentage error of mean (error as a percentage of the calculated mean).
3. Produce summary statistics and assay sheet.
4. Run outlier macro to find obvious outlier values.
5. Generate 'Z' intervals for remaining data (from calculated mean).
6. Check that median and mean are similar to verify a normal distribution.
7. Standardise remaining values i.e. subtract the mean and divide by the standard deviation.

8. Add results from each laboratory in 'standardised values' calculations (positive and negative) and divide by count.
9. Produce 'Mean of Standardised Values' Bar Charts.
10. Add absolute values from each laboratory in 'standardised values' calculations.
11. Divide result by count of results to calculate average absolute standard value for laboratory performance on each element.
12. Produce 'Mean of Absolute Standardised Values' Bar Charts.

CHARTS

The 'Mean of Standardised Values' charts (blue in reports) indicate any bias shown by laboratories on a particular element, but do not show any general error which might be plus and minus the mean. The 'Mean of Absolute Standardised Values' charts (red in reports) indicate the general error but no bias.

INTERPRETATION OF RESULTS

SUMMARY STATISTICS AND ASSAY TABLES

These tables are self-explanatory. The row titled 'error' refers to the margin of error expected at 95% confidence. That is, the standard normal probability or 'Z' statistic representing 95% (1.96) is multiplied by the standard deviation and the result is divided by the square root of the population. We can be 95% confident that the true mean lies between mean minus error and mean plus error. The row titled '% error in mean' is simply this margin of error expressed as a percentage of the calculated mean. Outliers are highlighted and not used for calculations at the top of the tables.

STANDARDISED VALUES

These numbers are generated using the following formula. Reported value minus the mean, result of this divided by the standard deviation. This creates a new distribution with mean '0' and standard deviation '1'. Positive and negative numbers result from this calculation depending on whether the reported value is above or below the mean. Laboratories reporting outliers are manually assigned 3.00 or -3.00 as these results have been removed from automatic calculation. The higher the absolute number reported, the further the reported assay is from the calculated mean.

MEAN OF ABSOLUTE STANDARDISED VALUES (RED CHARTS)

The bar representing each laboratory is the mean of the sum of the absolute standardised values reported on all assays of the element in question. That is, the absolute sum of the rows in the Standardised Values Table divided by the number of assays. These charts give a visual representation to the general error shown by the particular laboratories. These charts do not show bias.

MEAN OF STANDARDISED VALUES (BLUE CHARTS)

These charts show the mean of standardised values with negative values included. A direction of error or bias can be interpreted from laboratories showing high values, negative or positive.

BRIEFLY

General error is indicated in absolute column charts (red charts).

Bias is indicated in negative/positive column charts (blue charts).

The column charts show indications of error or direction of error - check the real data in the tables before coming to any decision as to the significance of this error. Also pay attention to the grade of the standard materials with regard to the laboratory level of detection. Some laboratories may report outliers due to the limitations of their methodology.

LEGEND FOR METHODS & READINGS

METHODS

READINGS

1A	1 Acid Digest	AAS	Atomic Absorption Spectroscopy
2A	2 Acid Digest	DIBK	DIBK Extraction
3A	3 Acid Digest	ES	ICP - Emission Spectroscopy
4A	4 Acid Digest	GRAV	Gravimetric
AD	Acid Digest	ICP	Inductively Coupled Plasma - Unspecified
AR	Aqua Regia	IR	Infrared
CSA	Carbon and Sulphur Analyser	MS	ICP - Mass Spectroscopy
FA	Fire Assay	TITR	Titration
FUS	Fusion	XRF	X-Ray Fluorescence
GF	Graphite Furnace		
GRAV	Gravimetric		
IH	In House Method		
MA	Multi-Acid Digest		
MICR	Microwave		
NAA	Neutron Activation Analysis		
PP	Pressed Powder		
PR	Pre-Roast		
TITR	Titration		

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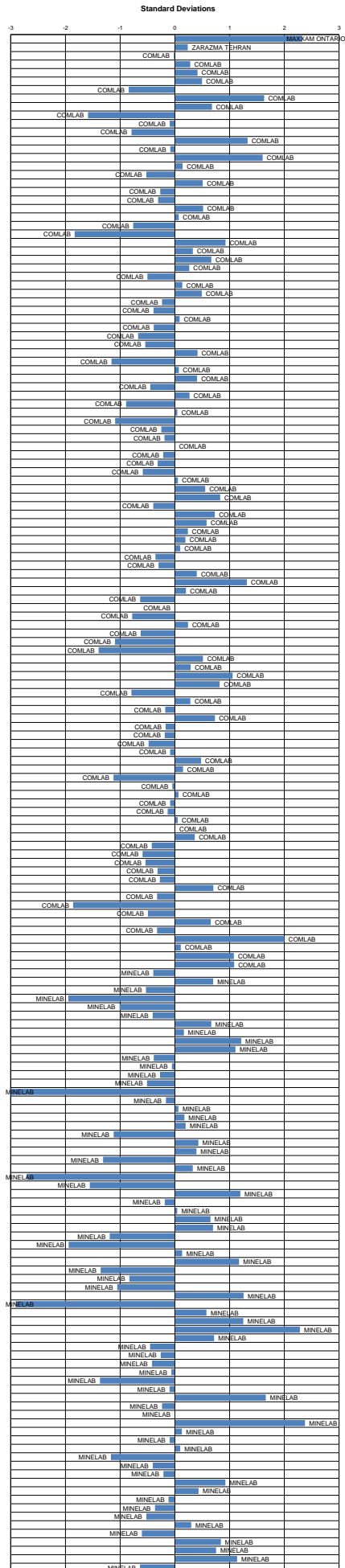
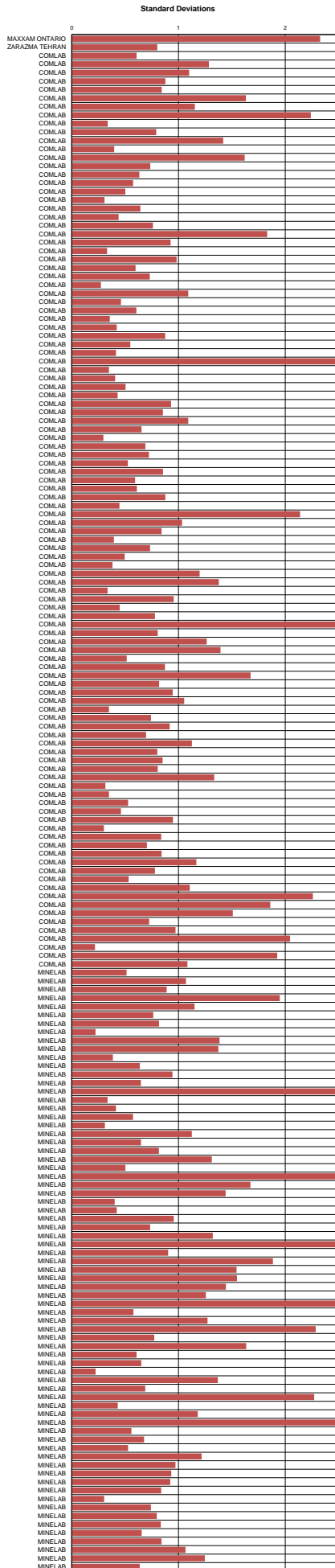
RESULTS OF ANALYSES PRESENTED AS TABLES AND PLOTS

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Aqua Regia Digest Gold	3 & 4
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Silver (Partial Digest)	13 & 14
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Copper (Partial Digest)	17 & 18
Lead (Total Digest)	19 & 20
Lead (Partial Digest)	21 & 22
Zinc (Total Digest)	23 & 24
Zinc (Partial Digest)	25 & 26
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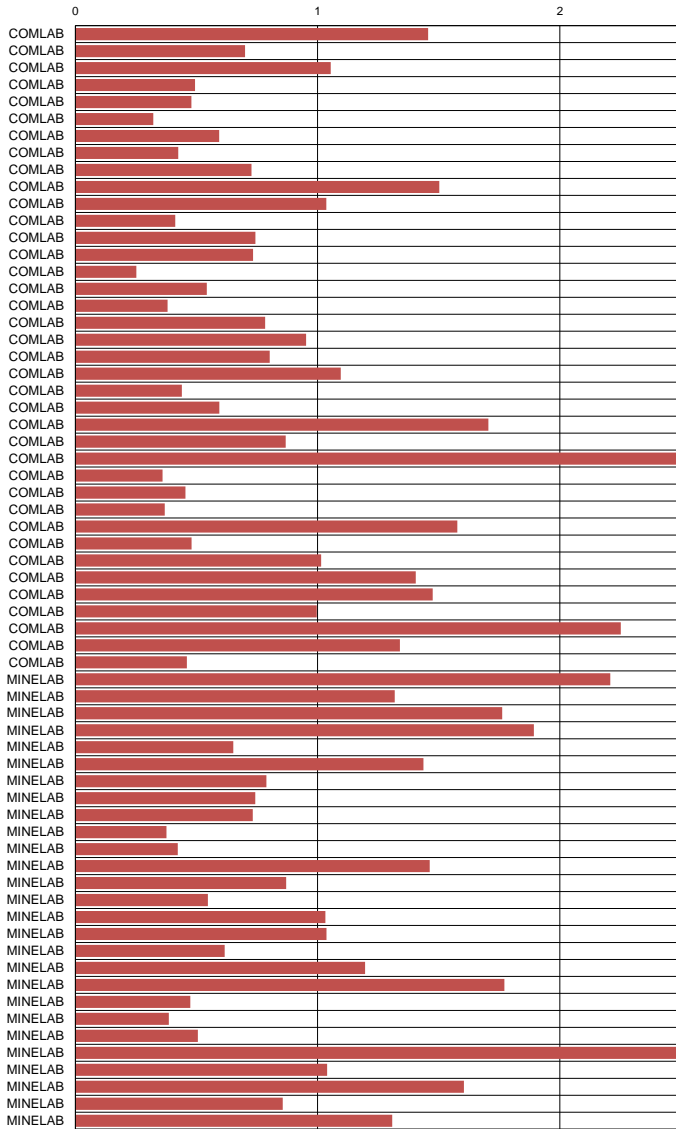
FA50 Gold Round Robin - Summary Statistics, Assays, Standardised Values and Graphs - October 2017

Table with 15 columns: Standard Reference, G917-1, G917-2, G917-3, G917-4, G917-5, G917-6, G917-7, G917-8, G917-9, G917-10, Method, Reading. Rows include various assay types (MAXIMUM OBTAINABLE, ZARZAMA TEHRAN, COMLAB) and numerous assay IDs with associated values and standardized values.

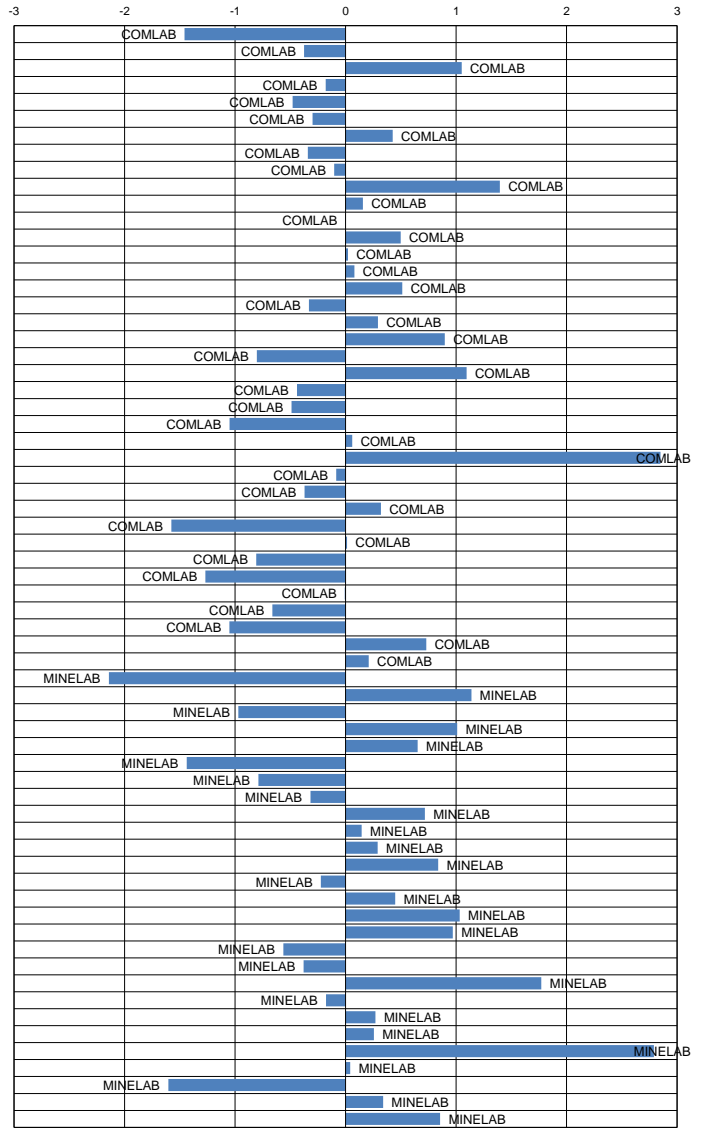
Highlighted values are outliers which are assigned a z-score of >3.00 or <-3.00 in the standardised values.



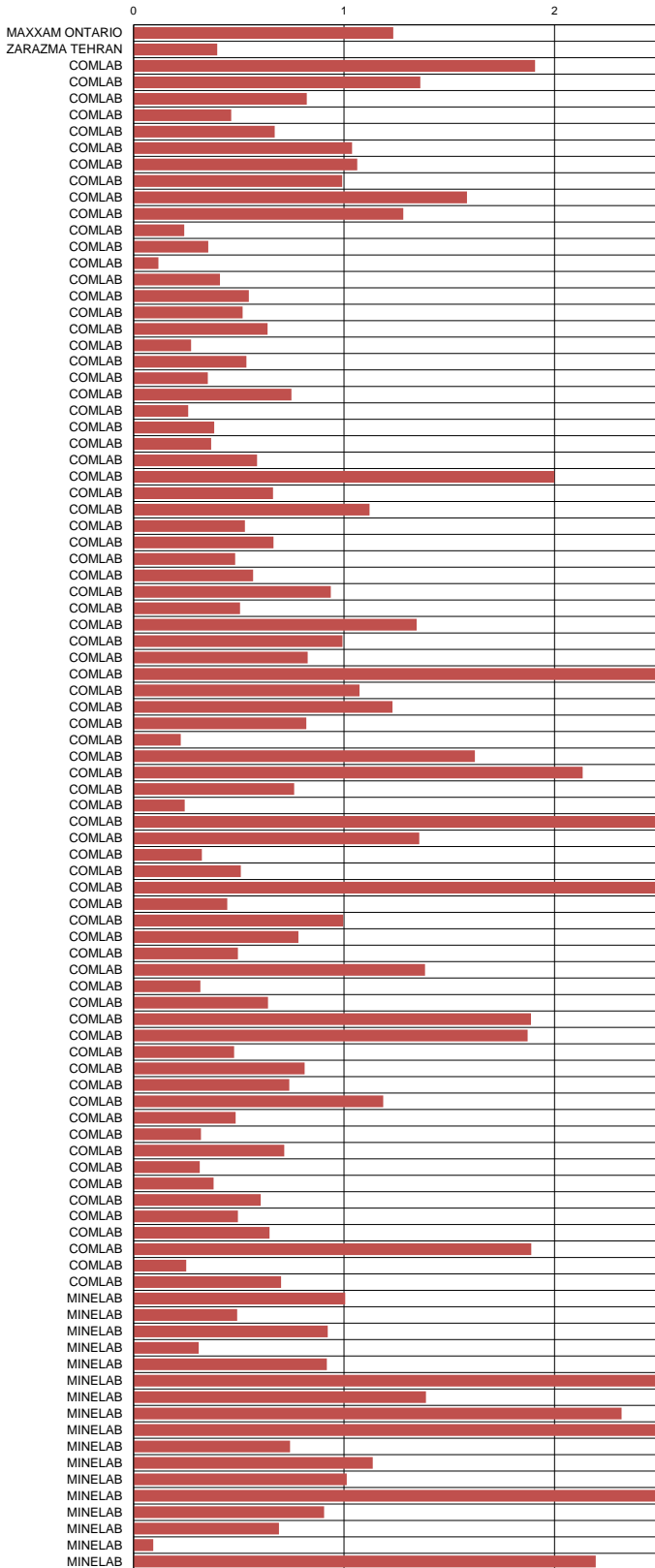
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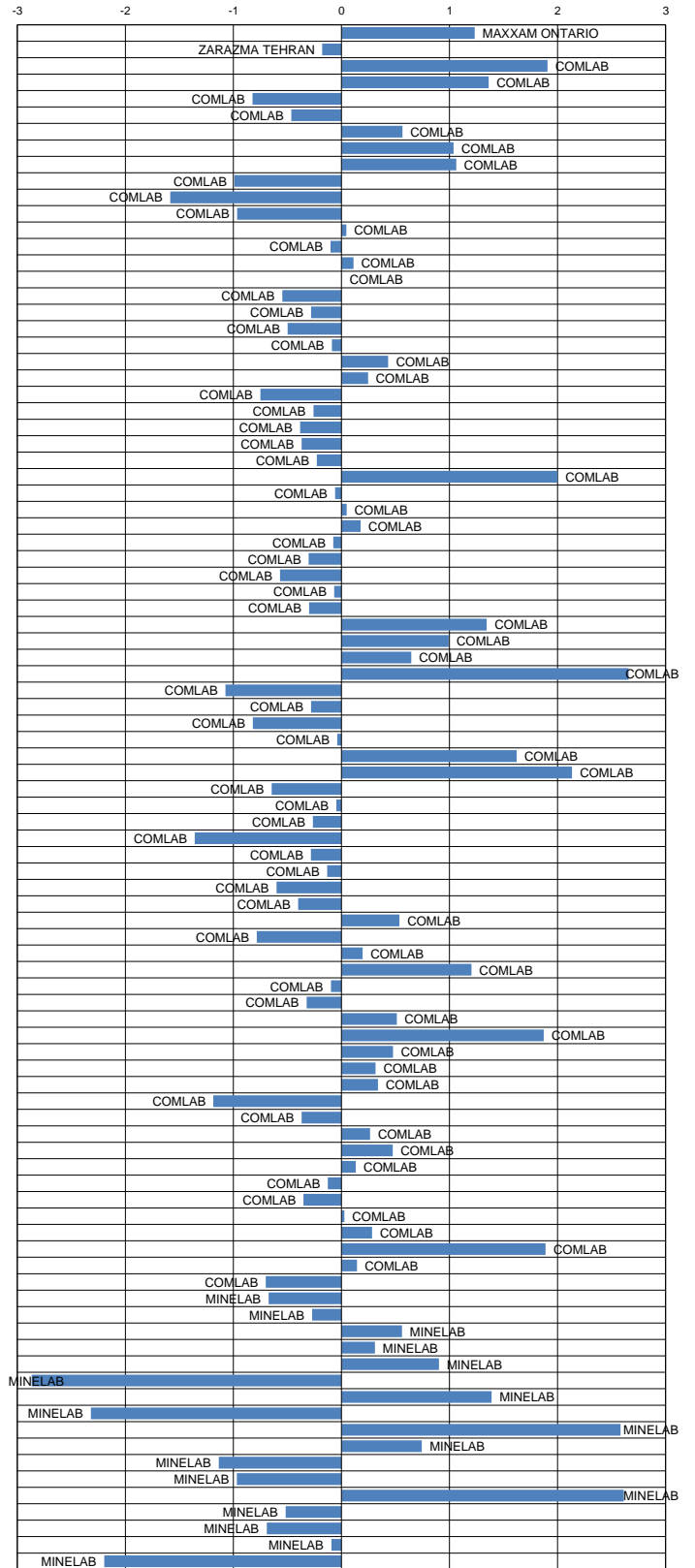
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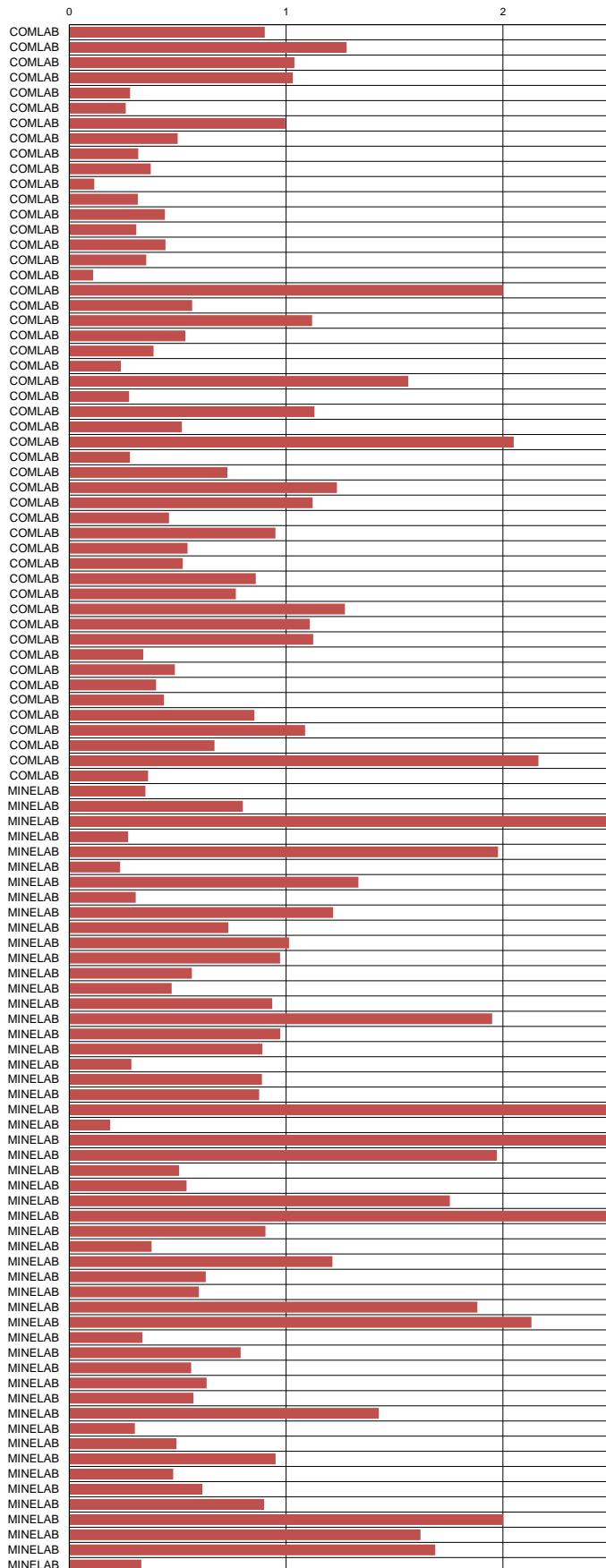
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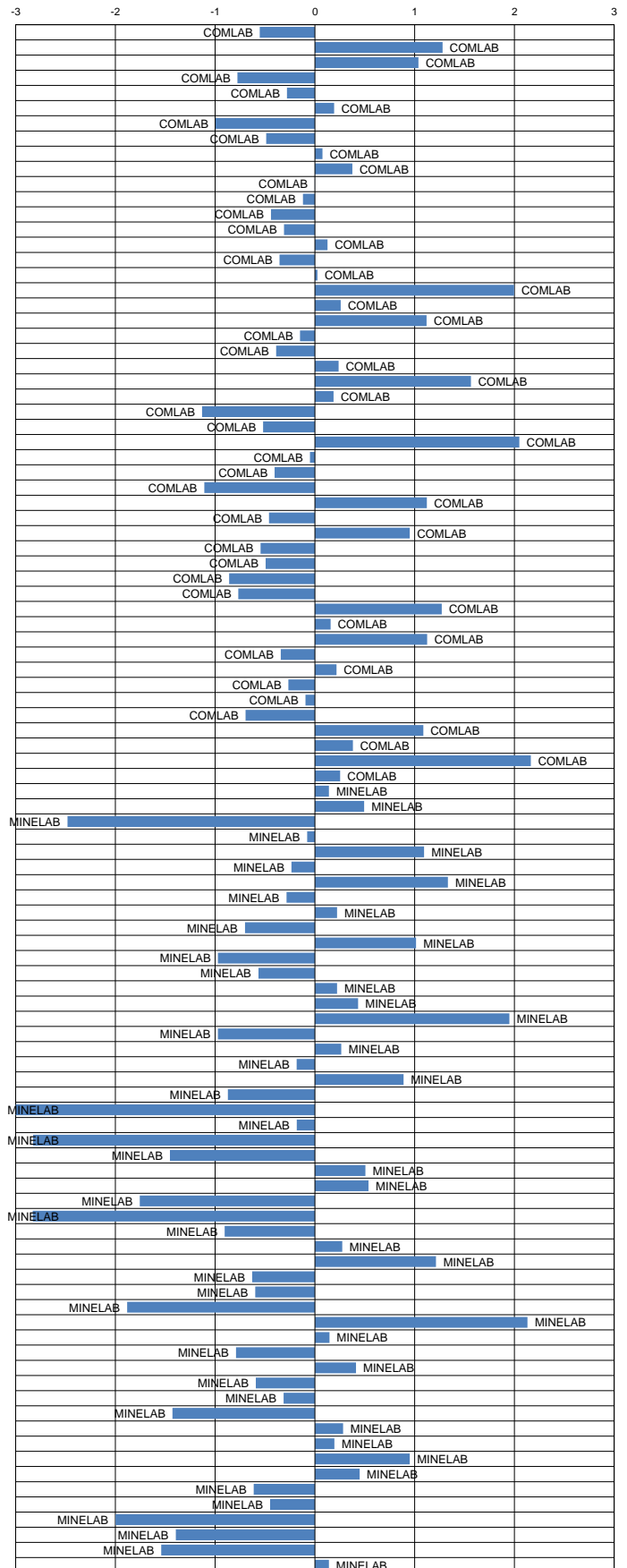
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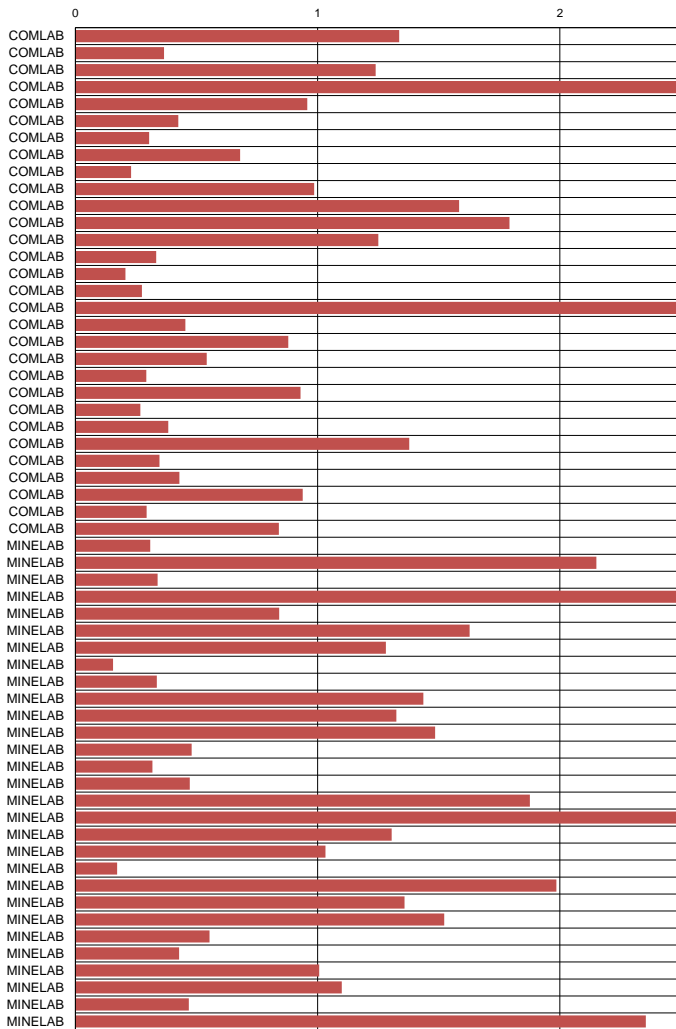
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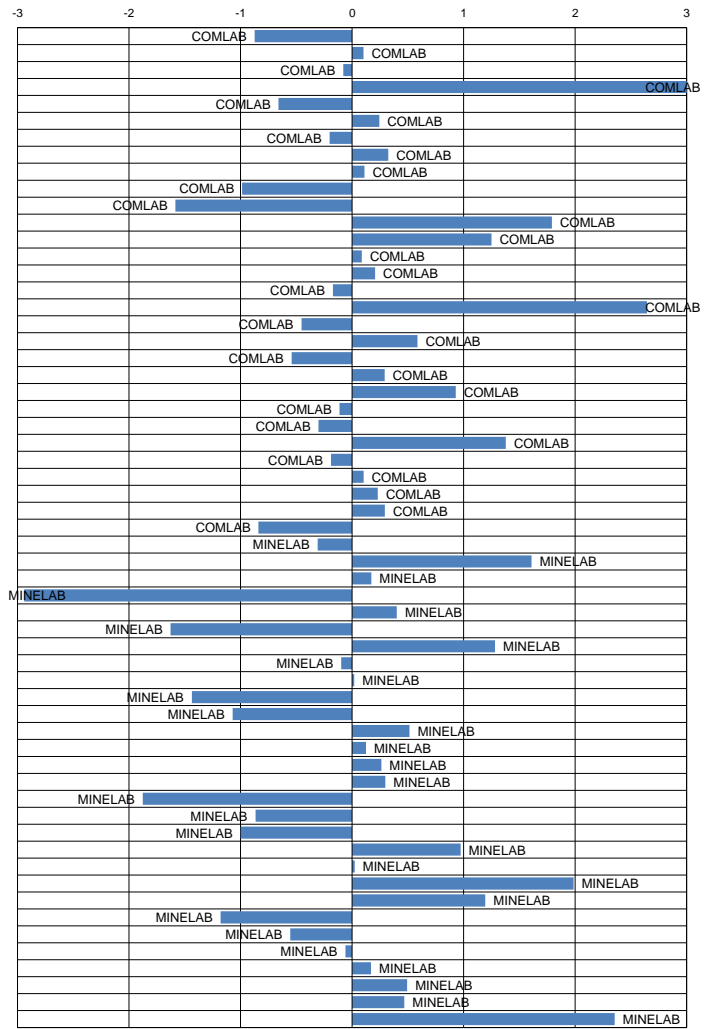
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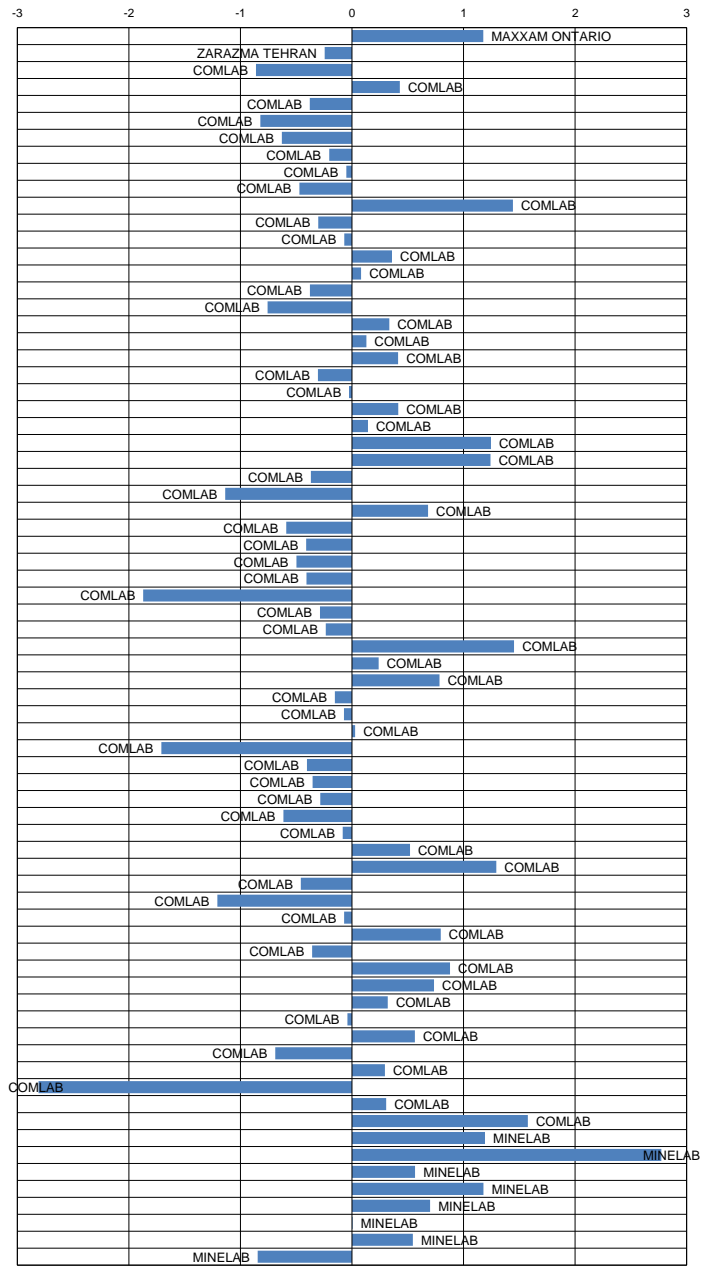
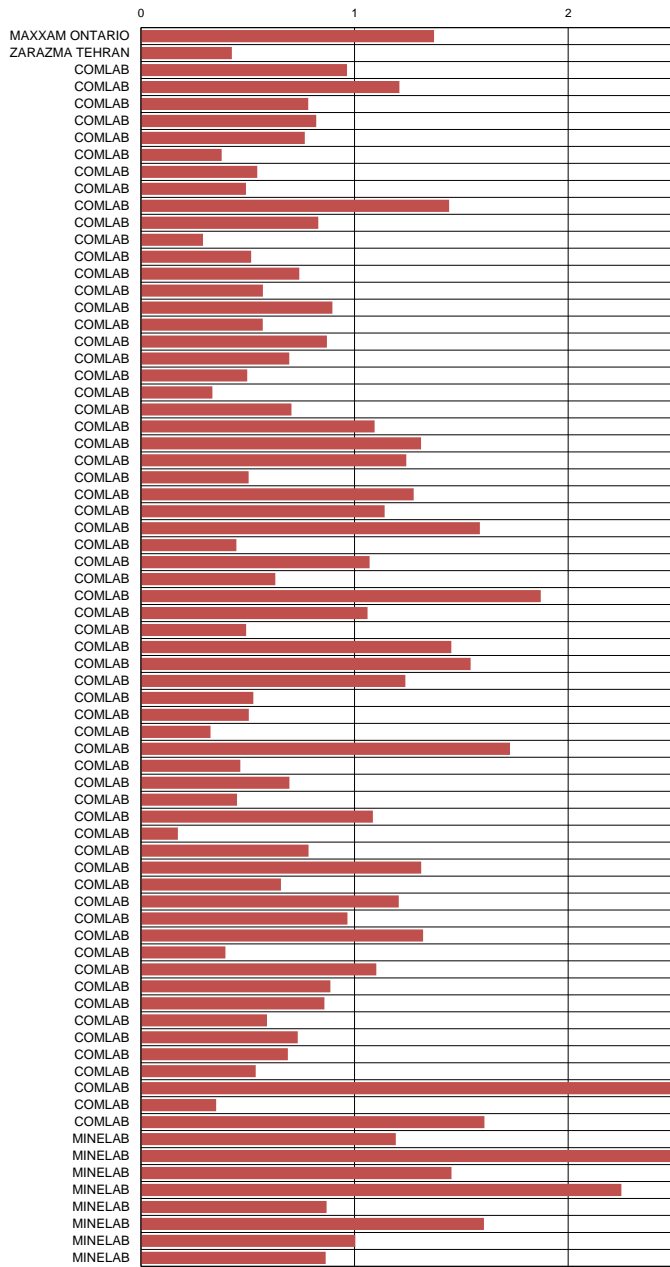


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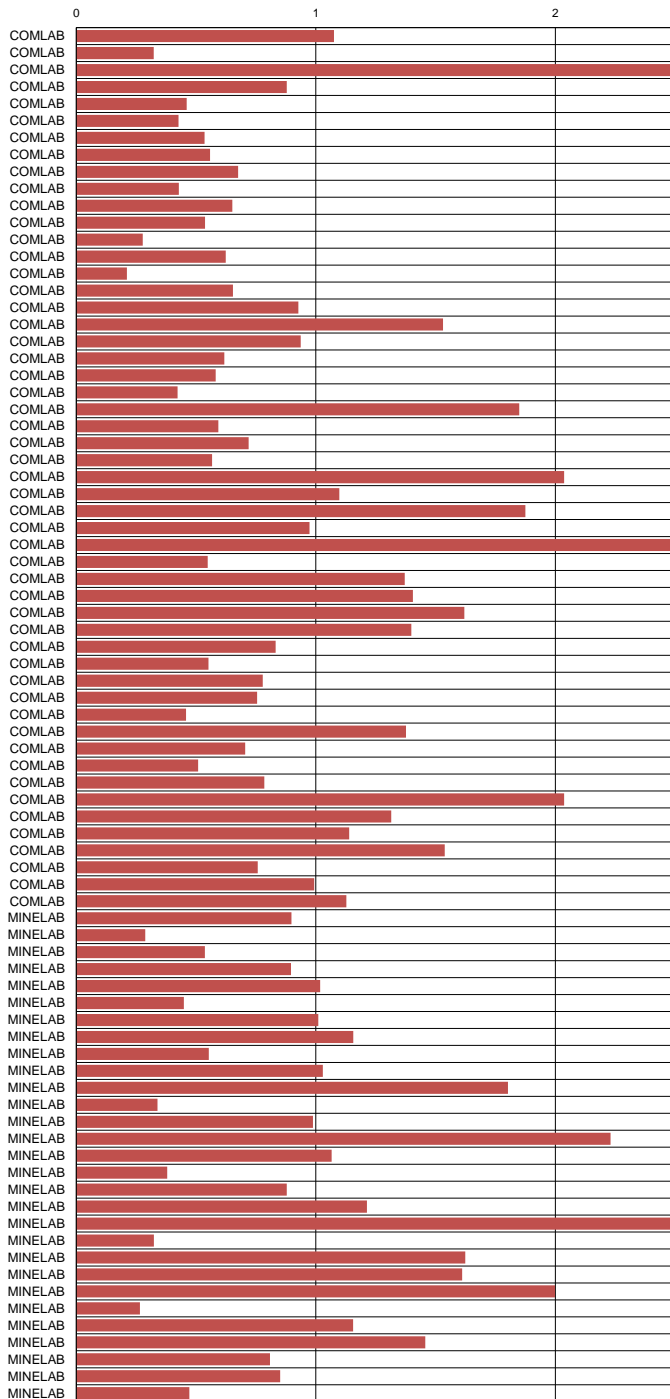


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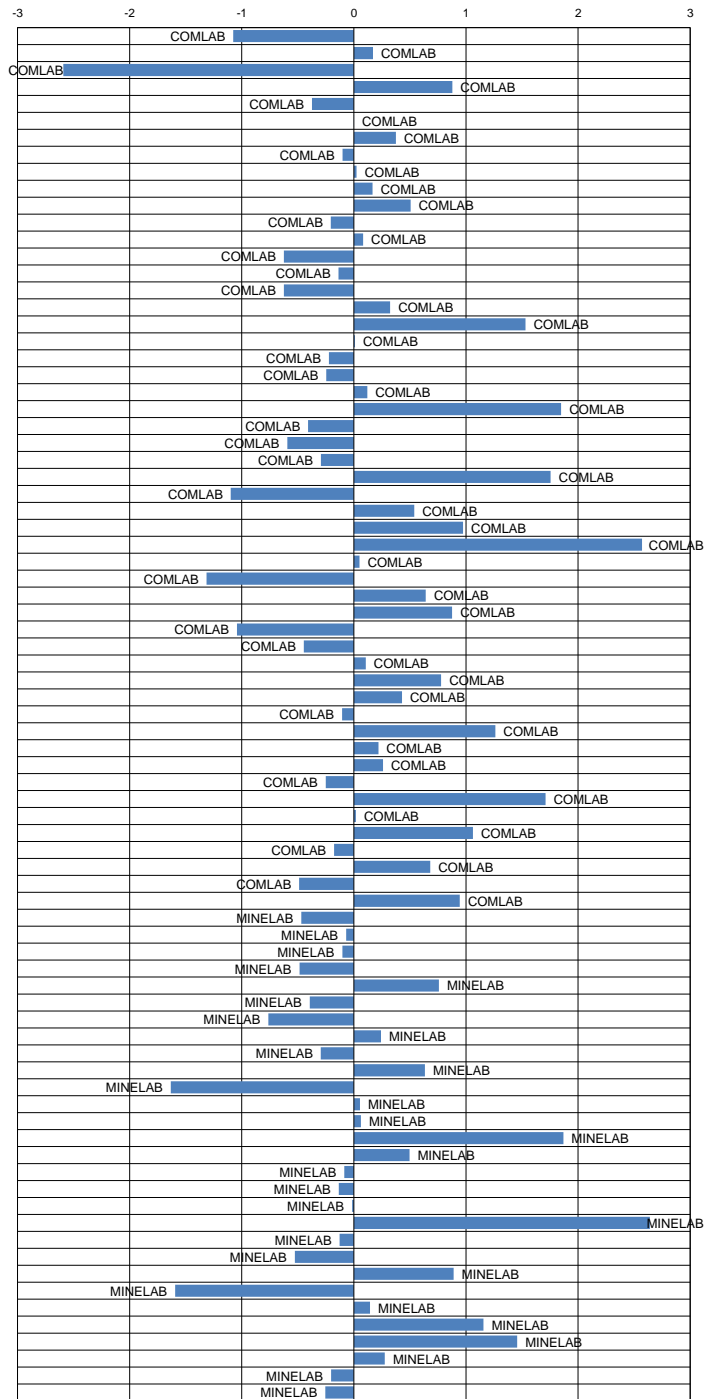
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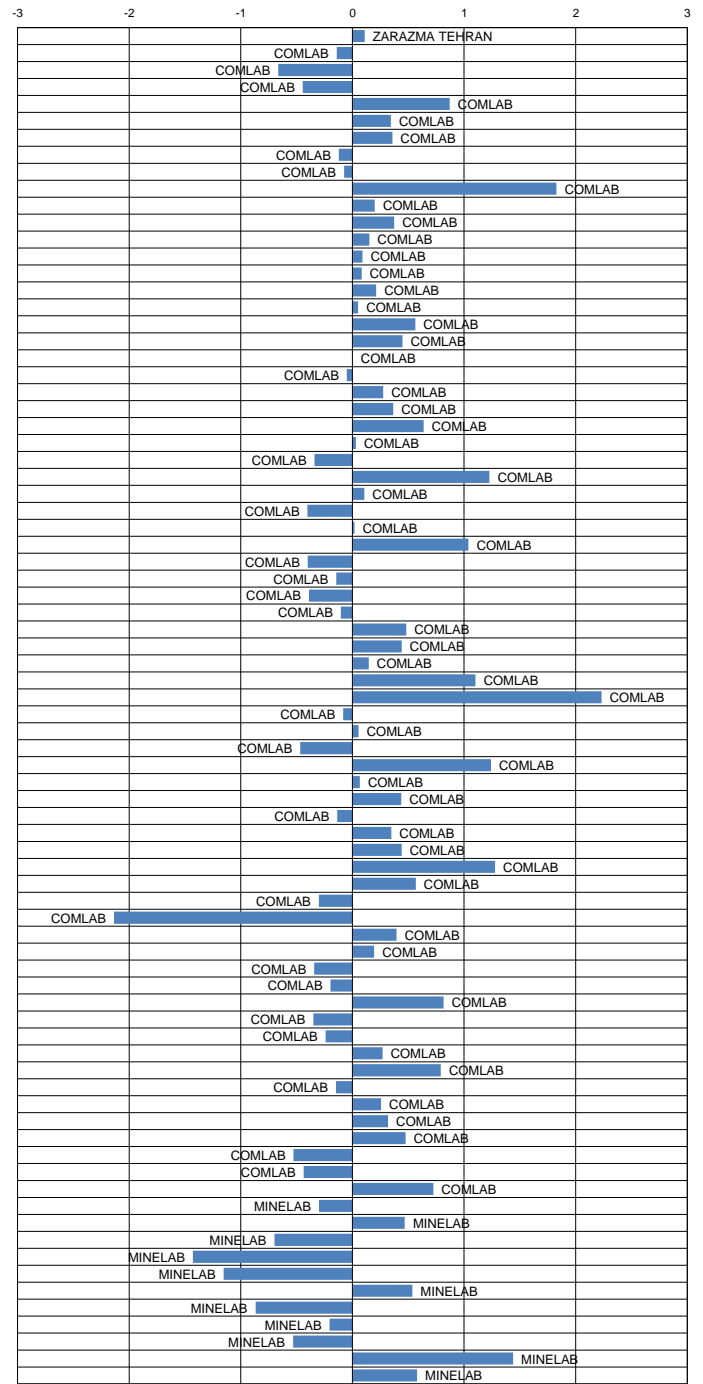
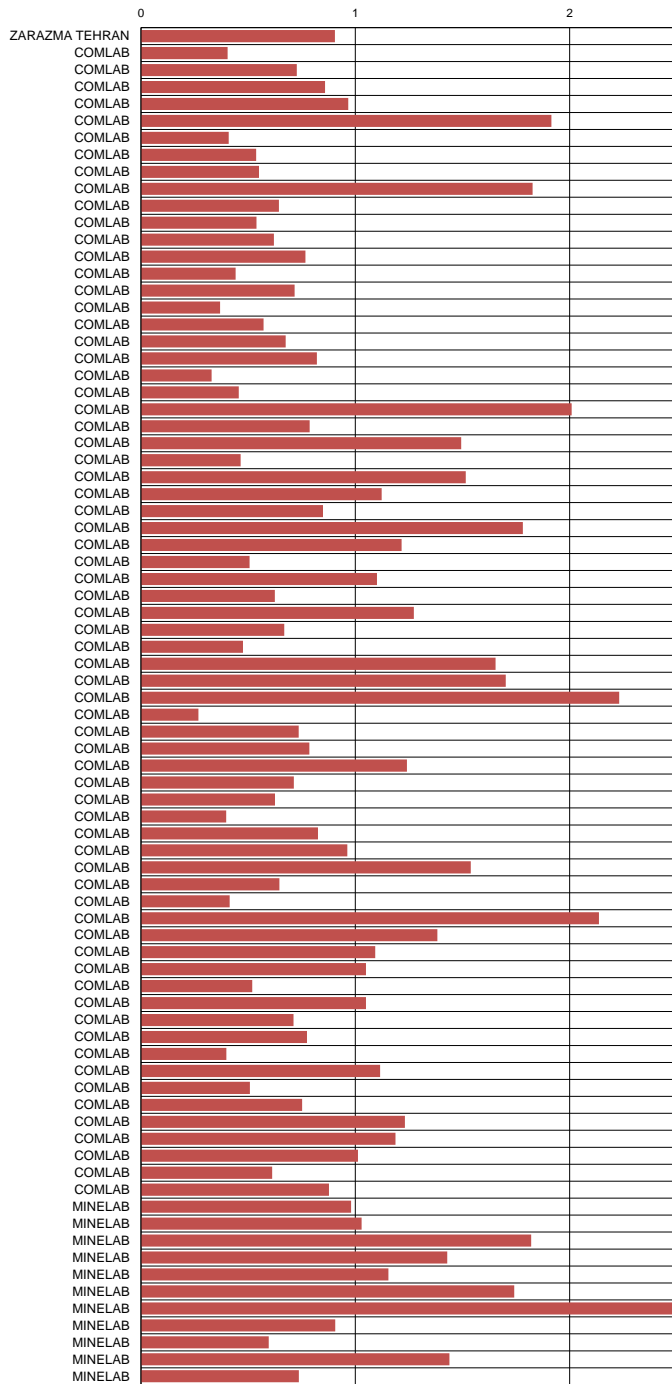


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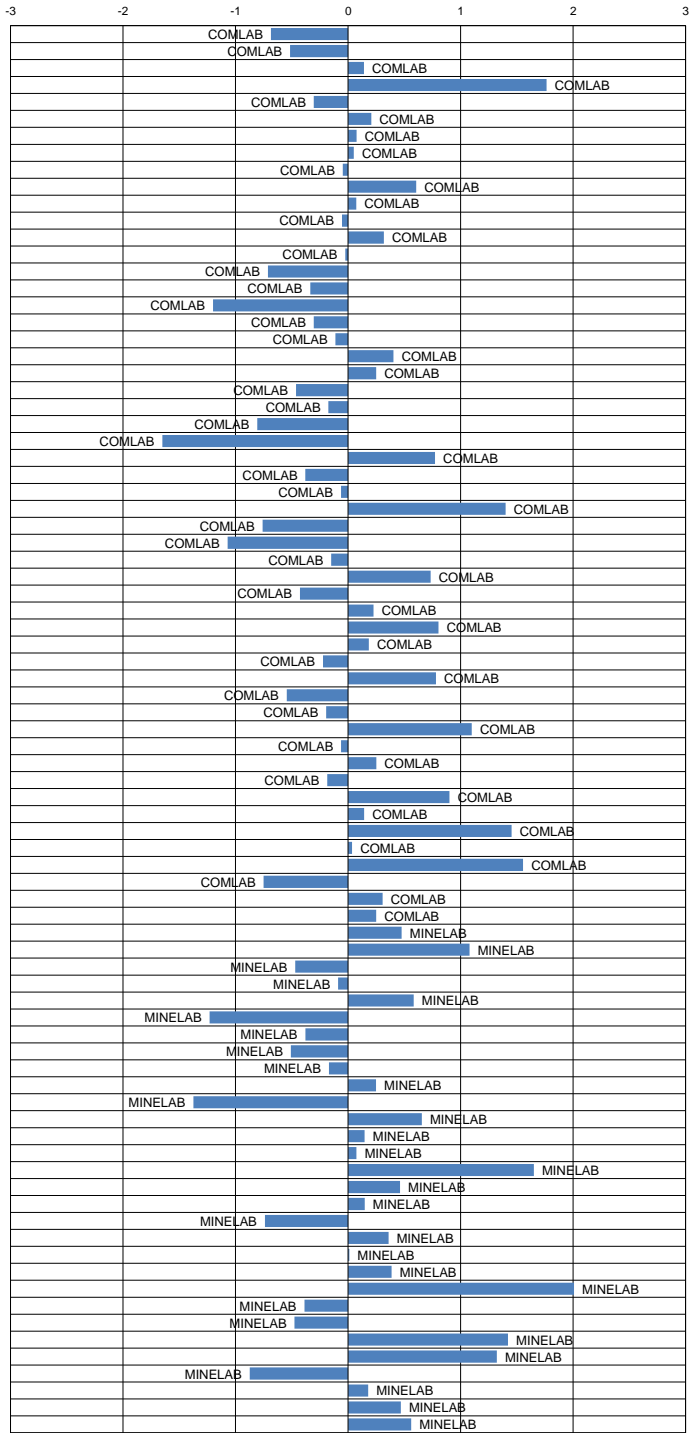
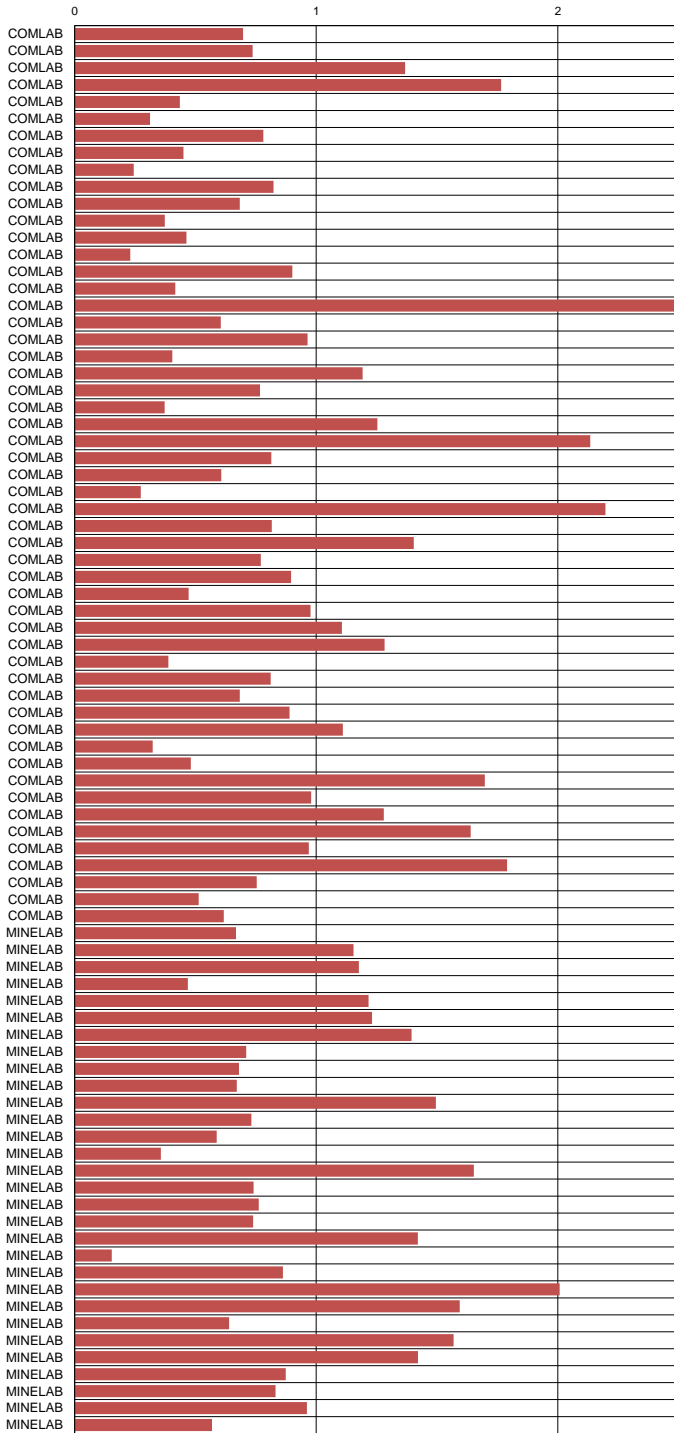
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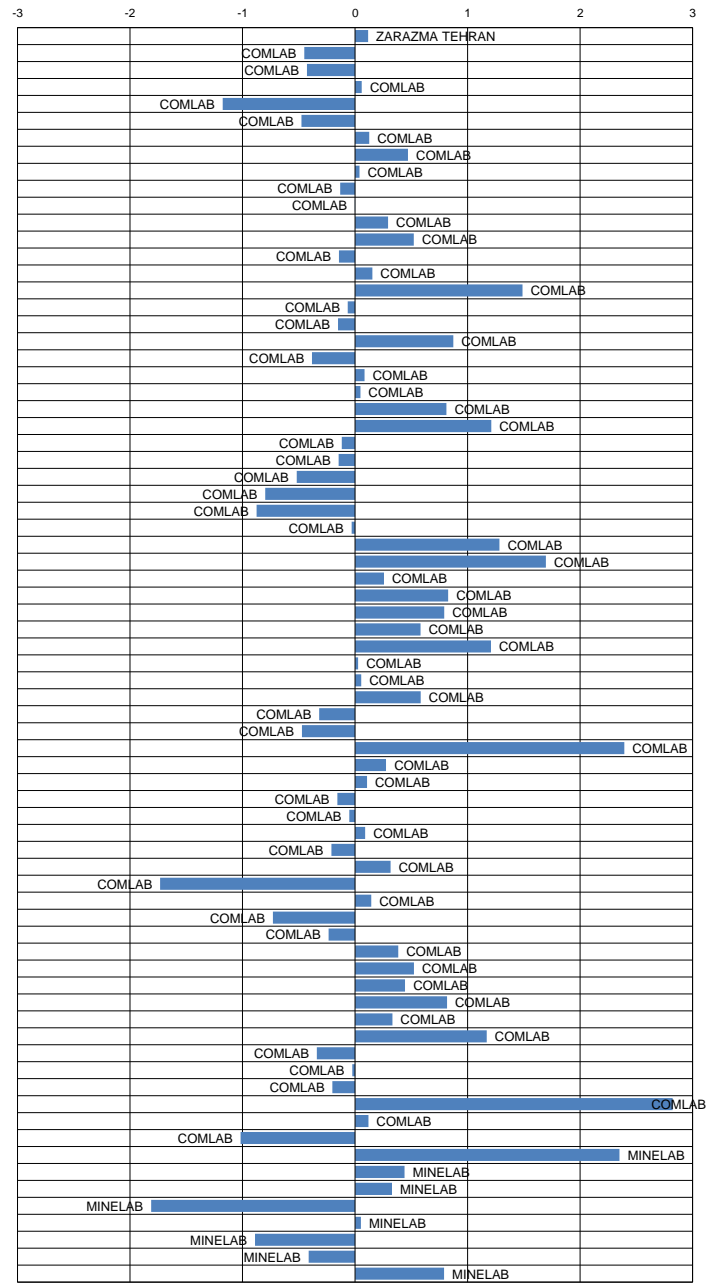
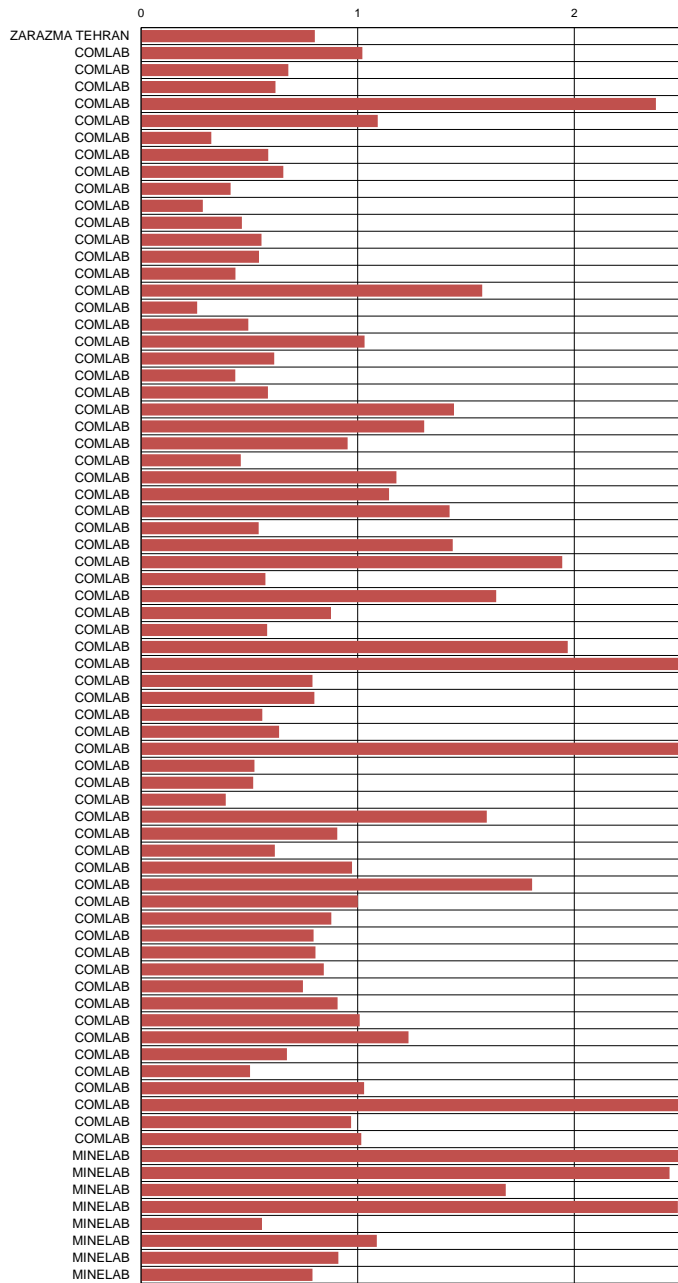
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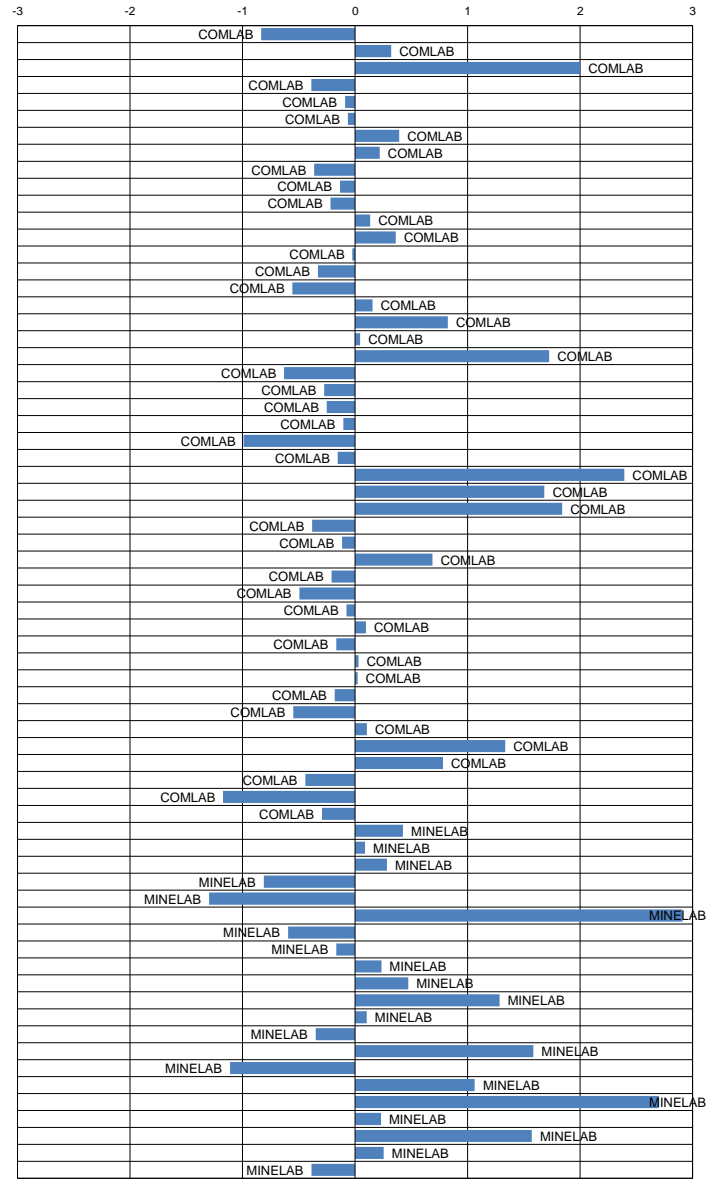
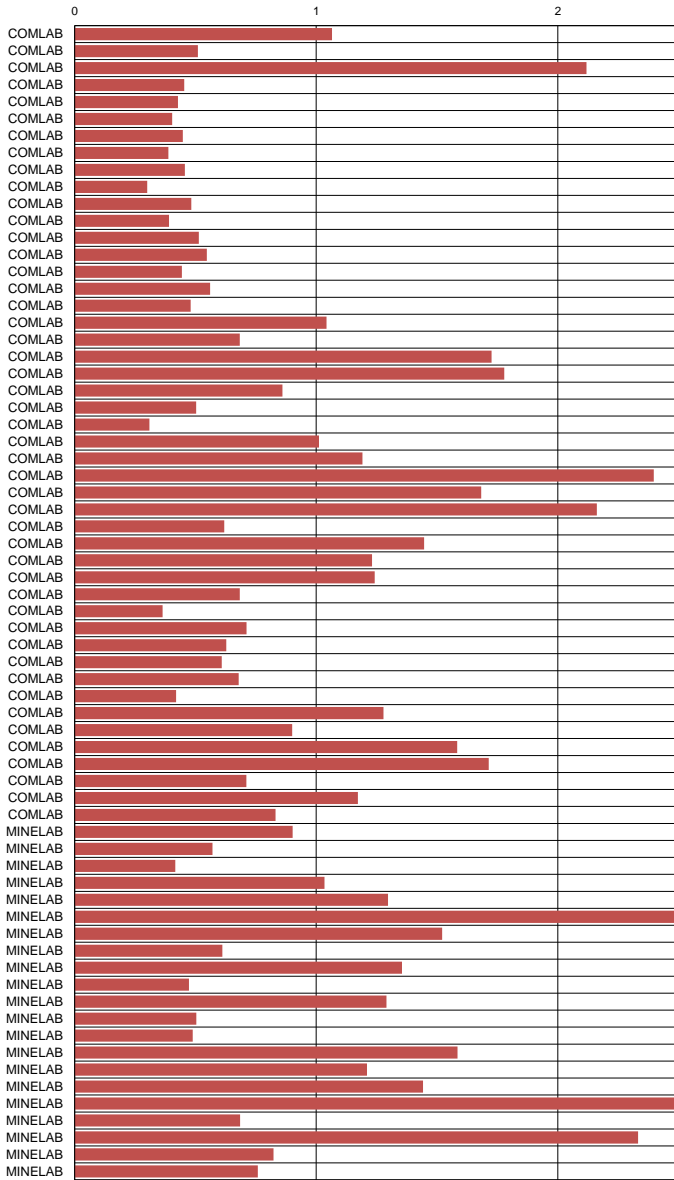
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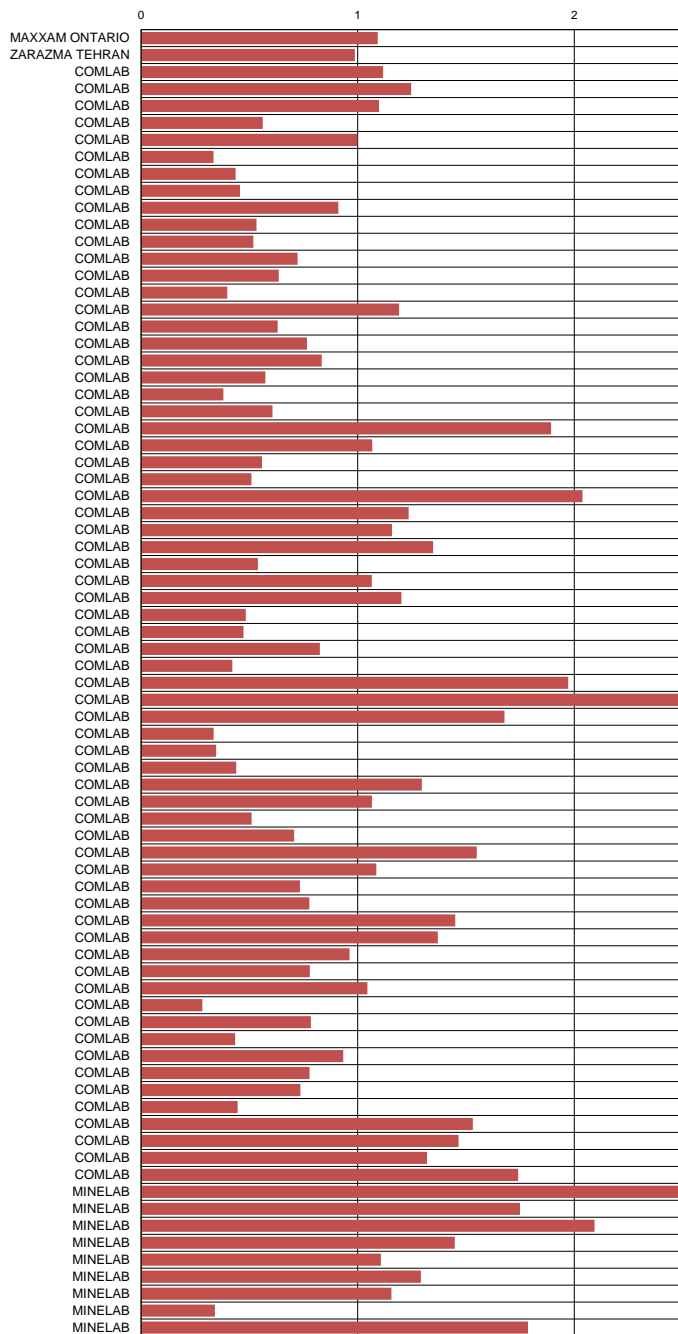


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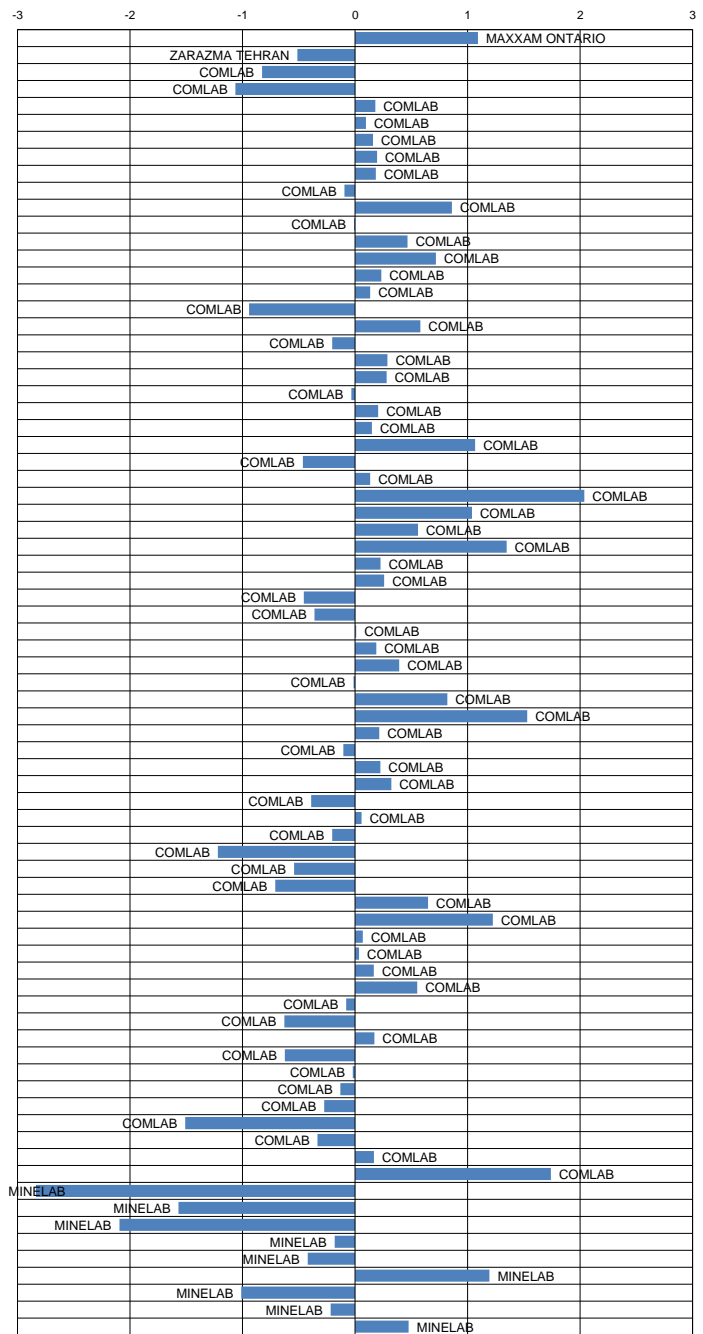
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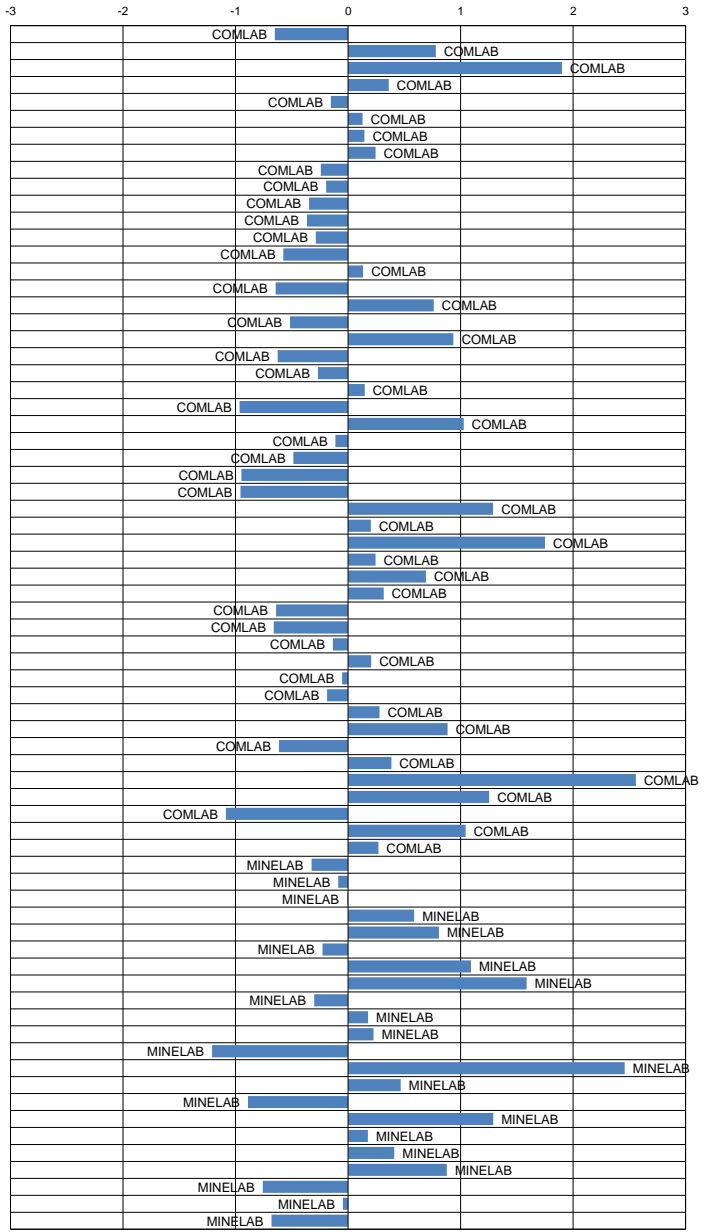
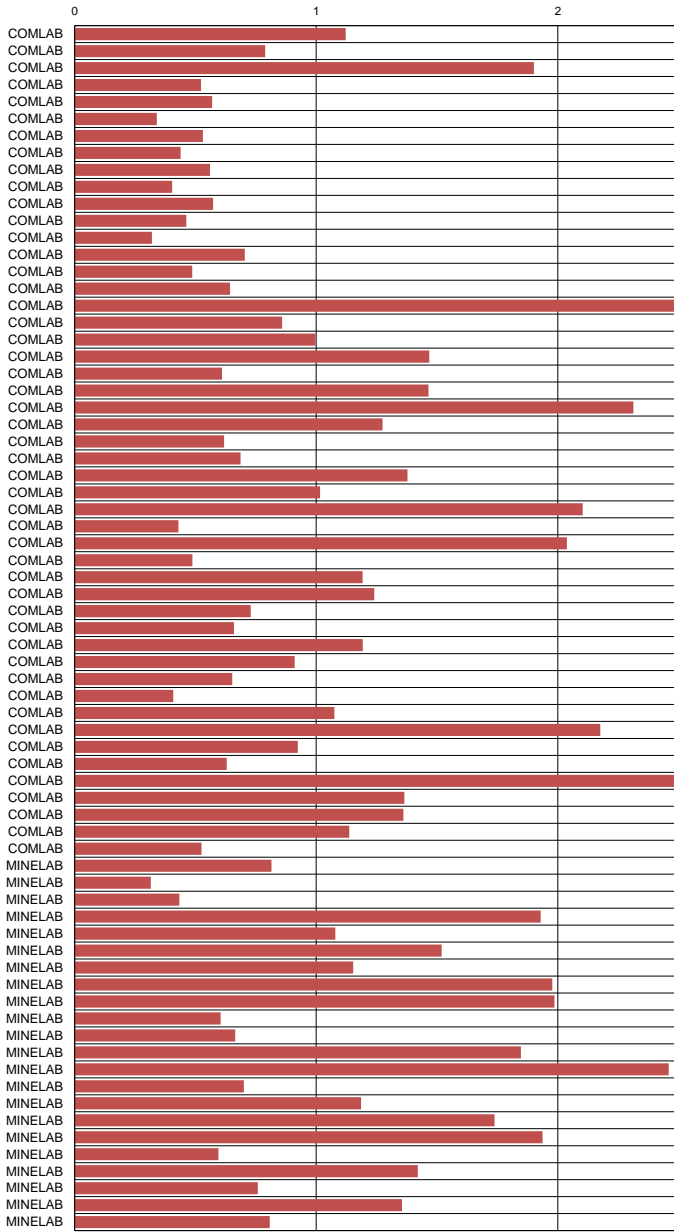


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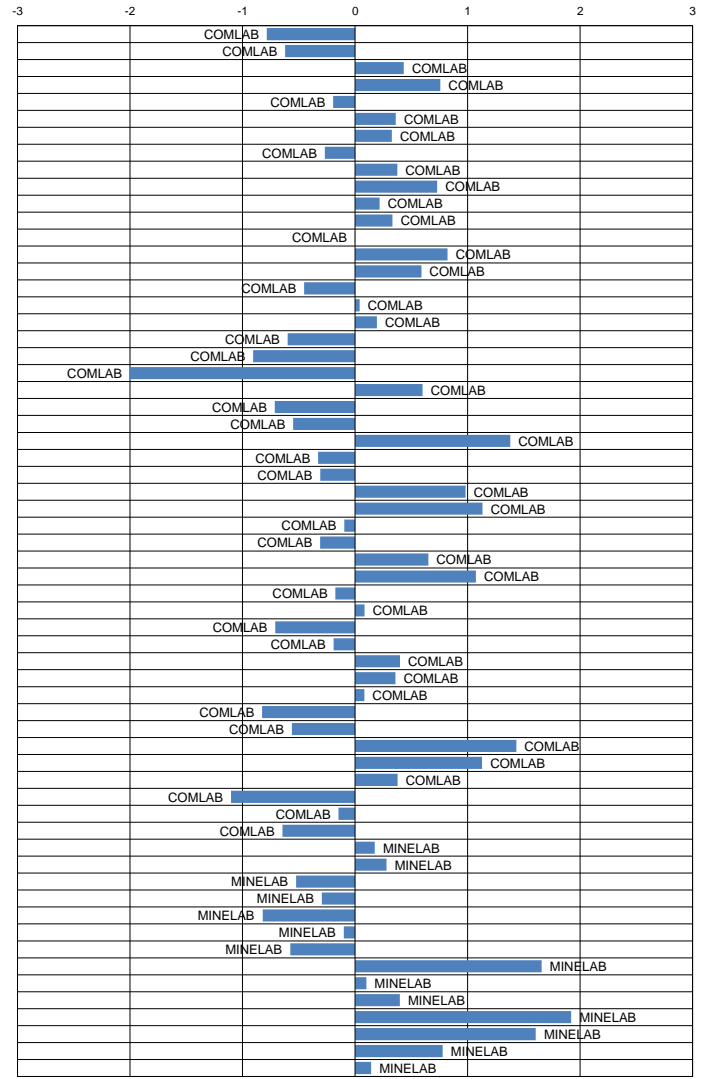
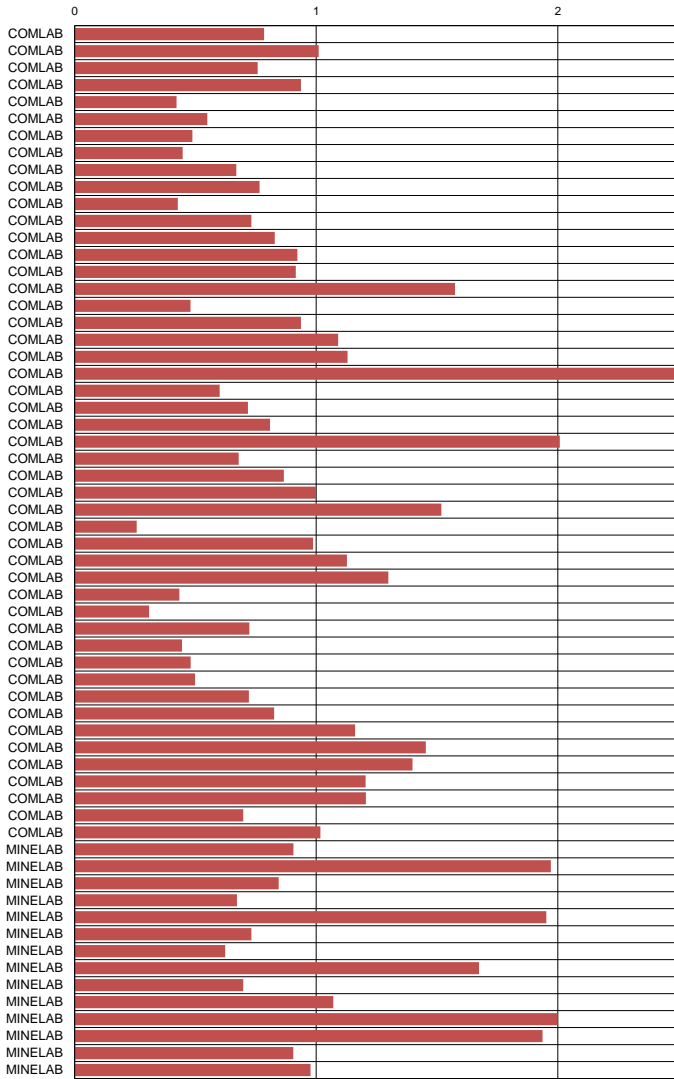
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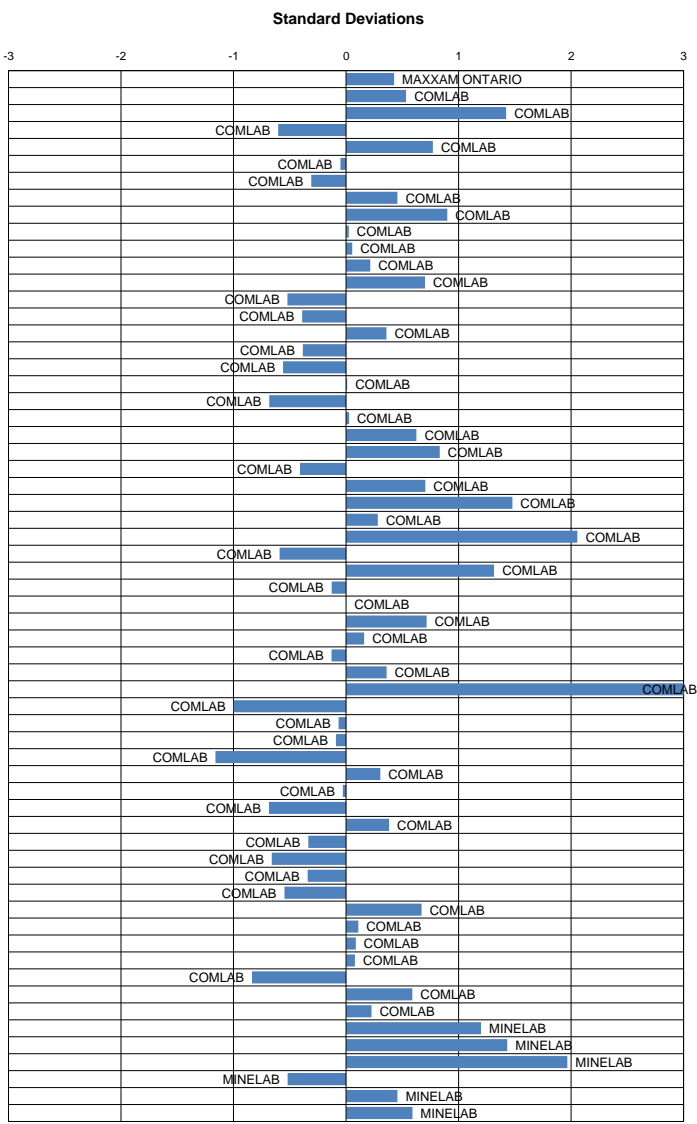
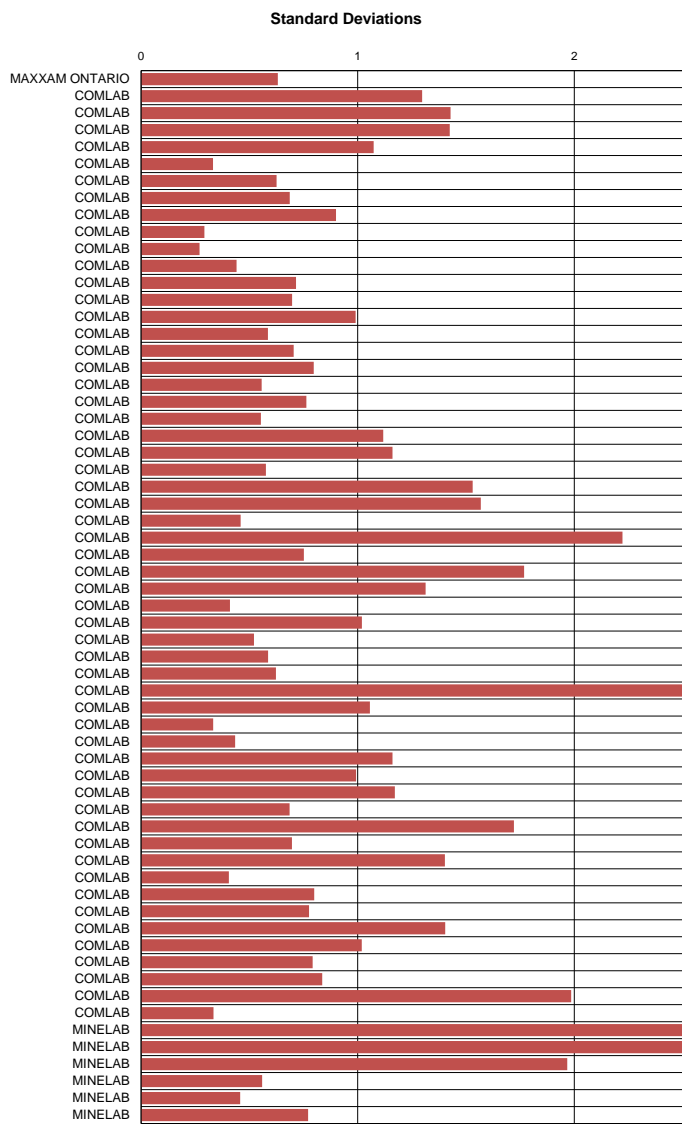
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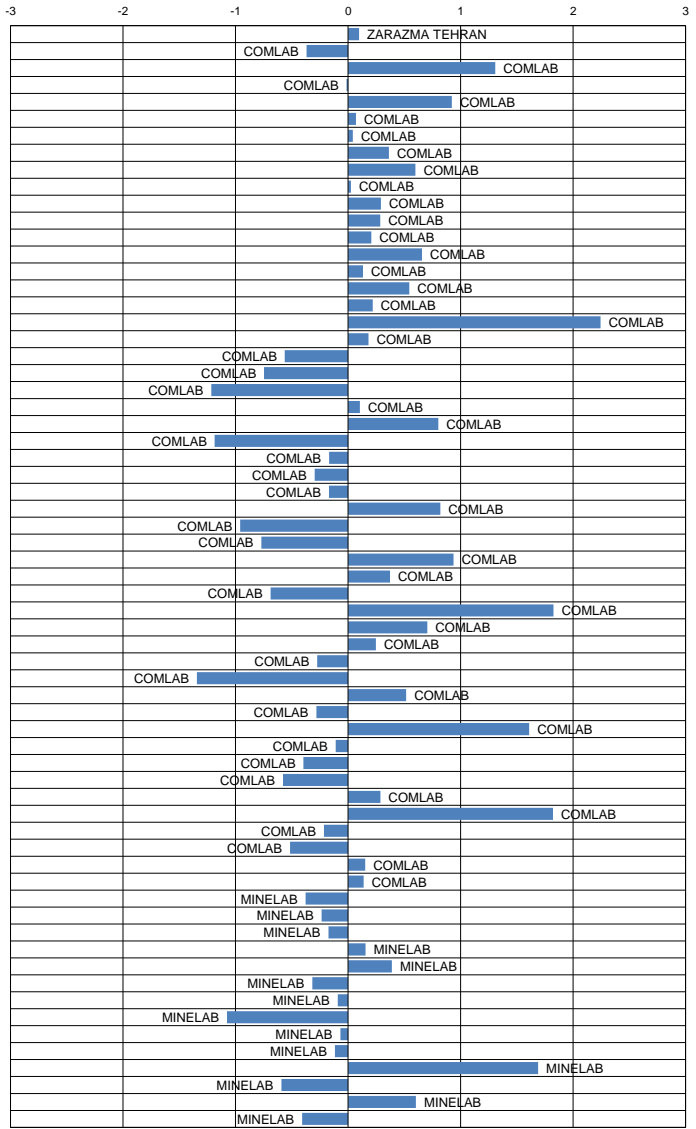
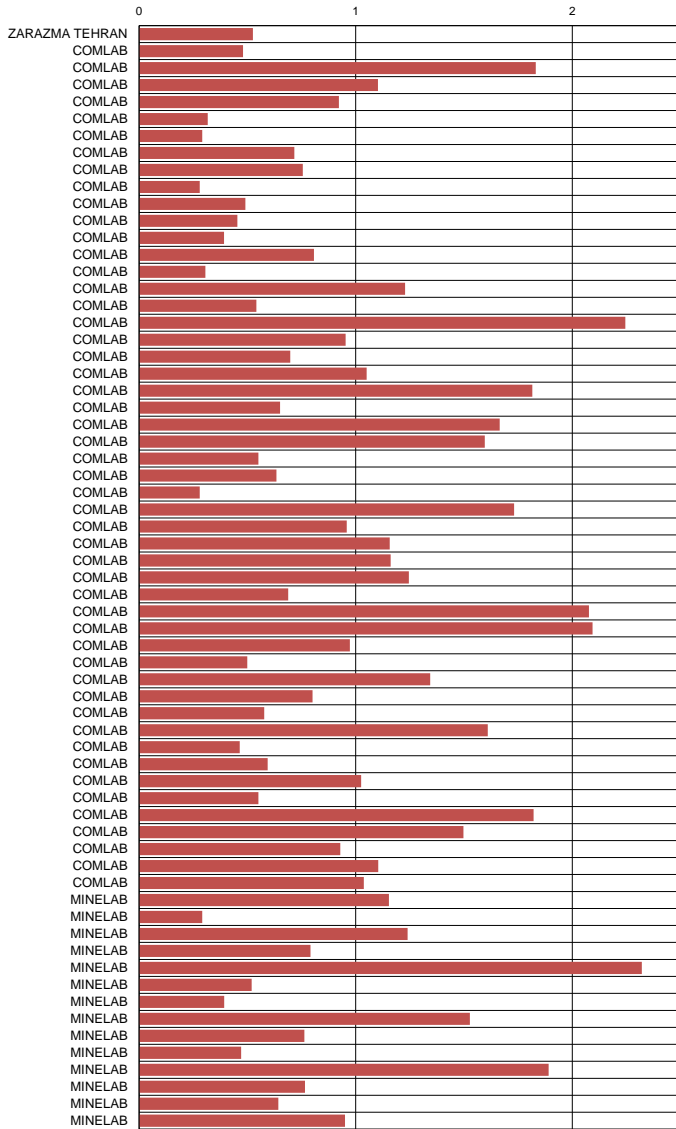
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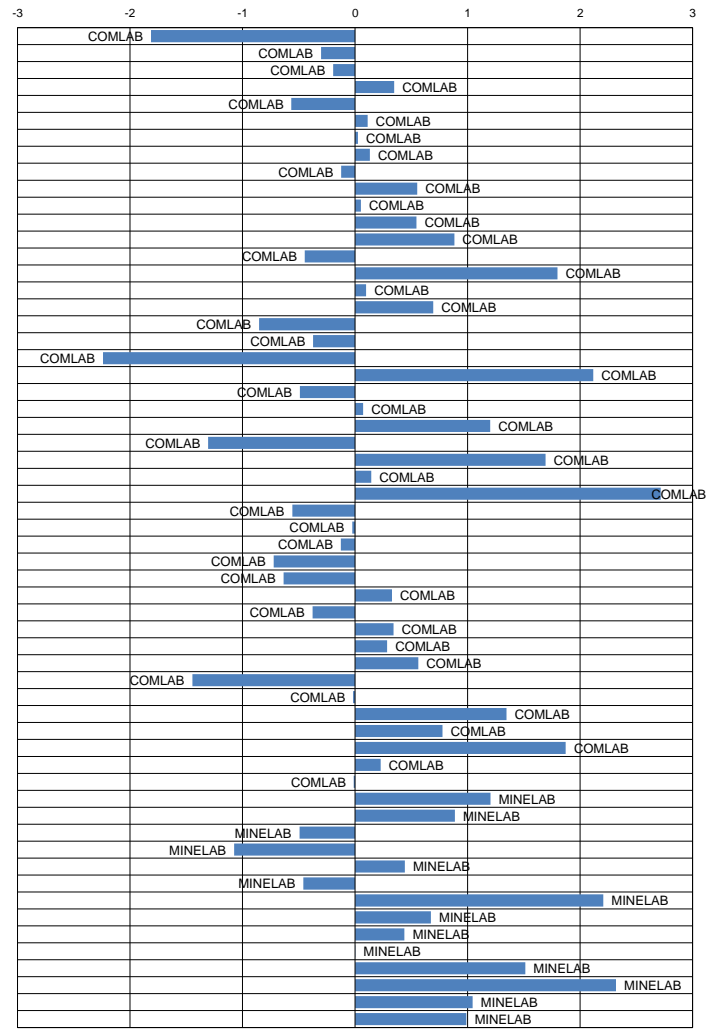
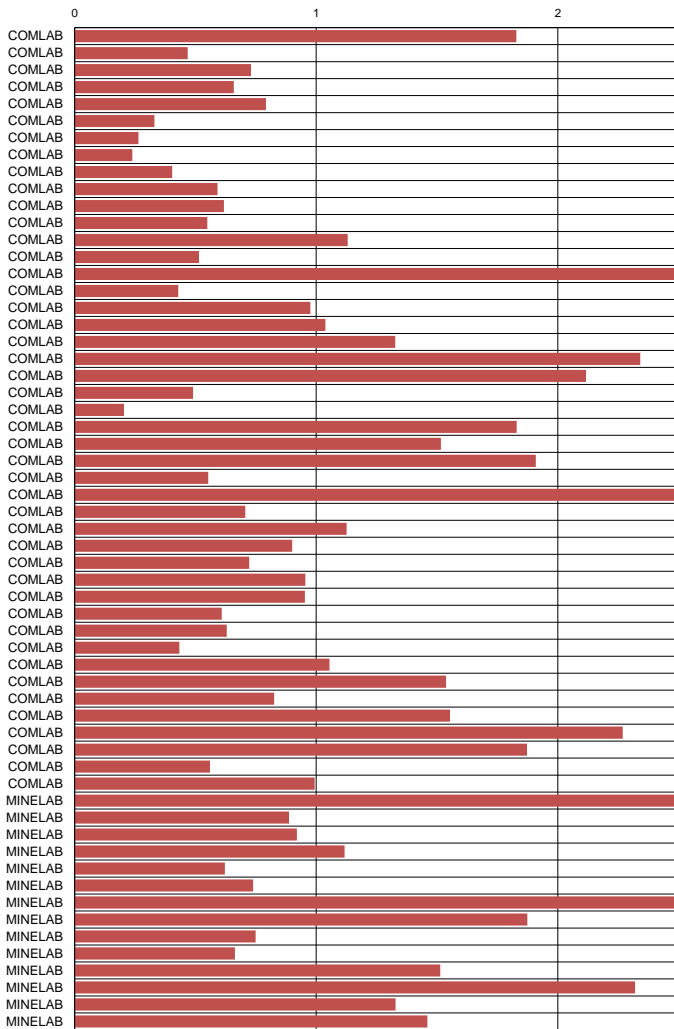
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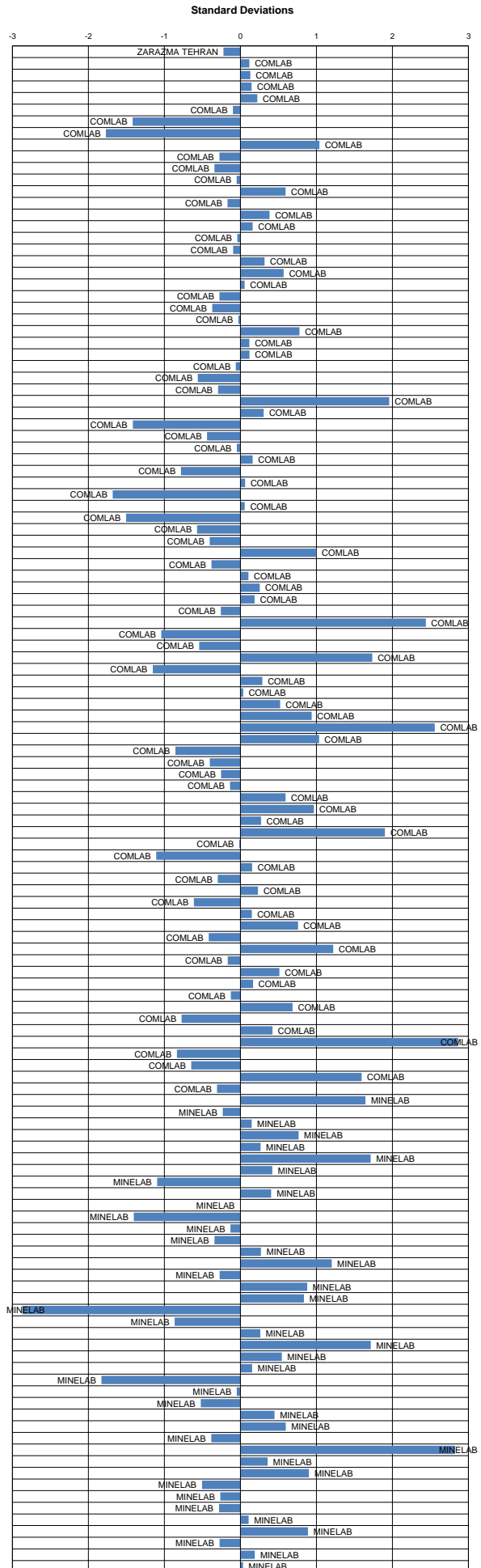
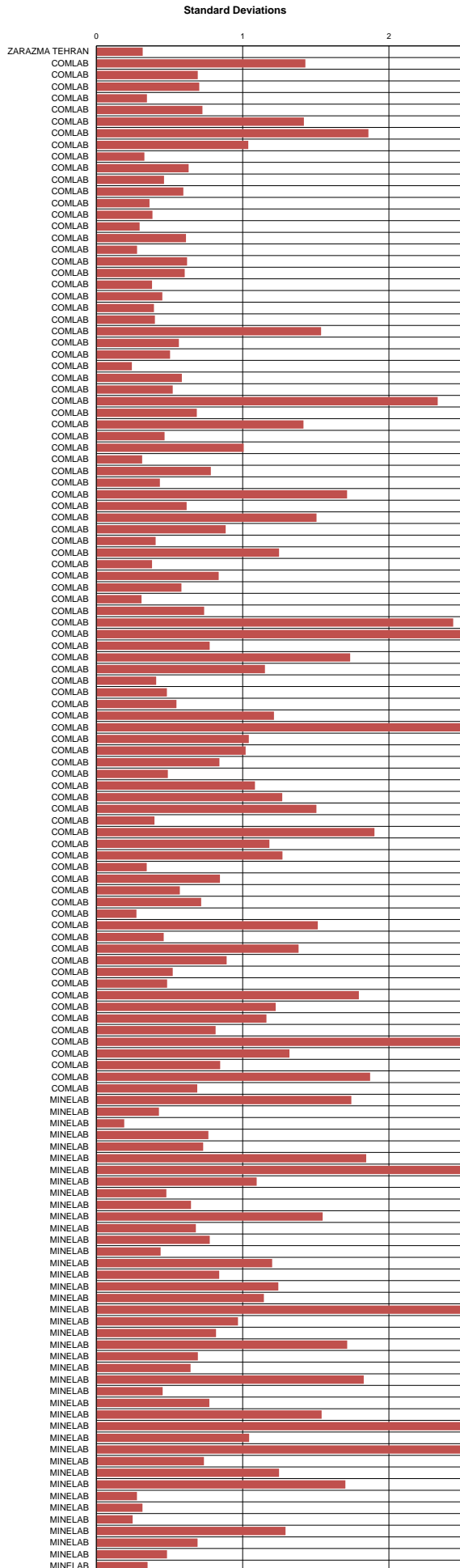
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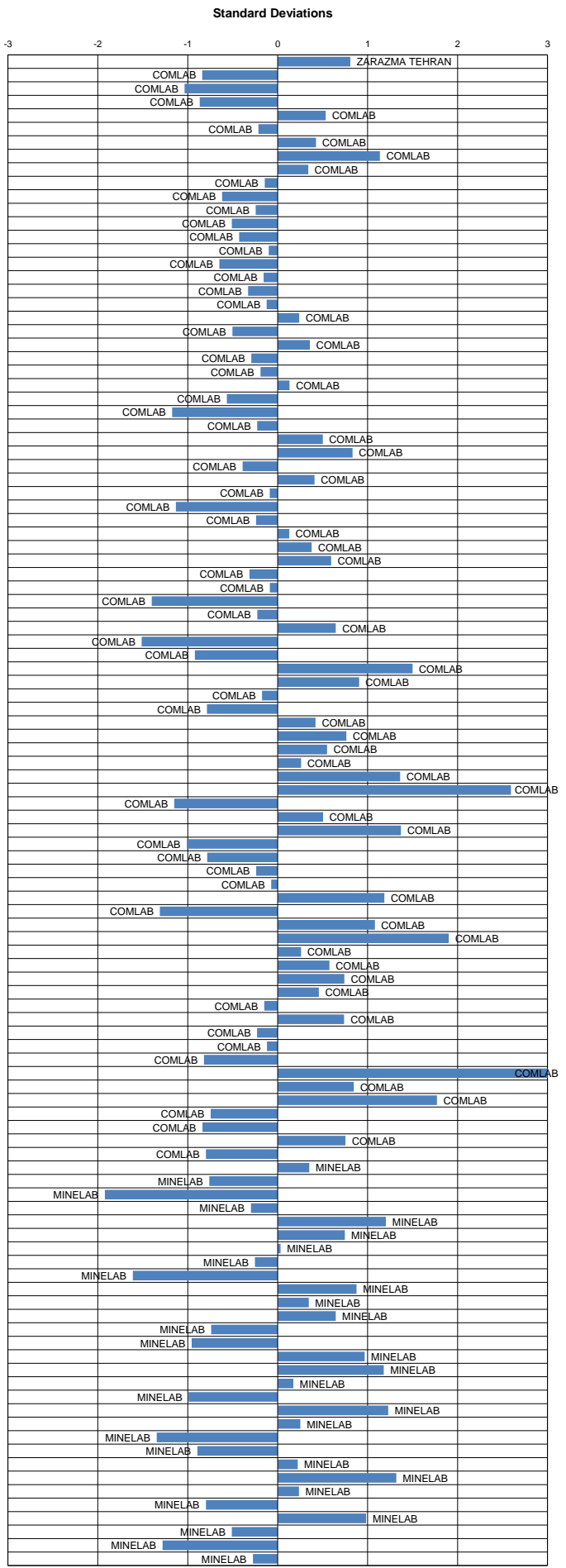
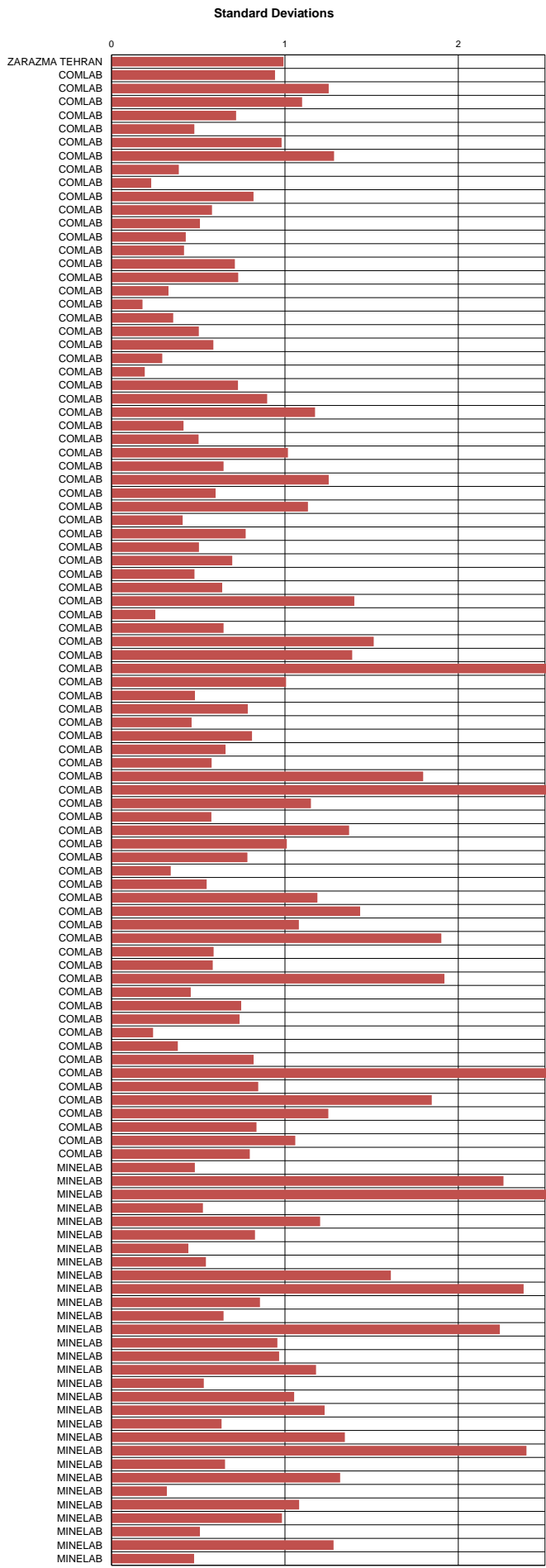


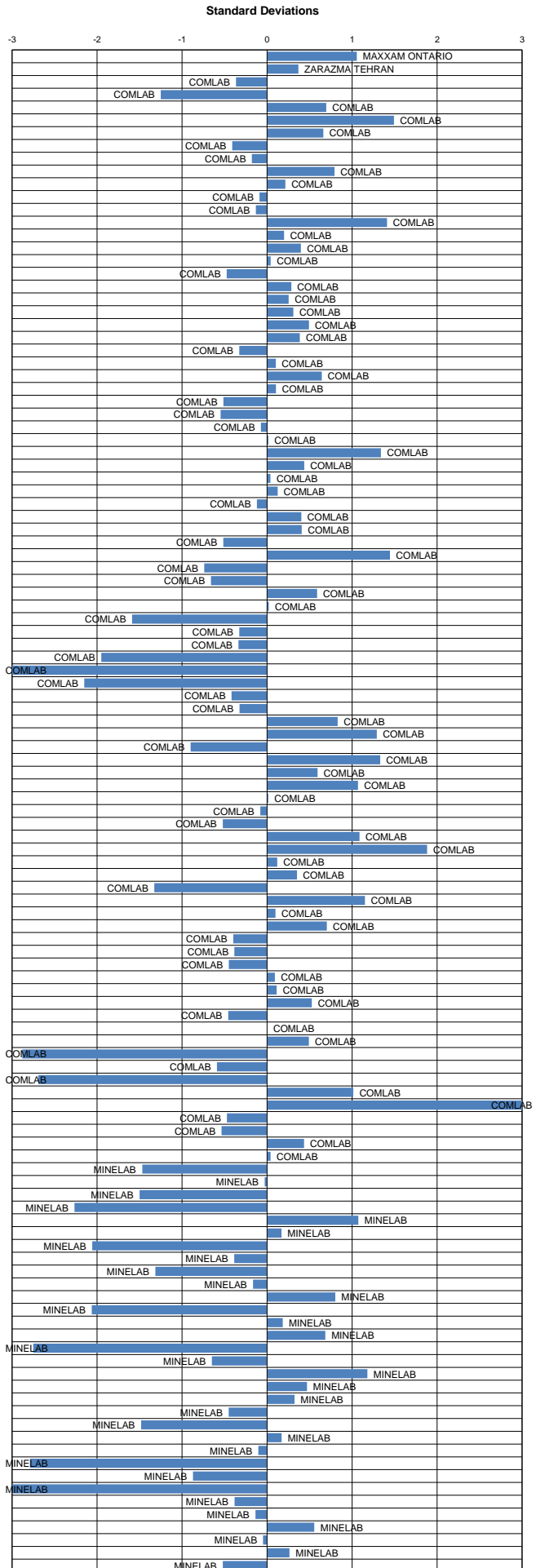
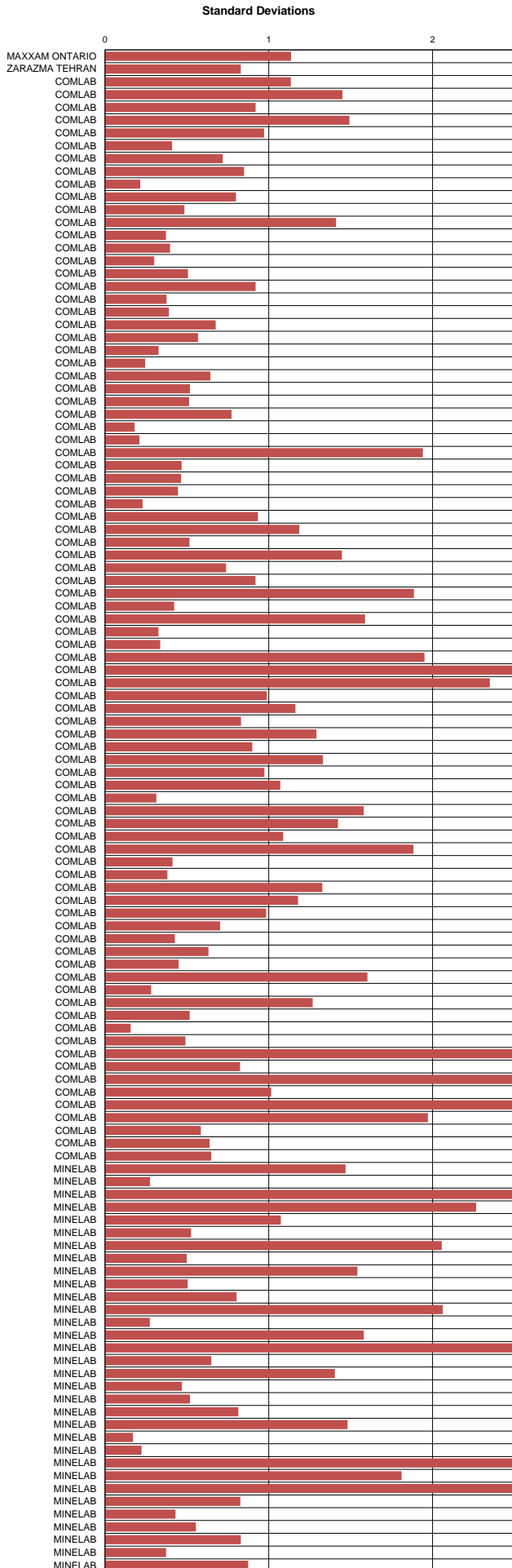
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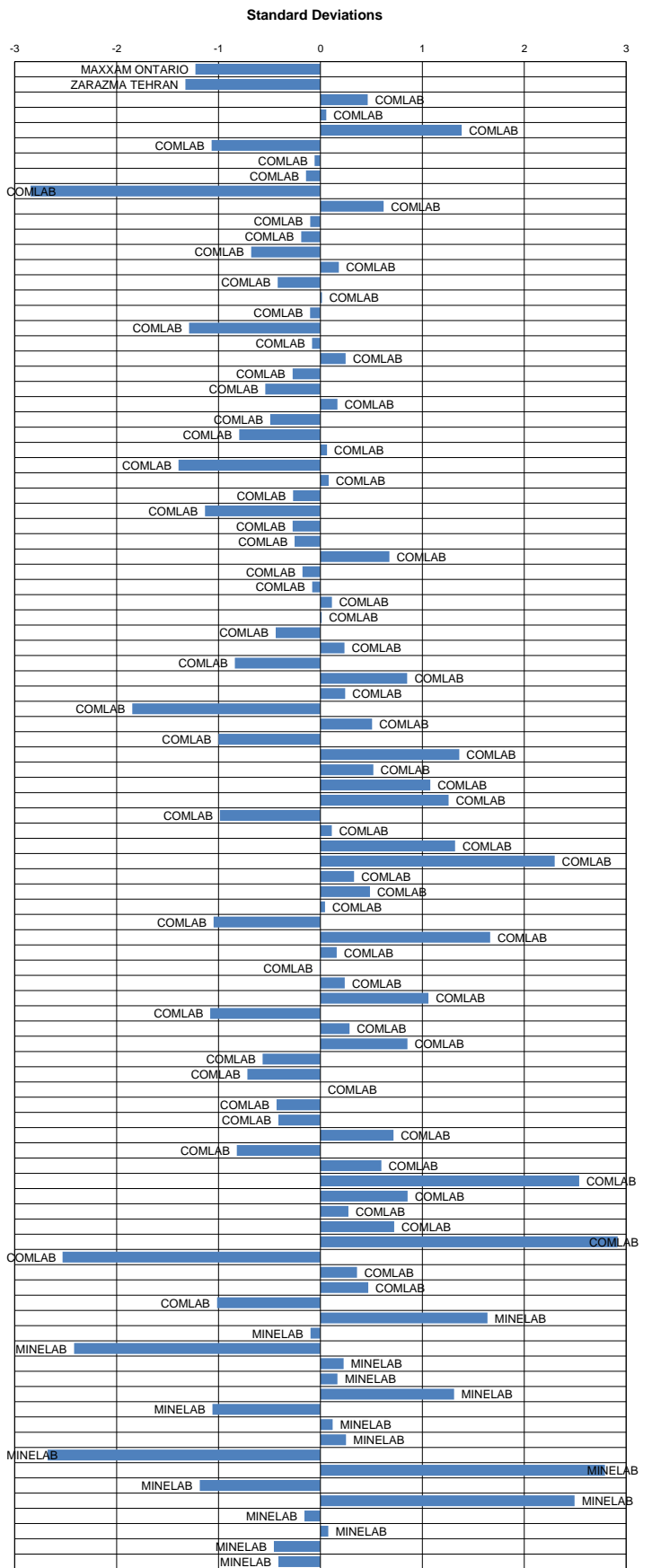
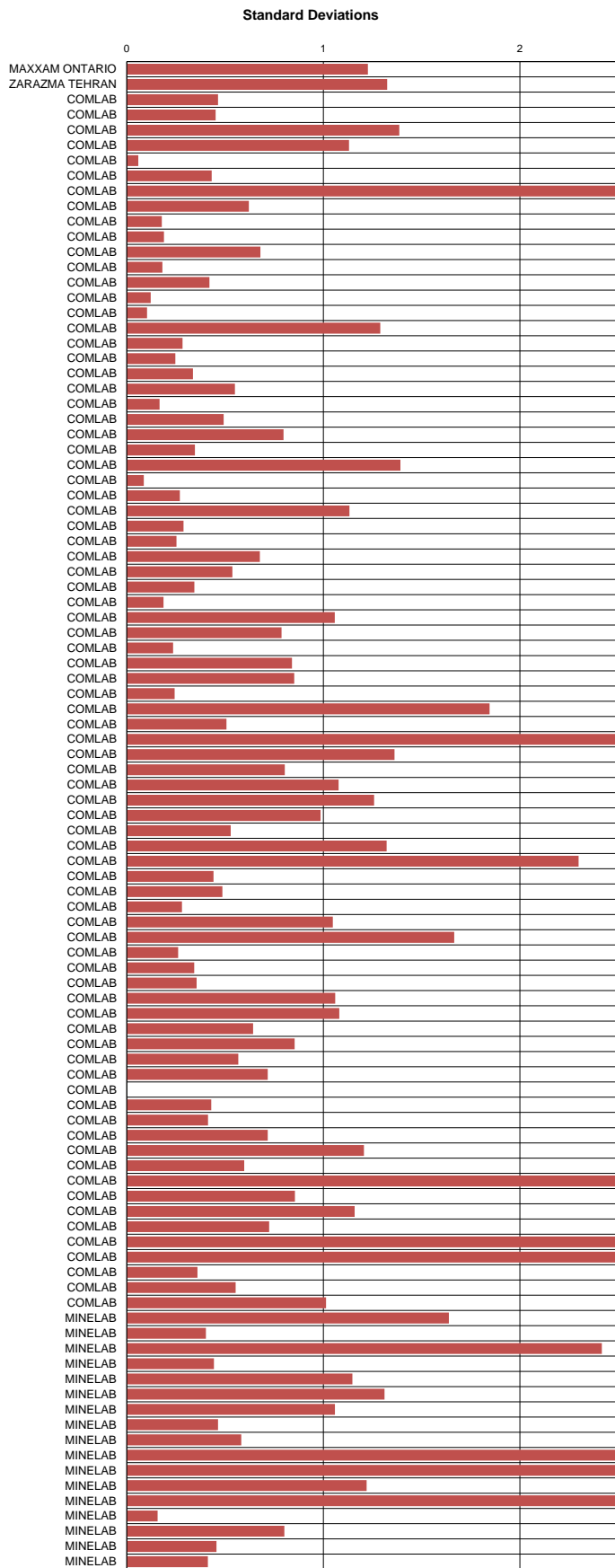
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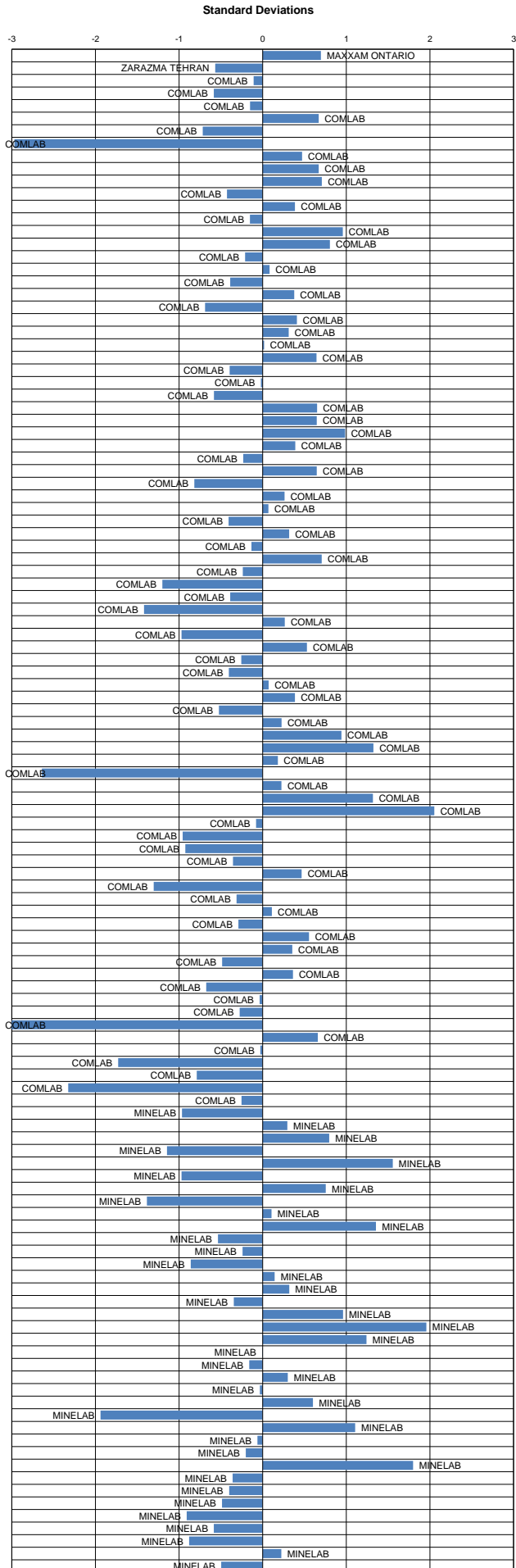
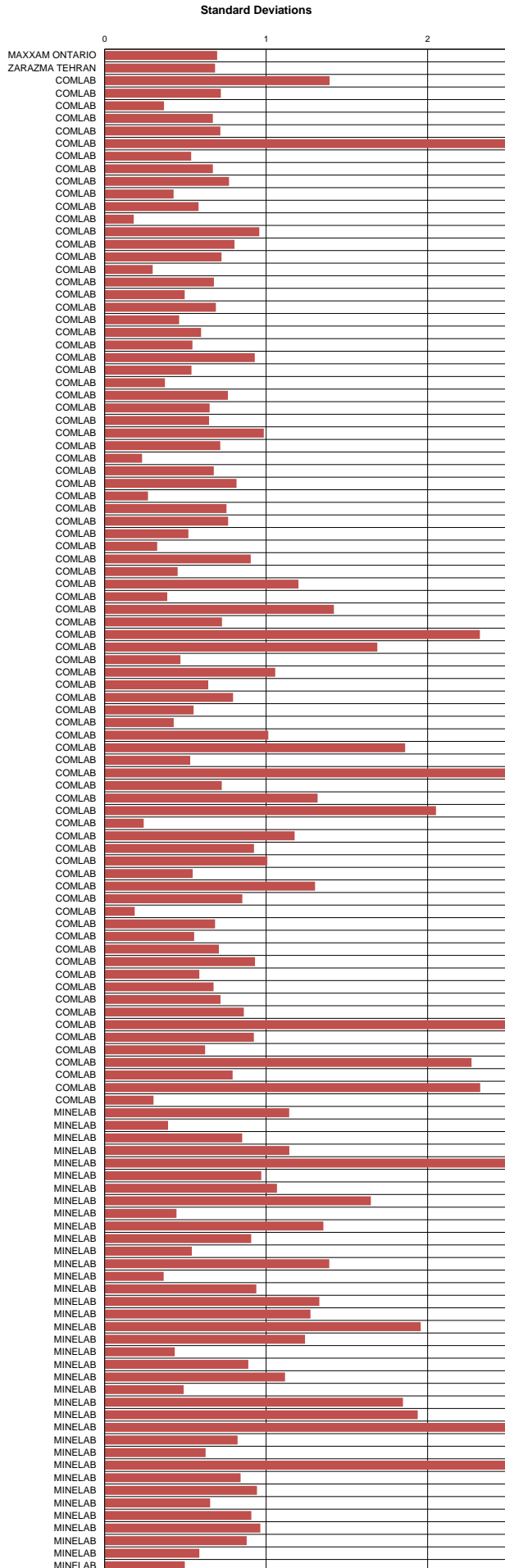






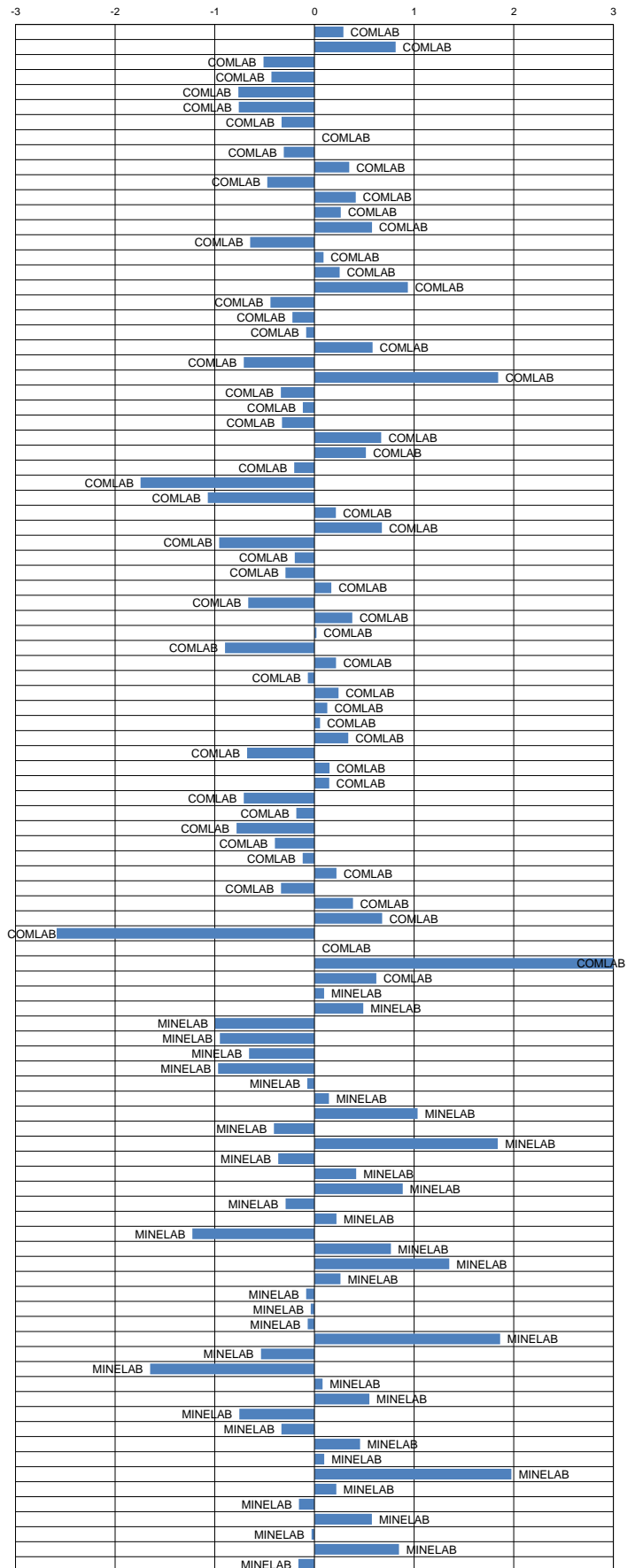
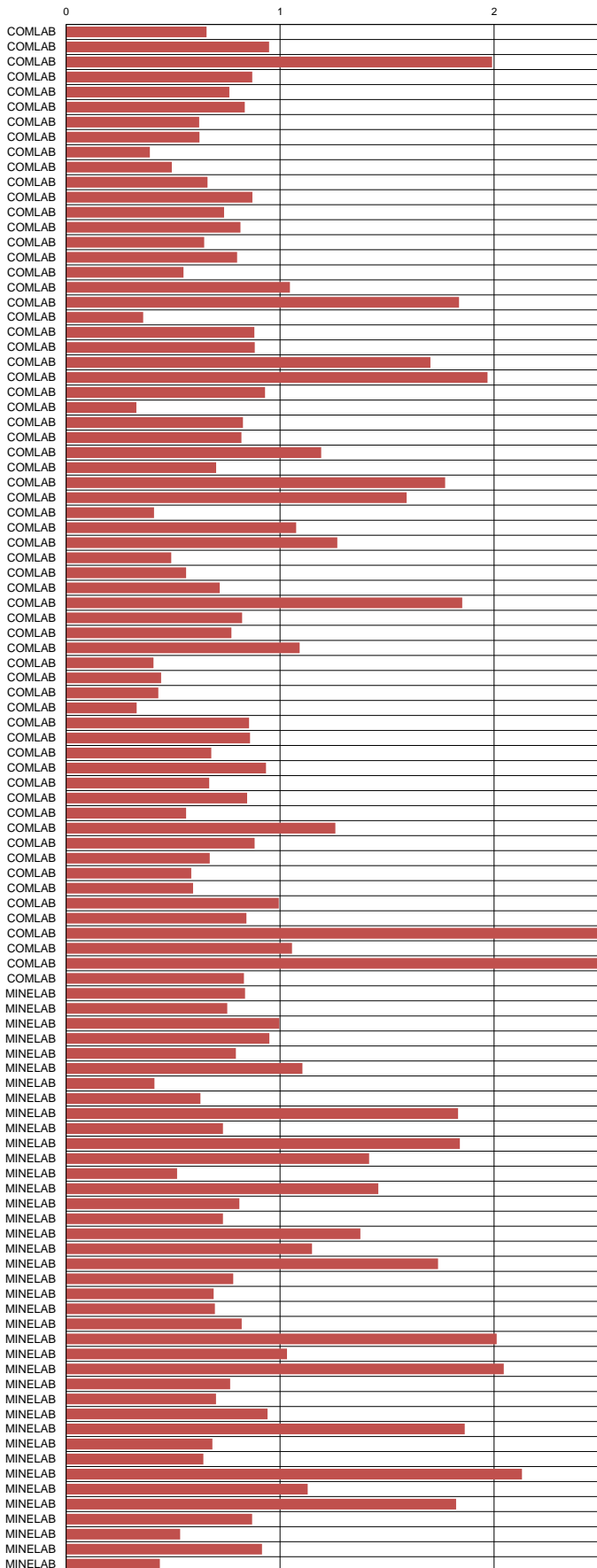






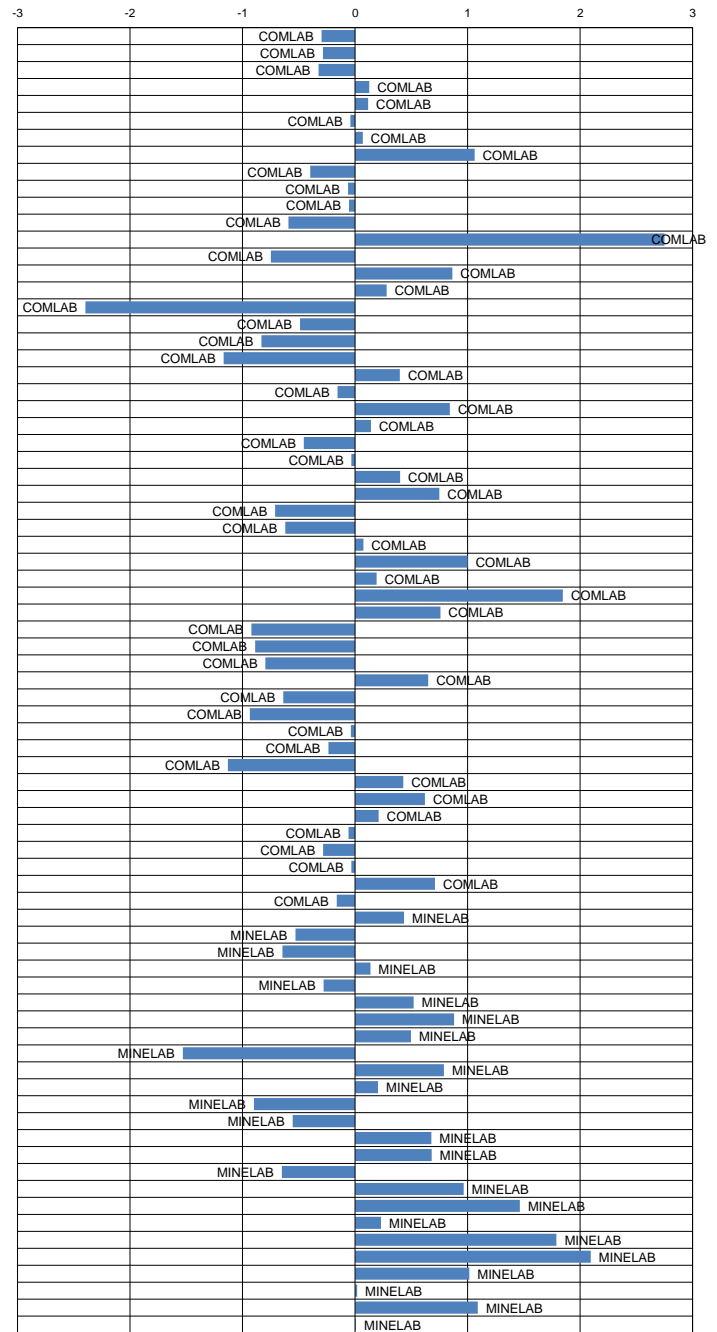
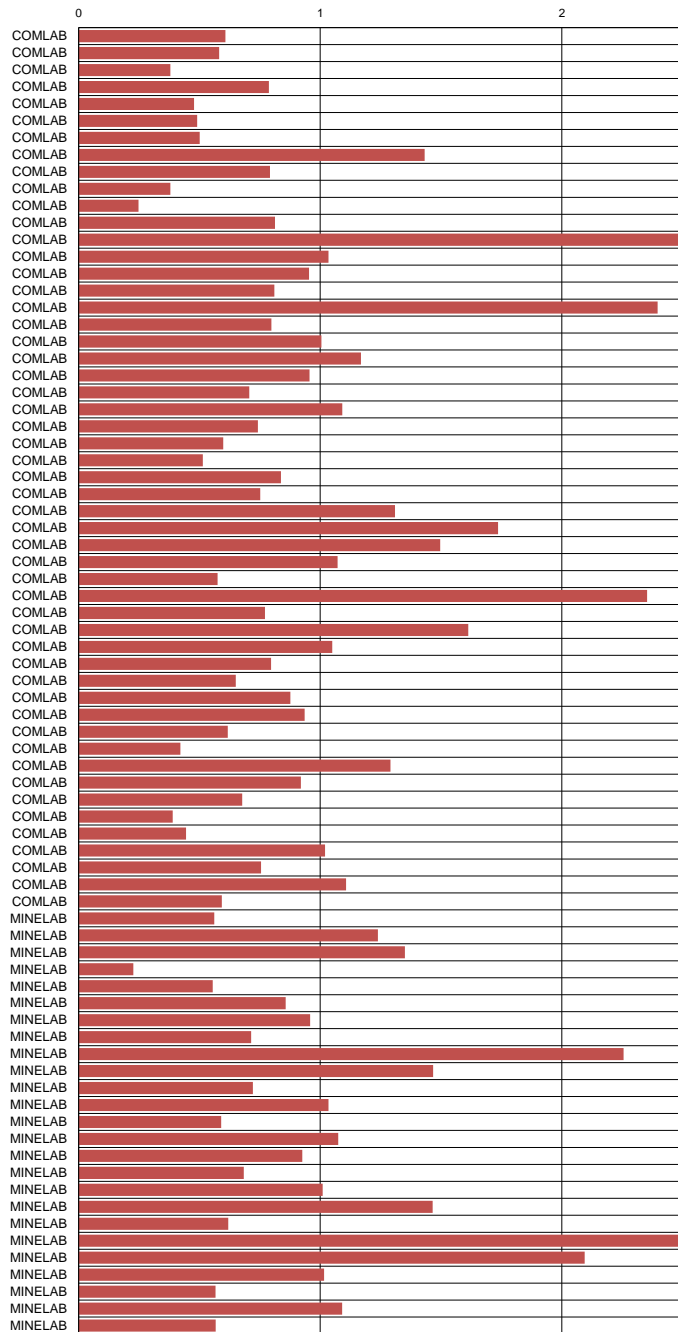
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SUMMARY REPORT OF INDIVIDUAL LABORATORY PERFORMANCE
Zarazma Minerals Studies Company

GOLD SAMPLES

Analysis	Samples Sent	Reported	Number of Outliers
Fire Assay	Yes (10)	Yes	1
Aqua Regia	Yes (10)	No	-
Low Level	Yes (5)	Yes	0

Au & Ag IN CARBON SAMPLES

The laboratory were not sent any samples for Au & Ag in carbon analysis.

Analysis	Reported	Number of Outliers
Gold	-	-
Silver	-	-

BASE METAL SAMPLES

10 Base Metal samples were sent to the laboratory for analysis by Total and / or Partial methods.

Analysis	Total Digest		Partial Digest	
	Reported	Number of Outliers	Reported	Number of Outliers
Silver	Yes	0	No	-
Copper	Yes	0	No	-
Lead	Yes	0	No	-
Zinc	Yes	0	No	-
Nickel	Yes	0	No	-
Arsenic	No	-	Yes	0
Cobalt	Yes	0	No	-

ORE GRADE BASE METAL SAMPLES

6 Ore Grade Base Metal samples were sent to the laboratory for analysis.

Analysis	Reported	Number of Outliers
Copper	Yes	0
Lead	Yes	0
Zinc	Yes	0
Nickel	Yes	0
Silver	Yes	0
Sulphur	Yes	0

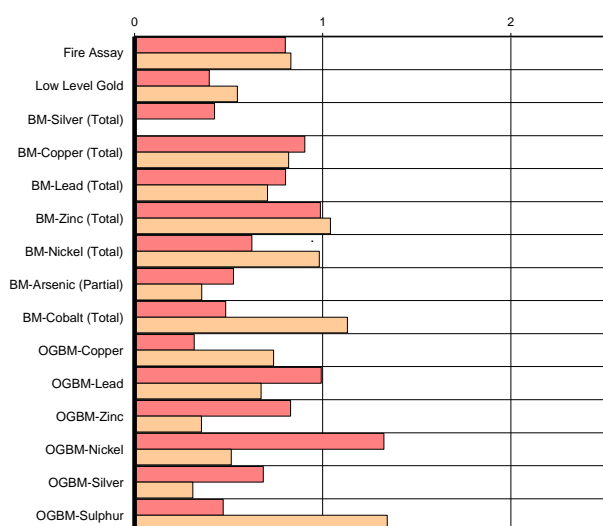
SULPHUR SAMPLES

The laboratory were not sent any Sulphur samples for analysis.

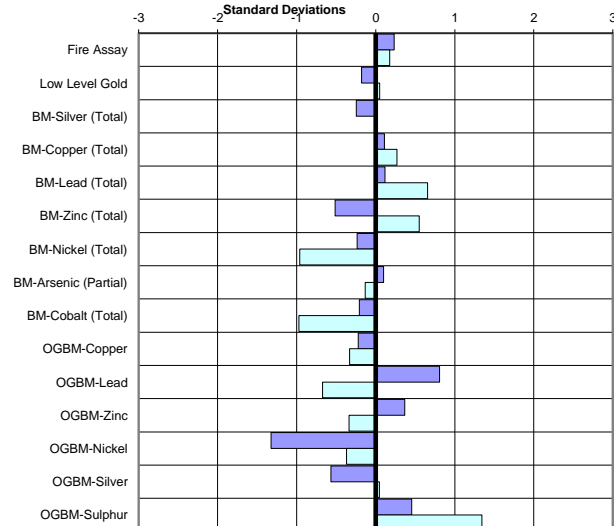
Analysis	Reported	Number of Outliers
Sulphur	-	-
Carbon	-	-

ERROR GRAPHS

Mean of Absolute Standardized Values
Standard Deviations



Mean of Standardized Values
Standard Deviations



FURTHER INFORMATION

The samples analysed in this survey are available for purchase. Please contact us or visit www.geostats.com.au for a complete listing of available materials.

To discuss this report, please contact us on +618 9314 2566, or srr@geostats.com.au