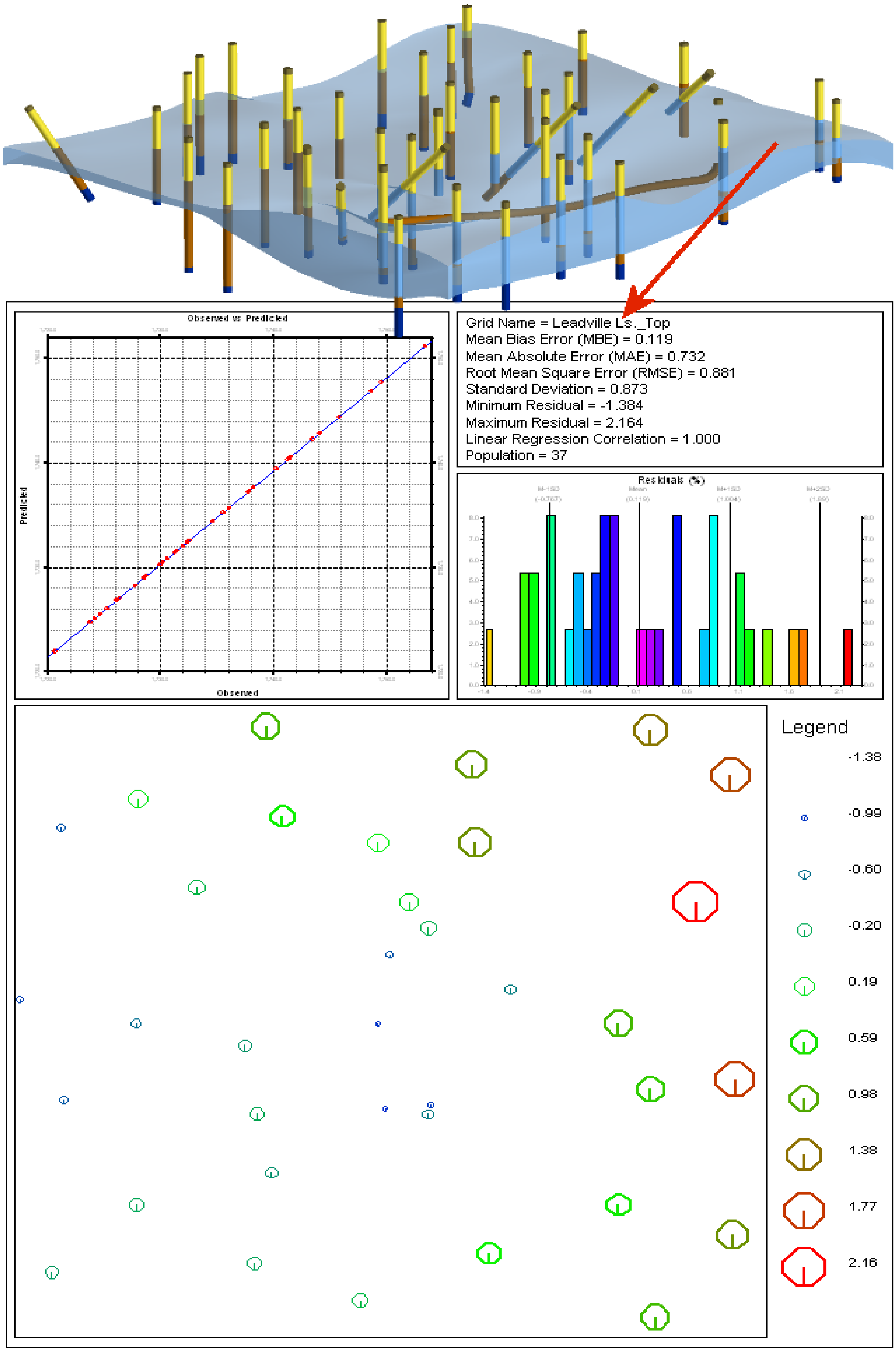
The ***Grid Evaluation*** program generates a report with diagrams that depict the accuracy of a grid model relative to the original control points used to interpolate the grid values.



The program input (Figure 1) consists of the interpolated grid model and the data that was used for the interpolation. This control point data may be located within the Datasheet, the borehole collar elevation table, the borehole stratigraphy table, or the aquifer tops table.

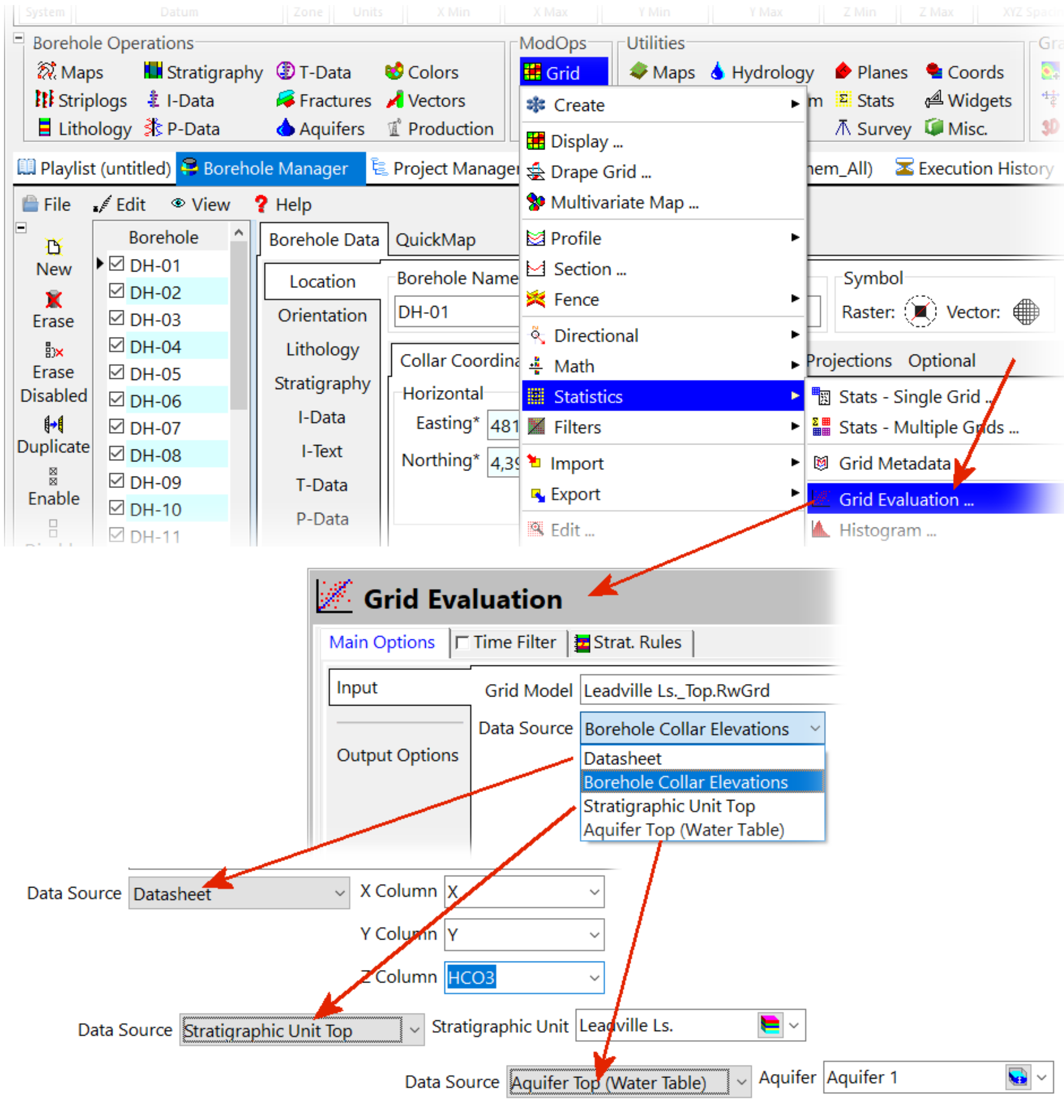


Figure 1

Upon completion, the program will produce a single-page graphical report (Figure 2) that summarizes the "goodness of fit" with a variety of diagrams;

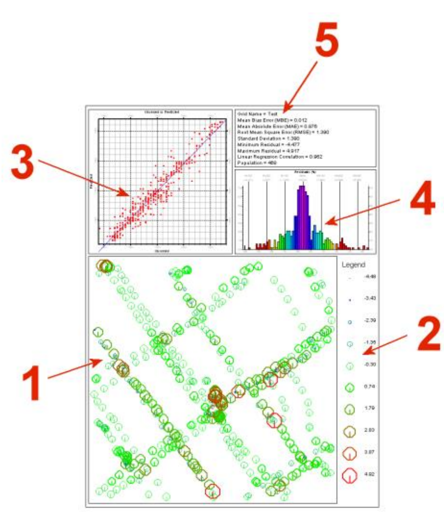


Figure 2

1. Control point location map (Figure 3) in which the symbols are proportionally scaled and heat-colored based on the magnitude of the residuals (i.e., the difference between the observed values and the corresponding interpolated grid node). Right-clicking on any of these points will display a menu that allows you to locate the point within the borehole database or the datasheet.

Figure 3

2. A legend explaining the symbology within the residuals map. For example, if the grid represents surface elevations in meters, a symbol with a corresponding value of 4.92 means that the interpolated value is 4.92 meters below where is should be.

3. A scattergram (Figure 4) depicting the residuals with the x-axis representing the observed values and the y-axis representing the predicted (interpolated) values. The blue line depicts a linear regression that is best-fit to the data. The correlation coefficient for this regression is shown within the statistical summary (item #5). A perfect fit would plot all of the points along a diagonal line.

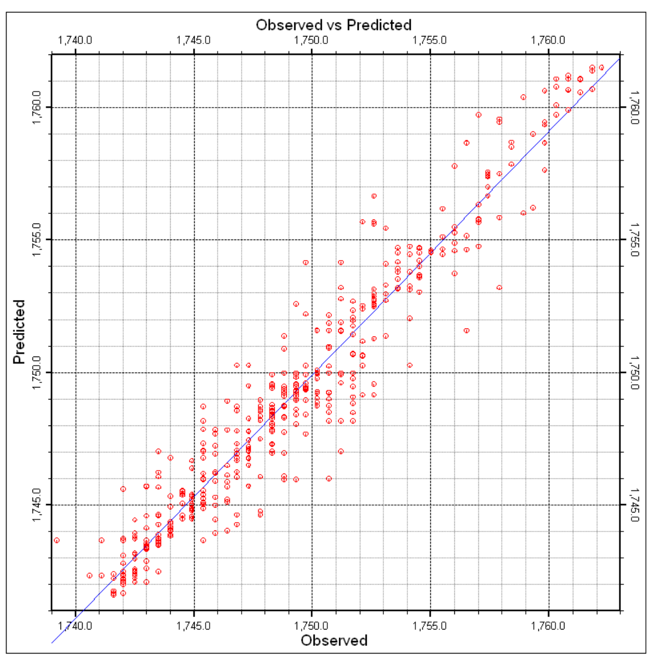


Figure 4

4. A cumulative frequency histogram (Figure 5) depicting the relative distribution of the residuals. In this example, the typical error (mean +/- one standard deviation) is 1.4 meters. Errors between 1.4 and 2.8 meters are atypical. Errors between 2.8 and 4.2 meters are uncommon. Errors greater than 4.2 meters are very rare.

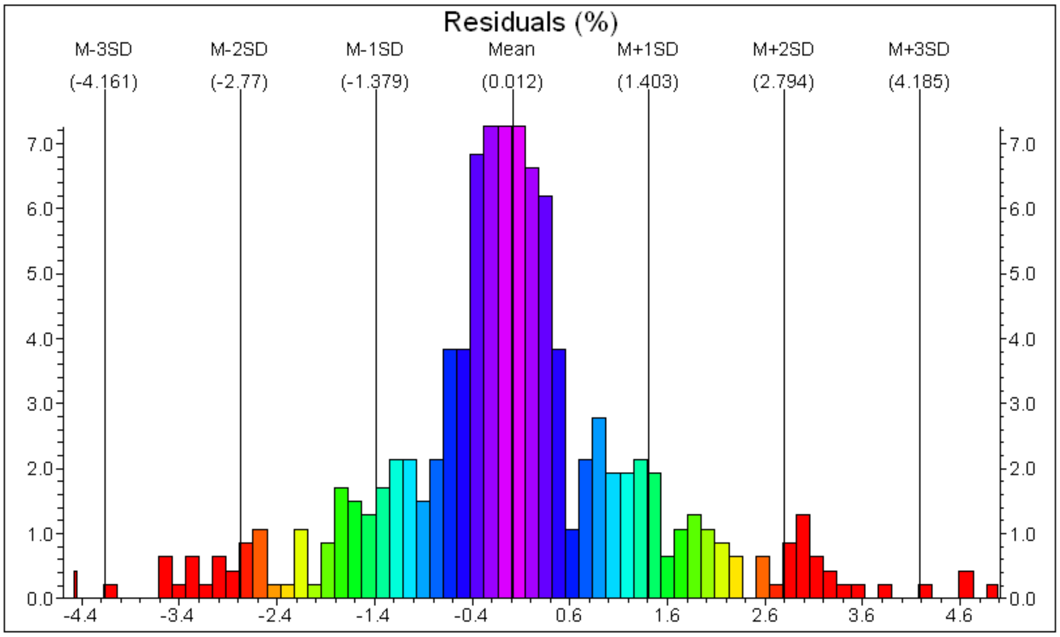


Figure 5

5. A statistical summary (Figure 6) which lists the following computations;

Grid Name = Test
Mean Bias Error (MBE) = 0.012
Mean Absolute Error (MAE) = 0.976
Root Mean Square Error (RMSE) = 1.390
Standard Deviation = 1.390
Minimum Residual = -4.477
Maximum Residual = 4.917
Linear Regression Correlation = 0.962
Population = 468

Figure 6

- **Mean Bias Error (MBE)** is the average difference between observed and predicted values. It shows if there's a tendency to consistently overestimate or underestimate the data. A value close to zero indicates little to no systematic bias. In this example, 0.012 suggests almost no bias in the predictions.

- **Mean Absolute Error (MAE)** is the average of the absolute differences between observed and predicted values, without considering the direction of the error. It provides a general measure of error magnitude, with lower values indicating more accurate predictions. Here, the average prediction error is 0.976.

- **Root Mean Square Error (RMSE)** is the square root of the average squared differences between observed and predicted values. RMSE penalizes larger errors more heavily than MAE, so it is often used when large errors are especially undesirable. A value of 1.390 indicates the average magnitude of error, with a heavier emphasis on larger errors.

- **Standard Deviation** of the residuals (differences between observed and predicted values). It measures the spread of errors around the mean, with higher values indicating greater variability. Here, a standard deviation of 1.390 suggests moderate variability in the errors.
- **Minimum Residual** is the largest negative error in the dataset, indicating the most significant instance of underestimation by the model. A value of -4.477 shows that, at its worst, the model underpredicted the observed value by 4.477.
- **Maximum Residual** is the largest positive error, indicating the most significant overestimation by the model. A value of 4.917 shows that, at its worst, the model overpredicted the observed value by 4.917.
- **Linear Regression Correlation** is the correlation coefficient between observed and predicted values, indicating the strength and direction of the linear relationship. This shows the goodness-of-fit for the blue linear regression line with the scattergram to the left. A correlation of 0.962 is very high, suggesting that the predicted values strongly correlate with the observed values and that the model captures the trend of the data well.
- **Population** refers to the number of data points or samples used in the analysis. Here, there are 468 points, which provides a reasonably large dataset for evaluating the model's performance.