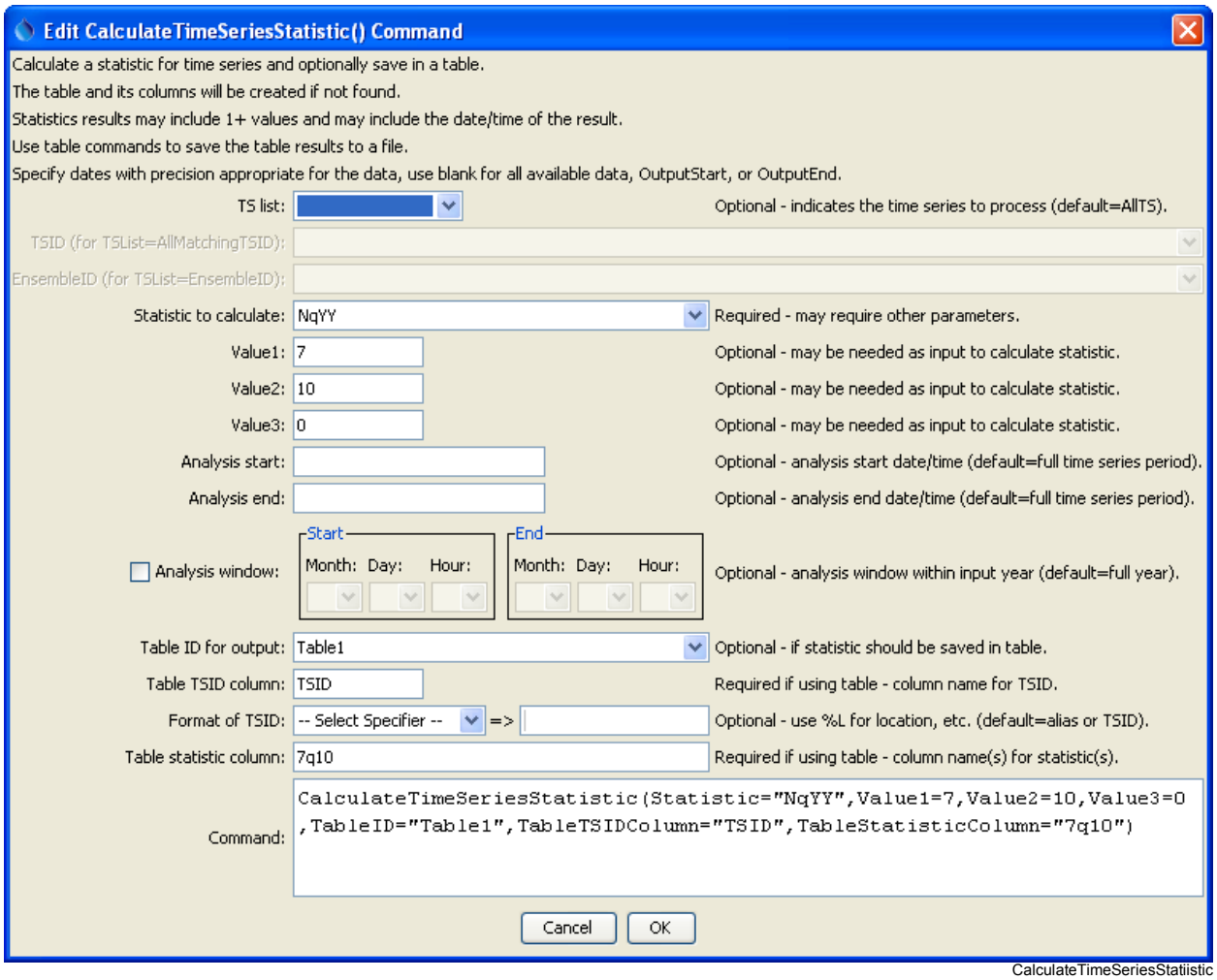
Command Reference: CalculateTimeSeriesStatistic()

Calculate time series statistic

Version 10.16.00, 2013-02-10

The `CalculateTimeSeriesStatistic()` command calculates a statistic for a time series (typically a single value, but may have multiple output values) and optionally adds the result to a table. Multiple time series can be processed. The sample from each time series consists of data values for the full period or a shorter analysis period if specified for the command. Missing values typically are ignored unless significant for the statistic (e.g., `Statistic=MissingCount`).

The following dialog is used to edit the command and illustrates the command syntax. Most statistics do not require additional input; however, those that do utilize the `Value*` parameters to specify additional information.



CalculateTimeSeriesStatiistic

CalculateTimeSeriesStatistic() Command Editor

The command syntax is as follows:

```
CalculateTimeSeriesStatistic(Parameter=Value,…)
```

Command Parameters

Parameter	Description	Default
TSList	Indicates the list of time series to be processed, one of: • AllMatchingTSID – all time series that match the TSID (single TSID or TSID with wildcards). • AllTS – all time series before the command. • EnsembleID – all time series in the ensemble. • FirstMatchingTSID – the first time series that matches the TSID (single TSID or TSID with wildcards). • LastMatchingTSID – the last time series that matches the TSID (single TSID or TSID with wildcards). • SelectedTS – the time series selected with the SelectTimeSeries() command.	AllTS
TSID	The time series identifier or alias for the time series to be processed, using the * wildcard character to match multiple time series.	Required if TSList=*TSID.
EnsembleID	The ensemble to be processed, if processing an ensemble.	Required if TSList=EnsembleID.
Statistic	Statistic to compute as shown in the **Statistic Details** table below.	None – must be specified.
Value1	Input data required by the statistic. Currently the dialog does not check the value for correctness – it is checked when the statistic is computed.	See **Statistic Details** table below.
Value2	Input data required by the statistic. Currently the dialog does not check the value for correctness – it is checked when the statistic is computed.	See **Statistic Details** table below.
Value3	Input data required by the statistic. Currently the dialog does not check the value for correctness – it is checked when the statistic is computed.	See **Statistic Details** table below.
AnalysisStart	The date/time to start analyzing data.	Full period is analyzed.
AnalysisEnd	The date/time to end analyzing data.	Full period is analyzed.
Analysis WindowStart	The calendar date/time for the analysis start within each year. Specify using the format MM, MM-DD, MM-DD hh, or MM-DD hh:mm, consistent with the time series interval precision. A year of 2000 will be used internally to parse the date/time. Use this parameter to limit data processing within the year, for example to analyze only a season. The analysis window has only been enabled for Count, GECount, GTCount, LECount, LTCount, Max,	Analyze the full year.

Parameter	Description	Default
	`Min`, `MissingCount`, `MissingPercent`, `NonmissingCount`, and `NonmissingPercent` statistics.	
`Analysis WindowEnd`	Specify date/time for the analysis end within each year. See `AnalysisWindowStart` for details.	Analyze the full year.
`TableID`	Identifier for table that receives the statistic. An existing table can be specified. If not found, a new table will be created.	Optional – table output is not required.
`TableTSIDColumn`	Table column name that is used to look up the time series. If a matching TSID is not found, a row will be added to the table. If a TSID is found, the statistic cell value for the time series is modified.	Optional – table output is not required.
`TableTSIDFormat`	The specification to format the time series identifier to insert into the TSID column. Use the format choices and other characters to define a unique identifier.	Time series alias if available, or the time series identifier.
`TableStatistic Column`	Table column name to receive the statistic value. If not found in the table, a new column is added automatically.	Optional – table output is not required.

The following table provides additional information about specific statistics, in particular to describe how the statistic is computed and whether additional input needs to be provided with `Value` command parameters.

Statistic Details

Statistic	Description	Required Values
`Count`	Number of data values total, including missing and non-missing.	
`DeficitMax`	Maximum deficit value (where deficit is mean minus value).	
`DeficitMean`	Mean deficit value (where deficit is mean minus value).	
`DeficitMin`	Minimum deficit value (where deficit is mean minus value).	
`DeficitSeqLengthMax`	Maximum number of sequential intervals where each value is less than the mean (for example maximum drought length).	
`DeficitSeqLengthMean`	Mean number of sequential intervals where each value is less than the mean (for example mean drought length).	
`DeficitSeqLengthMin`	Minimum number of sequential intervals where each value is less than the mean (for example minimum drought length).	
`DeficitSeqMin`	Maximum sum of sequential values where each value is less than the mean (for example maximum drought water volume).	
`DeficitSeqMean`	Mean of the sum of sequential values where each	

Statistic	Description	Required Values
	value is less than the mean (for example mean drought water volume).	
DeficitSeqMin	Minimum sum of sequential values where each value is less than the mean (for example minimum drought water volume).	
GECount	Count of values greater than or equal to Value1.	Value1 – criteria to check
GTCount	Count of values greater than Value1.	Value1 – criteria to check
Lag-1AutoCorrelation	Autocorrelation between values and the those that follow in the next time step, given by: $r_k = \frac{\sum_{i=1}^{N-k}(Y_i - Y_{mean})(Y_{i+k} - Y_{mean})}{\sum_{i=1}^{N}(Y_i - Y_{mean})^2}$	
Last	Last non-missing value.	
LECount	Count of values less than or equal to Value1.	Value1 – criteria to check
LTCount	Count of values less than Value1.	Value1 – criteria to check
Max	Maximum value.	
Mean	Mean value.	
Min	Minimum value.	
MissingCount	Number of missing values.	
MissingPercent	Percent of values that are missing.	
MissingSeqLengthMax	Maximum number of sequential values that are missing.	
NonmissingCount	Number of non-missing values.	
NonmissingPercent	Percent of values that are not missing.	
NqYY	This statistic is typically used to evaluate the return period of low flows and is implemented only for daily data. The N indicates the number of daily values to be averaged and YY indicates the return interval. For example, 7q10 indicates the flow corresponding to the 10-year recurrence interval for minimum average daily flow (for 7 days) in a year. This statistic is computed as follows, using 7q10 as an example: 1. Determine the number of years to be analyzed (from analysis period command parameters or time series data). 2. For each year, loop through each day from January 1 to December 31. Compute an average flow by averaging 7 days, in this case with 3 values on each side of the current day and including the current day. If at the end of the year, use 3 values from adjoining years. The number of missing data allowed is controlled by the Value3 command parameter.	Value1 – specify the number of daily values to be averaged. Currently this must be an odd number to allow bracketing the current day. Value2 – specify the return interval (e.g., 10). Value3 – specify the number of

Statistic	Description	Required Values
	3. For the year, save the minimum 7-day average. 4. Utilize the minimum values for all years, with log-Pearson Type III distribution, to determine the value for the 10-year recurrence interval. See http://pubs.usgs.gov/sir/2008/5126/section3.html for a description of NqYY and "Hydrology for Engineers, 3rd Edition," Linsley, Kohler, Paulhus for a description of log-Pearson Type III distribution.	missing values allowed in the average (e.g., 0 for most rigorous analysis). It may be useful to set this value if, for example, a single daily value is available in the time series, for example entered on the first day of the month.
`Skew`	Skew coefficient, as follows: $Cs = \frac{N \Sigma_{i=1}^{N}(Y_i - Y_{mean})^3}{(n-1)(n-2)s^3}$ where s = standard deviation	
`StdDev`	Standard deviation.	
`SurplusMin`	Maximum surplus value (where surplus is value minus mean).	
`SurplusMean`	Mean surplus value (where surplus is value minus mean).	
`SurplusMin`	Minimum surplus value (where surplus is value minus mean).	
`SurplusSeqLengthMax`	Maximum number of sequential intervals where each value is greater than the mean (for example maximum water surplus length).	
`SurplusSeqLengthMean`	Mean number of sequential intervals where each value is greater than the mean (for example mean water surplus length).	
`SurplusSeqLengthMin`	Minimum number of sequential intervals where each value is greater than the mean (for example minimum water surplus length).	
`SurplusSeqMin`	Maximum sum of sequential values where each value is greater than the mean (for example maximum water surplus volume).	
`SurplusSeqMean`	Mean of the sum of sequential values where each value is greater than the mean (for example mean water surplus volume).	
`SurplusSeqMin`	Minimum sum of sequential values where each value is greater than the mean (for example minimum water surplus volume).	
`TrendOLS`	Ordinary least squares analysis is used to compute results that are named `TableStatisticColumn` with appended `_Intercept`, `_Slope`, and `_R2`.	

Statistic	Description	Required Values
Variance	Variance.	

The following example illustrates how to use the command to compute the 7q10 statistic for daily flow:

```
ReadDateValue(Alias="linsley",InputFile="Data\linsley.dv")
  NewTable(TableID="Table1",Columns="TSID,string;7q10,double")
CalculateTimeSeriesStatistic(Statistic="NqYY",Value1=7,Value2=10,Value3=6,
  TableID="Table1",TableTSIDColumn="TSID",TableStatisticColumn="7q10")
WriteTableToDelimitedFile(TableID="Table1",
  OutputFile="Results/Test_CalculateTimeSeriesStatistic_7q10_linsley_out.csv")
```