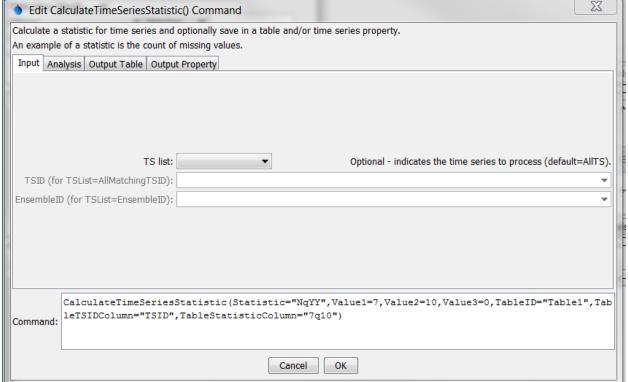
# Command Reference: CalculateTimeSeriesStatistic()

Calculate time series statistic

ersion 12.00.00, 2017-04-02

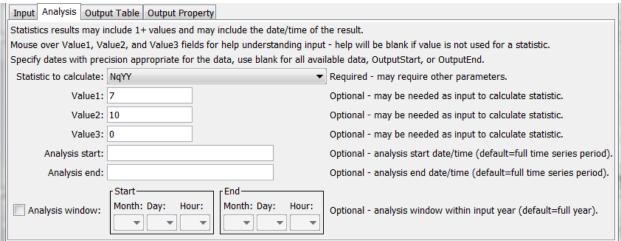
The CalculateTimeSeriesStatistic() command calculates a statistic for a time series (typically a single value, but may have multiple output values such as TrendOLS) and optionally adds the result to a table and/or sets a time series property. Some statistics, such as Max also have date/time. Multiple 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. See the documentation below and move the mouse over the entry fields in the dialog.



CalculateTimeSeriesStatiistic

CalculateTimeSeriesStatistic() Command Editor Showing Input Parameters



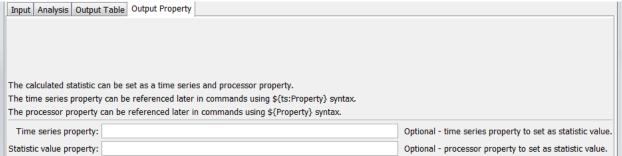
CalculateTimeSeriesStatiistic\_Analysis

#### CalculateTimeSeriesStatistic() Command Editor Showing Analysis Parameters

).

CalculateTimeSeriesStatiistic\_OutputTable

## CalculateTimeSeriesStatistic() Command Editor Showing Output Table Parameters



CalculateTimeSeriesStatiistic\_OutputProperty

### CalculateTimeSeriesStatistic() Command Editor Showing Output Property Parameters

The command syntax is as follows:

CalculateTimeSeriesStatistic(Parameter=Value,...)

## **Command Parameters**

Parameter	Description	Default
TSList	Indicates the list of time series to be processed,	AllTS
	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.	
TSID	The time series identifier or alias for the time	Required if
	series to be processed, using the * wildcard	TSList=*TSID.
	character to match multiple time series. Can be	
	specified with processor \${Property}.	
EnsembleID	The ensemble to be processed, if processing an	Required if
	ensemble. Can be specified with processor	TSList=EnsembleID.
Statistic	\${Property}.	None must be specified
Statistic	Statistic to compute as shown in the <b>Statistic Details</b> table below.	None – must be specified.
Value1	Input data required by the statistic. Currently the	See Statistic Details
	dialog does not check the value for correctness –	table below.
	it is checked when the statistic is computed.	
Value2	Input data required by the statistic. Currently the	See Statistic Details
	dialog does not check the value for correctness –	table below.
	it is checked when the statistic is computed.	
Value3	Input data required by the statistic. Currently the	See Statistic Details
	dialog does not check the value for correctness –	table below.
AnalysisStart	it is checked when the statistic is computed.  The date/time to start analyzing data as valid	Full period is analyzed.
Anarysisscare	date/time string or \${Property}.	Tun period is analyzed.
AnalysisEnd	The date/time to end analyzing data as valid	Full period is analyzed.
	date/time string or \${Property}.	Tun period is analyzed.
Analysis	The calendar date/time for the analysis start	Analyze the full year.
WindowStart	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	

Parameter	Description	Default
	only been enabled for Count, GECount,	
	GTCount, Last, LastNonmissing,	
	LECount, LTCount, Max, Min,	
	MissingCount, MissingPercent,	
	NonmissingCount, and	
	NonmissingPercent statistics.	
Analysis	Specify date/time for the analysis end within each	Analyze the full year.
WindowEnd	year. See AnalysisWindowStart for details.	
TableID	Identifier for table that receives the statistic. An	Optional – table output is
	existing table can be specified. If not found, a	not required.
	new table will be created. Can be specified with	
	<pre>processor \${Property}.</pre>	
TableTSIDColumn	Table column name that is used to look up the	Optional – table output is
	time series. If a matching TSID is not found, a	not required.
	row will be added to the table. If a TSID is	
	found, the statistic cell value for the time series is	
	modified. The column name can use processor	
	\${Property} and time series % specifiers (e.g.,	
	%L for location) and properties using syntax	
TableTSIDFormat	\$\{\tai}\ The area is fraction to format the time series	Time series alias if
TableISIDFOIMat	The specification to format the time series identifier to insert into the TSID column. Use the	available, or the time
	format choices and other characters to define a	series identifier.
	unique identifier.	series identifier.
TableStatistic	Table column name(s) to receive the statistic	Optional – table output is
Column	value(s). If not found in the table, a new column	not required.
	is added automatically. The column names can	1
	use processor \${Property} and use time	
	series % specifiers (e.g., %L for location) and	
	<pre>properties using syntax \${ts:Property}.</pre>	
TableStatistic	Table name for date/time corresponding to	Date/time not output to
DateTimeColumn	statistic, if available (for example for Max).	table.
TimeSeries	If specified, the output statistic will be set as a	No property is set.
PropertyName	property value for the time series. In the future,	
	statistics with multiple values will use a variation	
	of the property name.	
Statistic	Name of the processor property to set the value of	No property is set.
ValueProperty	the statistics.	

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

#### **Statistic Details**

Statistic	Description	Analysis Window Allowed?	Date/Time for Statistic Calculated?	Required Values
Count	Number of data values total, including missing and non-missing.	Yes		
DeficitMax	Maximum deficit value (where deficit is mean minus value).	No		
DeficitMean	Mean deficit value (where deficit is mean minus value).	No		
DeficitMin	Minimum deficit value (where deficit is mean minus value).	No		
DeficitSeq LengthMax	Maximum number of sequential intervals where each value is less than the mean (for example maximum drought length).	No		
DeficitSeq LengthMean	Mean number of sequential intervals where each value is less than the mean (for example mean drought length).	No		
DeficitSeq LengthMin	Minimum number of sequential intervals where each value is less than the mean (for example minimum drought length).	No		
DeficitSeqMin	Maximum sum of sequential values where each value is less than the mean (for example maximum drought water volume).	No		
DeficitSeqMean	Mean of the sum of sequential values where each value is less than the mean (for example mean drought water volume).	No		
DeficitSeqMin	Minimum sum of sequential values where each value is less than the mean (for example minimum drought water volume).	No		
GECount	Count of values greater than or equal to Value1.	Yes		Value1 – criteria to check
GTCount	Count of values greater than Value1.	Yes		Value1 – criteria to check
Lag-1Auto Correlation	Autocorrelation between values and the those that follow in the next time step, given by: $r_k = \sum_{i=1}^{N-k} \frac{N-k}{Y_i} - \frac{Y_{mean}}{Y_{mean}}$ $\sum_{i=1}^{N} (Y_i - Y_{mean})^2$	No		

Statistic	Description	Analysis Window Allowed?	Date/Time for Statistic Calculated?	Required Values
Last	Last non-missing or missing value. Second statistic is the date/time of the value.	Yes	Yes	7.04
LastNonmissing	Last non-missing value. Second statistic is the date/time of the value.	Yes	Yes	
LECount	Count of values less than or equal to Value1.	Yes		Value1 – criteria to check
LTCount	Count of values less than Value1.	Yes		Value1 – criteria to check
Max	Maximum value.	Yes	Yes (first)	
Mean	Mean value.	No		
Min	Minimum value.	Yes	Yes (first)	
MissingCount	Number of missing values.	Yes		
MissingPercent	Percent of values that are missing.	Yes		
MissingSeq LengthMax	Maximum number of sequential	No		
NonmissingCount	values that are missing.  Number of non-missing values.	Yes		
Nonmissing	Percent of values that are not	Yes		
Percent	missing.	168		
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	No		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 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.

04-4:-4:-	Bassistian	Analysis Window Allowed?	Date/Time for Statistic Calculated?	Daminad Values
Statistic	Description	Allowed	Odiculated:	Required Values
	controlled by the Value3 command parameter. 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 <a href="http://pubs.usgs.gov/sir/2008/5126/section3.html">http://pubs.usgs.gov/sir/2008/5126/section3.html</a> for a			
	description of NqYY and "Hydrology for Engineers, 3 <sup>rd</sup> Edition," Linsley, Kohler, Paulhus for a description of log-Pearson Type III distribution.			
Skew	Skew coefficient, as follows: $Cs = \underbrace{N \sum_{i=1}^{N} (Y_i - Y_{mean})^3}_{(n-1)(n-2)s^3}$ where $s = \text{standard}$ deviation	No		
StdDev	Standard deviation.	No		
SurplusMin	Maximum surplus value (where surplus is value minus mean).	No		
SurplusMean	Mean surplus value (where surplus is value minus mean).	No		
SurplusMin	Minimum surplus value (where surplus is value minus mean).	No		
SurplusSeq LengthMax	Maximum number of sequential intervals where each value is greater than the mean (for example maximum water surplus length).	No		
SurplusSeq LengthMean	Mean number of sequential intervals where each value is greater than the mean (for example mean water surplus length).	No		
SurplusSeq LengthMin	Minimum number of sequential intervals where each value is greater than the mean (for example minimum water surplus length).	No		
SurplusSeqMin	Maximum sum of sequential values where each value is greater than the mean (for example maximum water surplus volume).	No		
SurplusSeqMean	Mean of the sum of sequential values where each value is greater	No		

Statistic	Description	Analysis Window Allowed?	Date/Time for Statistic Calculated?	Required Values
	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).	No		
Total	Total of values.	No		
TrendOLS	Ordinary least squares analysis is used to compute results that are named TableStatisticColumn with appended _Intercept, Slope, and R2.	No		
Variance	Variance.	No		

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")
```