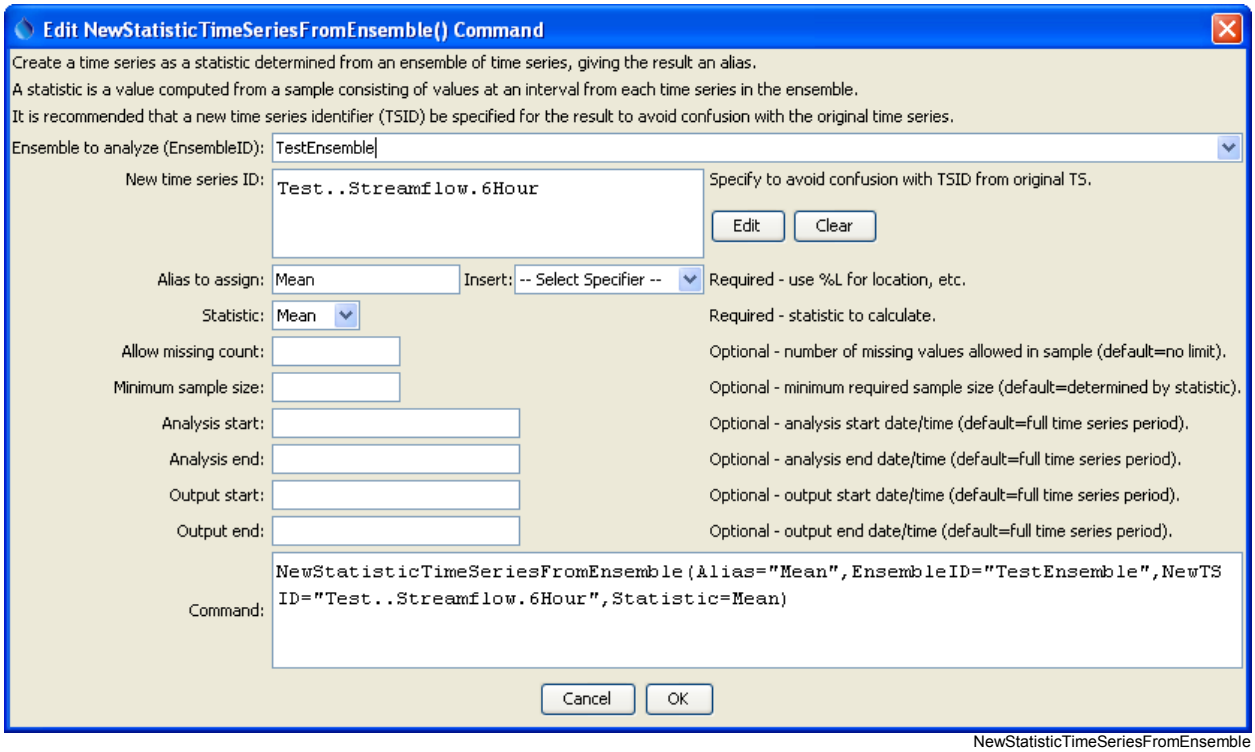
Command Reference: NewStatisticTimeSeriesFromEnsemble()

Create a time series containing a statistic determined from a time series ensemble

Version 10.18.00, 2013-02-21

The `NewStatisticTimeSeriesFromEnsemble()` command uses data from time series in an ensemble to calculate a statistic for each interval in the ensemble, and assigns the statistic value to the corresponding interval in the result. For example, for a statistic of `Mean` applied to a daily time series, all January 1, 1970 values will be used for the sample and the mean value will be assigned to January 1, 1970 in the output time series. Leap year values will be included if they are included in the period of the ensemble.

The following dialog is used to edit the command and illustrates the syntax for the command.



NewStatisticTimeSeriesFromEnsemble

NewStatisticTimeSeriesFromEnsemble() Command Editor

The command syntax is as follows:

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

The following older command syntax is updated to the above syntax when a command file is read:

```
TS Alias = NewStatisticTimeSeriesFromEnsemble(Parameter=Value,…)
```

Command Parameters

Parameter	Description	Default
EnsembleID	The identifier for the ensemble to analyze.	None – must be specified.
NewTSID	The time series identifier to be assigned to the new time series, which is useful to avoid confusion with the original time series. **This parameter may be required in the future.**	None – use the same identifier as the original time series.
Alias	The alias to assign to the time series, as a literal string or using the special formatting characters listed by the command editor. The alias is a short identifier used by other commands to locate time series for processing, as an alternative to the time series identifier (TSID).	None – must be specified.
Statistic	The statistic to compute. See the **Available Statistics** table below.	None – must be specified.
Allow Missing Count	The number of missing values allowed in the sample of values in order to produce a result. This capability should be used with care because it may result in data that are not representative of actual conditions.	Missing values are ignored in the sample used to compute the statistic.
MinimumSample Size	The minimum number of values in the sample that are required to compute the statistic.	Use the sample with no restrictions, although some statistics may have requirements.
AnalysisStart	The date/time for the analysis start, using a precision that matches the original time series.	Analyze the full period.
AnalysisEnd	The date/time for the analysis start, using a precision that matches the original time series.	Analyze the full period.
OutputStart	The date/time for the output start, using a precision that matches the original time series. An output period longer than the analysis period will result in missing values in output.	Output the full period.
OutputEnd	The date/time for the output start, using a precision that matches the original time series. An output period longer than the analysis period will result in missing values in output.	Output the full period.

Available Statistics

Statistic	Description	Limitations
Exceedance Probability10	The data value corresponding to a 10% chance of value being exceeded.	Small sample size will skew – see statistic details.
Exceedance Probability30	The data value corresponding to a 30% chance of value being exceeded.	Small sample size will skew – see statistic details.
Exceedance Probability50	The data value corresponding to a 50% chance of value being exceeded.	Small sample size will skew – see statistic details.
Exceedance Probability70	The data value corresponding to a 70% chance of value being exceeded.	Small sample size will skew – see statistic details.
Exceedance	The data value corresponding to a 90%	Small sample size will skew –

Statistic	Description	Limitations
Probability90	chance of value being exceeded.	see statistic details.
GeometricMean	Geometric mean of all values in the sample.	All values must be >= 0.
Max	Maximum of all values in the sample.	None.
Mean	Arithmetic mean of all values in the sample.	None.
Median	Median of all values in the sample.	None.
Min	Minimum of all values in the sample.	None.
Missing Count	The count of values that are missing.	This statistic will be computed regardless of AllowMissingCount and MinimumSampleSize.
Missing Percent	The percent of values that are missing.	See above.
Nonmissing Count	The count of values that are not missing.	See above.
Nonmissing Percent	The percent of values that are not missing.	See above.
Total	Total of values in the sample.	None.

Statistic Details

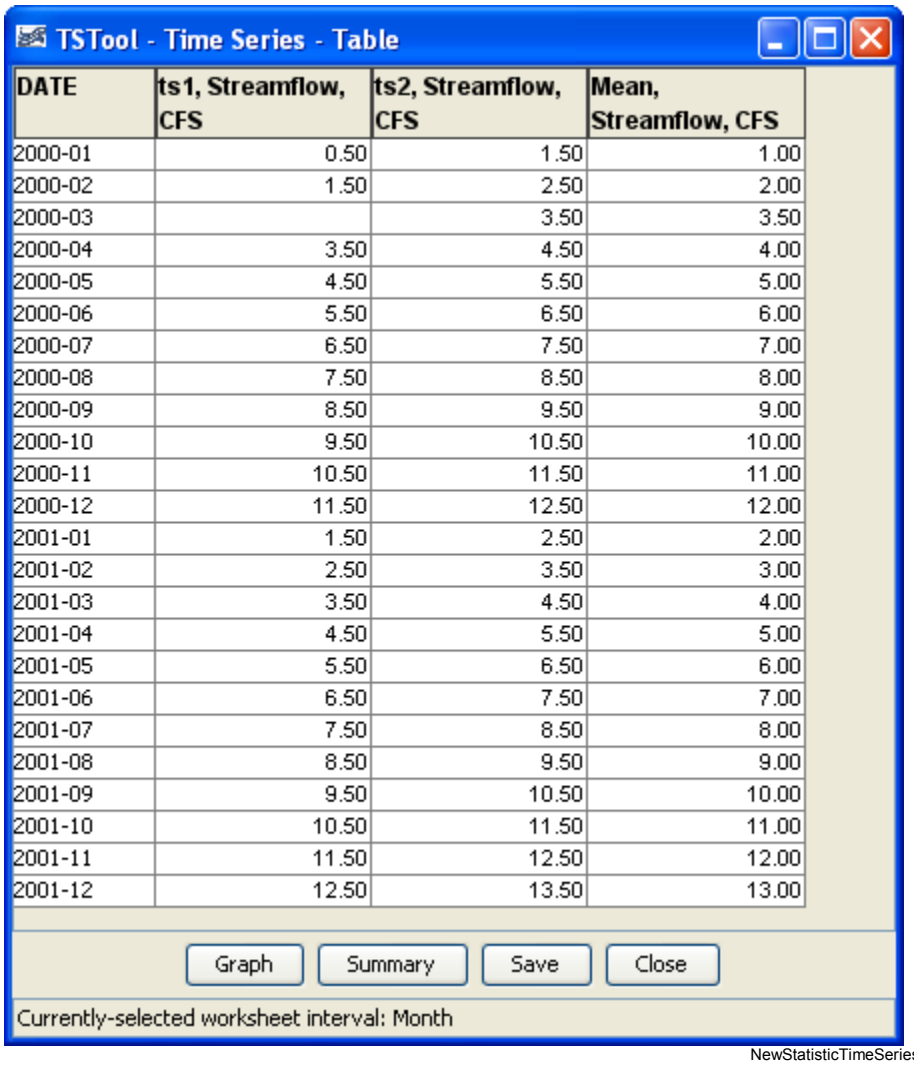
Statistic	Description
Exceedance Probability*	The statistic for each time step in the analysis period is computed as follows: 1. The data values are extracted for each trace with missing values being ignored. The sample size is *n*. 2. The data values are sorted into ascending order. 3. Exceedance probabilities are computed for the number of sample values according to Weibull plotting positions as follows (for *i=1,...,n*): a. If *n = 1*, the exceedance probability $P_i=1.0$. This is an extreme case due to small sample size. b. Otherwise, $P_i=(n-(i-1))/(n+1)$. Therefore, when *i=1*, $P_i=n/(n+1)$ and when *i=n*, $P_i=1/(n+1)$. The probabilities will be listed from high to low value (the opposite order of the sorted data values). 4. The data value corresponding to the requested probability is calculated by iterating over the probabilities until the calculated probability for a value is less than the requested probability: a. If the first probability satisfies the condition, the computed value is set to the minimum value in the sample (no extrapolating past the end). b. Otherwise, the value is interpolated from the previous and current sample values. If no calculated probability is less than the requested probability, the computed value is set to the maximum value in the sample (no extrapolating past the end). To create an exceedance probability plot, use several commands with different exceedance probability levels (listed low to high). Graphing the time series in a bar graph with BarOverlap=True will draw the bars on top of each other to give the desired appearance. The edges of the colors will represent the specific exceedance probabilities and the colored areas will represent ranges of exceedance probabilities.

Examples

The following example command file illustrates how to compute the mean statistic for one monthly data:

```
# Test computing a statistic time series for Month data where Statistic=Mean
StartLog(LogFile="Results/Test_NewStatisticTimeSeriesFromEnsemble_Month_Mean.TSTool.log")
# Define 2 years of data that when averaged equal even numbers
# The 2nd time series is shifted by 1 from the first.
# Include missing values in the first time series but not the second.
NewPatternTimeSeries(Alias="ts1",NewTSID="ts1..Streamflow.Month",
    Description="test data 1",SetStart="2000-01",SetEnd="2001-12",Units="CFS",
    PatternValues=".5,1.5,,3.5,4.5,5.5,6.5,7.5,8.5,9.5,10.5,11.5,
    1.5,2.5,3.5,4.5,5.5,6.5,7.5,8.5,9.5,10.5,11.5,12.5")
NewPatternTimeSeries(Alias="ts2",NewTSID="ts2..Streamflow.Month",
    Description="test data 2",SetStart="2000-01",SetEnd="2001-12",Units="CFS",
    PatternValues="1.5,2.5,3.5,4.5,5.5,6.5,7.5,8.5,9.5,10.5,11.5,12.5,
    2.5,3.5,4.5,5.5,6.5,7.5,8.5,9.5,10.5,11.5,12.5,13.5")
# Create an ensemble to hold the above time series
NewEnsemble(TSList=AllTS,NewEnsembleID="TestEnsemble",NewEnsembleName="Test Ensemble")
# Compute the statistic
NewStatisticTimeSeriesFromEnsemble(Alias="Mean",EnsembleID="TestEnsemble",
    NewTSID="Test..Streamflow.Month.Mean",Statistic=Mean)
```

The following figure illustrates the results:



DATE	ts1, Streamflow, CFS	ts2, Streamflow, CFS	Mean, Streamflow, CFS
2000-01	0.50	1.50	1.00
2000-02	1.50	2.50	2.00
2000-03		3.50	3.50
2000-04	3.50	4.50	4.00
2000-05	4.50	5.50	5.00
2000-06	5.50	6.50	6.00
2000-07	6.50	7.50	7.00
2000-08	7.50	8.50	8.00
2000-09	8.50	9.50	9.00
2000-10	9.50	10.50	10.00
2000-11	10.50	11.50	11.00
2000-12	11.50	12.50	12.00
2001-01	1.50	2.50	2.00
2001-02	2.50	3.50	3.00
2001-03	3.50	4.50	4.00
2001-04	4.50	5.50	5.00
2001-05	5.50	6.50	6.00
2001-06	6.50	7.50	7.00
2001-07	7.50	8.50	8.00
2001-08	8.50	9.50	9.00
2001-09	9.50	10.50	10.00
2001-10	10.50	11.50	11.00
2001-11	11.50	12.50	12.00
2001-12	12.50	13.50	13.00

NewStatisticTimeSeriesFromEnsemble_Table

NewStatisticTimeSeriesFromEnsemble() Command Results

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