

# Package: dartx (via r-universe)

October 6, 2024

**Type** Package

**Title** Applies Drainage Area Ratio Method With Correction Factors

**Version** 0.1.0

**Description** Applies empirically derived parameters for drainage area ratio calculated streamflows in Texas.

**License** GPL-3

**Depends** R (>= 2.10)

**Imports** dplyr, fuzzyjoin, lmomco, rlang

**Suggests** dataRetrieval

**Encoding** UTF-8

**LazyData** true

**URL** <https://github.com/mps9506/dartx>

**BugReports** <https://github.com/mps9506/dartx/issues>

**RoxygenNote** 6.1.0

**Repository** <https://mps9506.r-universe.dev>

**RemoteUrl** <https://github.com/mps9506/dartx>

**RemoteRef** HEAD

**RemoteSha** 584b73012a4f047623db9575136db608b2848bab

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dartx	<i>Applies Correction Factor to Drainage Area Ratio Calculated Streamflows</i>
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## Description

Streamflows estimated using the drainage-area ratio method are typically over- or under-estimated at the tails of the streamflow distribution. Asquith, Roussel, and Vrabel (2006) provide empirically-derived correction factors for estimating streamflows in Texas using the drainage-area ratio method. Applying this function to a dataframe of streamflows will return a dataframe with the original streamflow, the non-exceedance probability (cume\_dist), the correction factor used (exp), and the estimated streamflow (Q).

## Usage

```
dartx(.data, flow, dar, defaultPhi = TRUE, ...)
```

## Arguments

.data	table of class data.frame with at least one column with streamflows
flow	Variable specifying streamflows in df
dar	numeric, drainage area ratio to be applied
defaultPhi	logical. Defaults to TRUE. Use TRUE to apply values recommended by Asquith et. al. If FALSE provide a dataframe with derived values of phi as a dataframe with the following variables: min, max, exp. Where min and max are the range of percentile values to apply the value of phi and exp is the value of phi to be applied.
...	optional arguments. If defaultPhi = TRUE, expects a dataframe supplied for the argument customPhi.

## Details

The drainage area ratio is an algebraic method for estimating same-day streamflows from one location to another on the basis the ratio of the drainage areas are the same as the ratio of the streamflow. The typical equation is:

$$Y = X \left( \frac{A_y}{A_x} \right)^\phi$$

Where  $Y$  is the streamflow at the ungaged site,  $X$  is the streamflow at the gaged site,  $A_y$  and  $A_x$  are drainage areas of  $Y$  and  $X$ . Often,  $\phi$  is assumed equal to one.

Asquith, Roussel, and Vrabel (2006) developed empirically derived values of  $\phi$  based on streamflow percentiles (non-exceedance probability) for 54 percentiles of daily mean streamflow in Texas. Values of  $\phi$  range from 0.700 to 0.935.

**Value**

dataframe with new variables: Q\_percentile, exp and Q. Where Q\_percentile are the non-exceedance probability, exp are the values of phi applied to the DAR calculation and Q is the DAR estimated flow value.

**References**

Asquith, William H., Meghan C. Roussel, and Joseph Vrabel. 2006. "Statewide Analysis of the Drainage-Area Ratio Method for 34 Streamflow Percentile Ranges in Texas." 2006–5286. U.S. Geological Survey Scientific Investigations Report. U.S. Geological Survey. <https://pubs.usgs.gov/sir/2006/5286/pdf/sir2006-5286.pdf>.

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quartilePhi*Exponent values for streamflow estimation*

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**Description**

Mean values of phi per quartile for stations < 100 miles apart and absolute value of the logarithm of the ratio of the drainage areas  $\geq 0.25$ . Included mainly to demonstrate how to use custom Phi values.

**Usage**

quartilePhi

**Format**

A data frame with four rows and three variables:

**min** minimum of the range of streamflow percentile values that exp is used for

**max** maximum of the range of streamflow percentile values that exp is used for

**exp** estimated values of the exponent parameter to apply to the drainage area ratio

**Source**

Asquith, William H., Meghan C. Roussel, and Joseph Vrabel. 2006. "Statewide Analysis of the Drainage-Area Ratio Method for 34 Streamflow Percentile Ranges in Texas." 2006–5286. U.S. Geological Survey Scientific Investigations Report. U.S. Geological Survey.

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