

Input

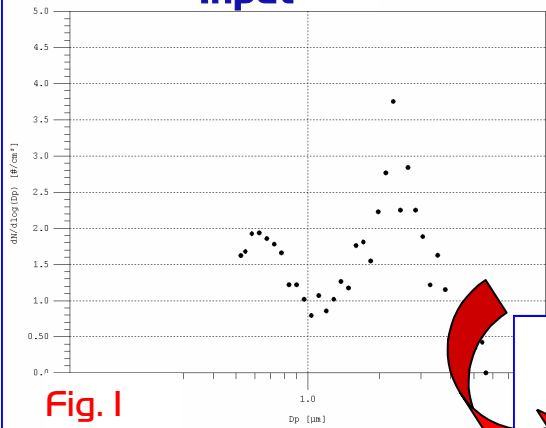


Fig. 1

Data Fitting

Multimodal Fitting

DistFit uses a multiple-initialization **Simplex** method to fit multimodal size distributions to the data. The range of data included is selected by moving fitting boundaries (two red vertical lines in Fig. 3). “0” data can be treated as either real or missing data, and either included or excluded, respectively, from the fit.

AutoFit, ManualFit

By default, **DistFit** uses Simplex minimization with an **AutoFit** routine to fit unimodal, bimodal, and trimodal distributions to the data, and determines which distribution best represents the data. Alternatively, users can choose **ManualFit** to specify the number of modes used in the fit and to specify the fitting functions for each mode.

Converted

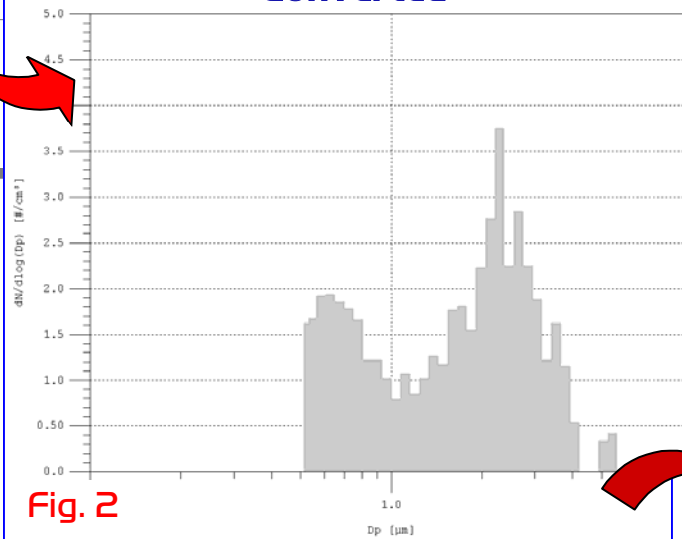


Fig. 2

Data Conversion

Input data can be converted using the following methods.

Data Type Conversion

Available data types are frequency, classified, cumulative less-than, and cumulative greater-than. Available input size types are aerodynamic and geometric diameter. Available input weighting types are number, total length, surface area, volume, and mass.

The input data, size, and weighting type can be converted to any of these available types. For example, the input data type in Fig. 1 is frequency data, and the converted data type in Fig. 2 is classified data.

Data-Interval Merging

The data in Fig. 2 shows substantial interval-to-interval variations, possibly caused by poor count statistics. **DistFit** can remove such interval-to-interval variations by merging multiple intervals (shown in Fig. 3) as part of the data conversion process.

Data-Set Merging

Data from multiple instruments can be merged into a single, composite data set.

Data Exclusion

Data can be excluded from the data conversion and fitting processes by three methods: (1) individual data points can be excluded, (2) ranges of data can be excluded by moving the fitting boundaries (shown in Fig. 3), and (3) “0” data can be treated as real or missing data, and included or excluded, respectively.

MultiFit

Multiple data files in a directory can be automatically fit and a fit report can be produced that summarizes the fit parameters for all of the data files.

Data and Fit Reports

Data reports include features of the converted data, such as measures of central tendency, fraction greater than and less than 1 μm, and respirable fraction. Fit reports include the modal parameters and the χ^2 fitting parameter for each fit attempted (unimodal, bimodal, or trimodal).

Merged and Fitted Data

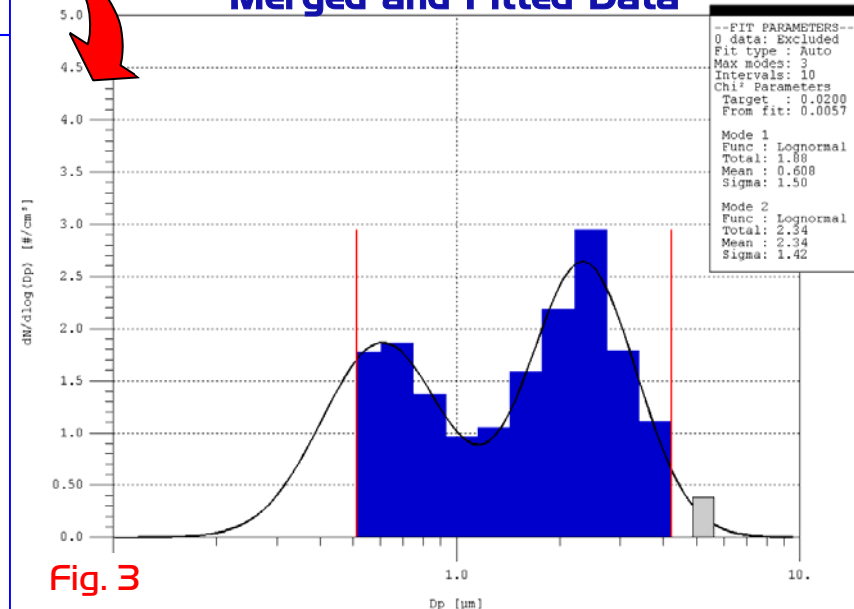
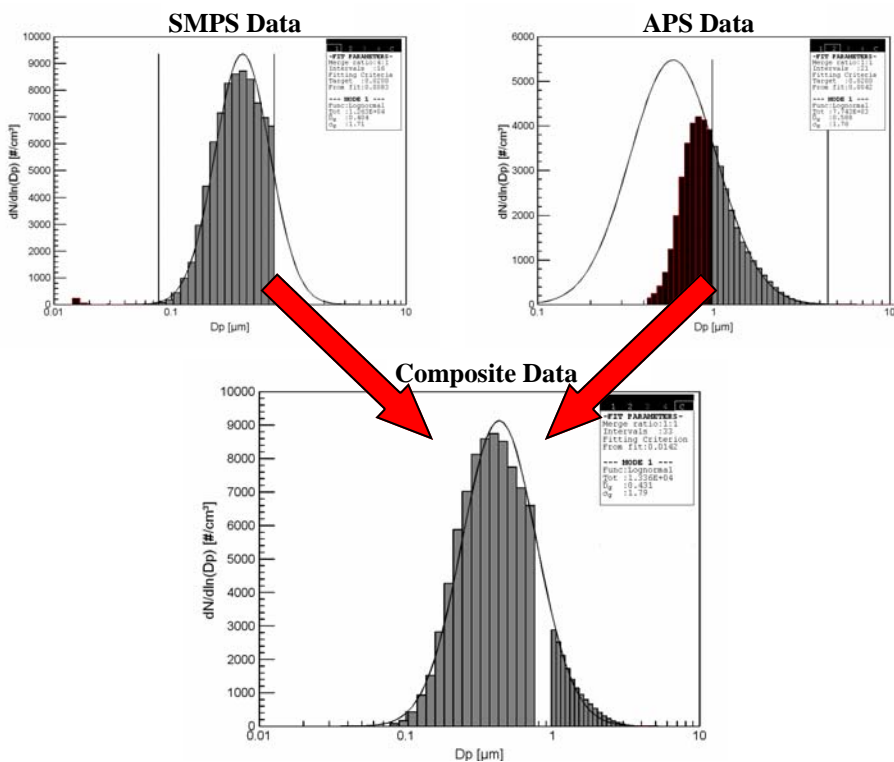


Fig. 3

Merging multiple data sets

DistFit can be used to merge multiple component data sets, such as TSI SMPS and APS data sets, into a single, composite data set. **DistFit** optionally rescales and then merges multiple data sets, and then fits multimodal functions to the composite data set.



- Free demo version available
- Educational discount available
- More details about **DistFit** available online at www.Aerosols.com
- Features currently under development include reading instrument data

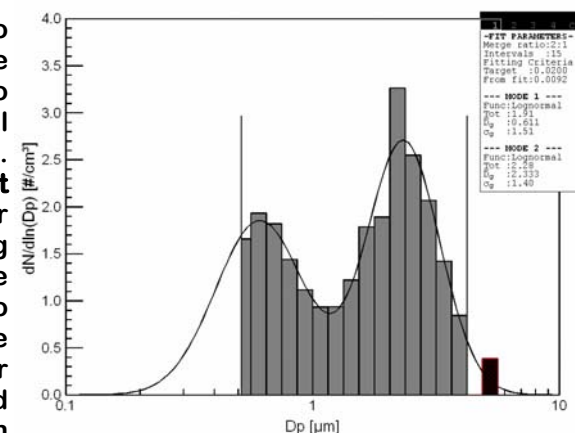
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DistFit

Particle Data Conversion & Fitting Program

DistFit is a program to manipulate particle size distribution data and to fit multimodal distributions to the data. The need for **DistFit** arises from the particular problem of handling conversions between the many data types used to represent particle size distributions. For example, a measured number size distribution



might be converted to a volume distribution. The measured particle size might be aerodynamic diameter, yet it is more common to display the geometric diameter. Data can be entered into **DistFit** as frequency, classified, cumulative less-than, or cumulative greater-than, and converted to any of the other data types. **DistFit** then fits unimodal or multimodal distributions (lognormal or Rosin-Rammler) to the size-distribution data. Finally, classifications of the data, such as the submicron/supramicron fractions, respirable fractions, and PM (particulate matter) fractions, can be calculated.

DistFit Features

- Fit multimodal particle size distributions
- Convert data type
- Merge multiple data intervals
- Merge multiple data sets
- Exclude selected data from fit
- Automatically fit multiple data sets
- Produce reports on data and fitted functions