

Particle Analysis

Granulometric Analysis

- Disaggregated sample passed through nested screens
- Screen intervals usually at 1 ϕ or 0.5 ϕ
- Weight resting on the screens summed to 100%
- Plotted as a histogram or on a probability graph

Phi Scale, (ϕ)

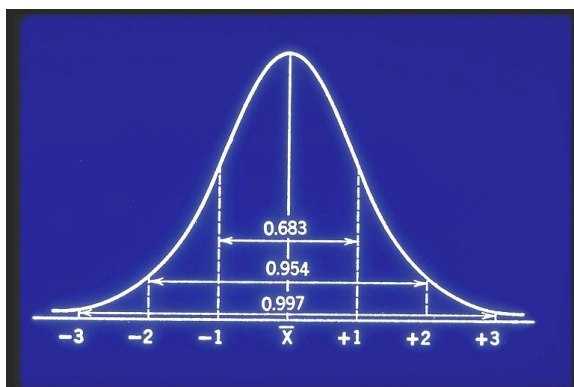
Log-normal distribution

$$\phi = -\log_2(d_{mm})$$

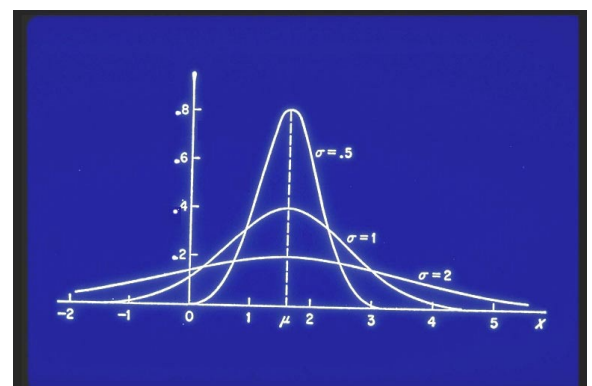
Gaussian Distribution

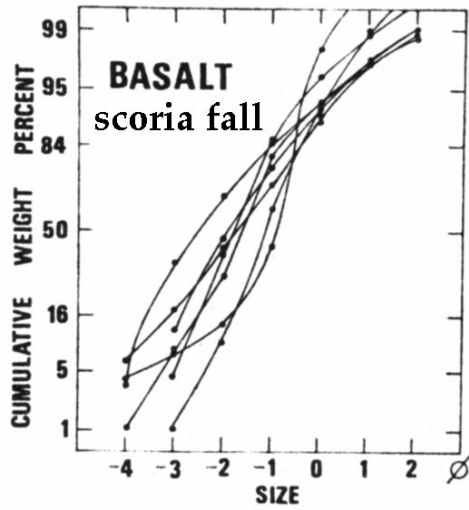
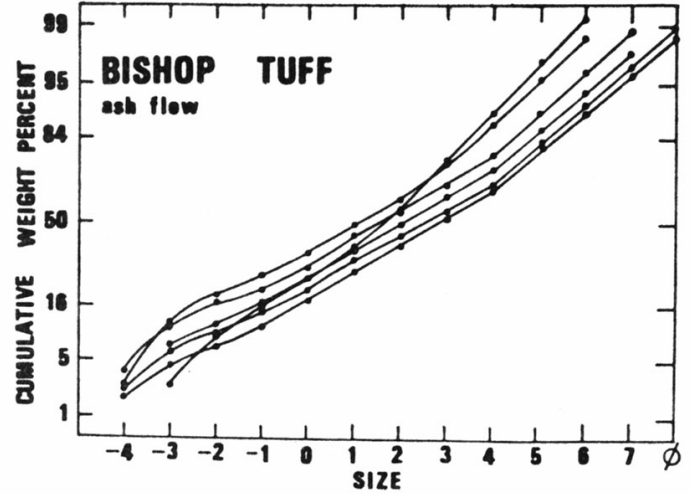
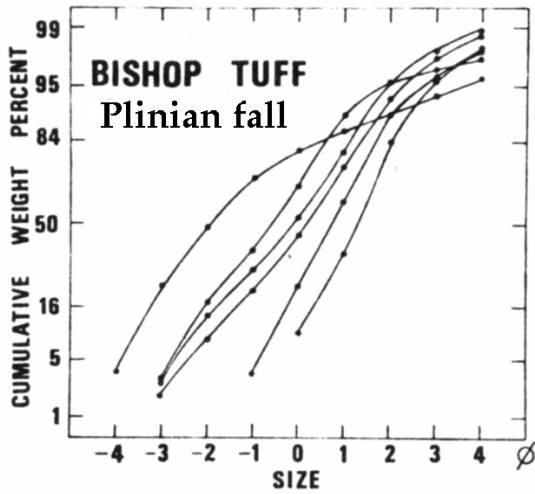
- **Mean diameter (Md_ϕ)**
 - Determined graphically as the 50th percentile of the cumulative distribution
- **Sorting (σ_ϕ)**
 - Determined graphically as the number of classes between the 16th and 84th percentiles

Gaussian Distribution



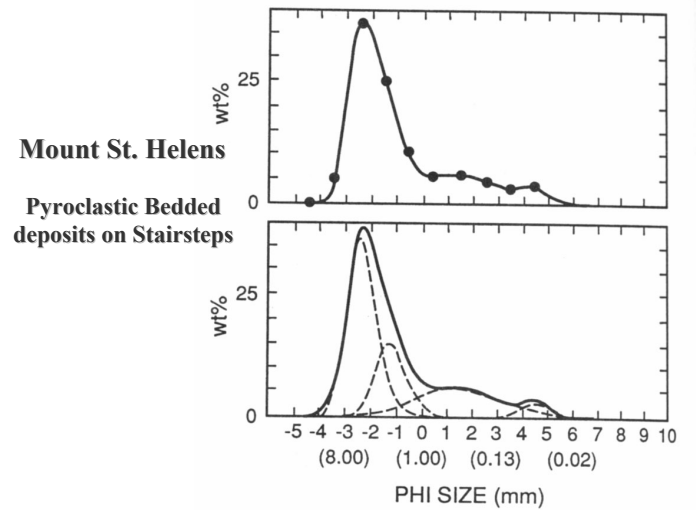
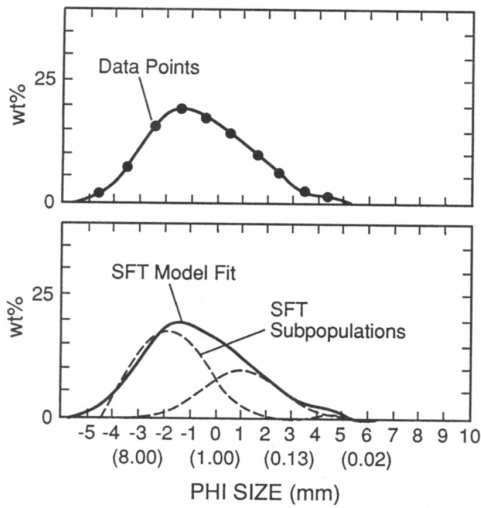
Sorting Parameter





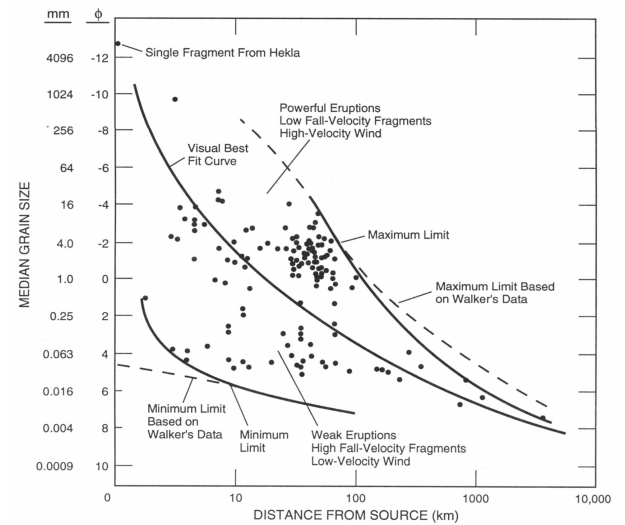
Deconvolution of Size Data

- Methods of resolving data
- Use of histograms
- Sequential Fragmentation/Transport
- Interpretation of various size modes



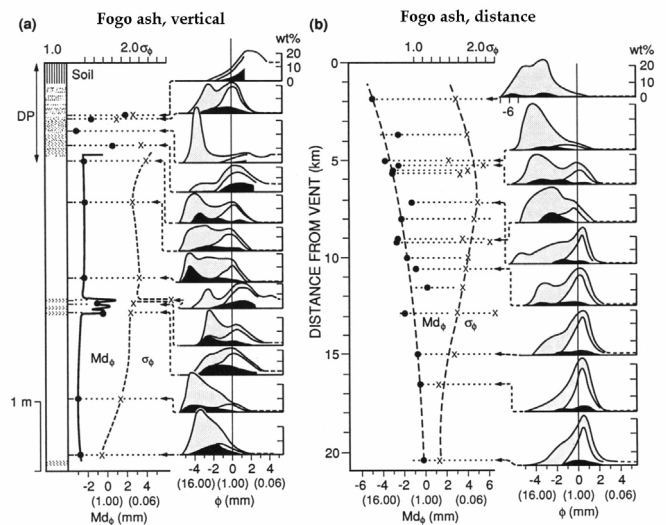
Changes with Distance

- Decrease in median grain size
- Decrease in maximum grain size
 - Pumice
 - Lithic clasts
- Increase in glass/crystal ratio



Component analysis

- Juvenile glass, pumice
- Crystals
- Lithic



Grain Shape and Texture

- Vesicularity
 - Size, abundance, shape of bubbles
- Angularity
 - Infers nature of magma rupture
- Rounding
 - Measures degree of transport
- Surface alteration
 - Weathering, hydrothermal, or juvenile?