Integrated Software for the Analysis and Presentation of Directional Data, with Spherical Projections, Bootstrap Statistics, Kinematic Analysis, Cluster Partitioning, and Data Visualization

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Abstract

Orient is a *free* professional directional data analysis and spherical projection program, with a user-friendly interface and simple data input. Orient has been in development since 1986, and introduced modified Kamb contouring, Point Girdle Random diagrams, orientation fields, and automated domain analysis.

In 2015 Orient 3.0 brought a new level of accuracy and speed, with interactive data analysis, UTM coordinate conversions, digitizing, and integration with Microsoft Excel, LibreOffice, Adobe Illustrator, InkScape, CorelDRAW, and Google Earth. Features included circular histograms and frequency plots; upper and lower hemisphere orthographic, stereographic, and equal-area projections; Fisher, Watson, and Bingham confidence cones; unlimited coordinate system and data rotations; extensively configurable plots and symbols; color gradient plots; and vector graphics.

New updates through version 3.4 have added bootstrap analysis; Kent distribution statistics; best-fit conical fold axes and small circles; cluster partitioning for axis, vector, and girdle distributions; kinematic data error calculation and orthonomalization; data point weighting; translucent display of hidden data; and numerous other fixes and upgrades.

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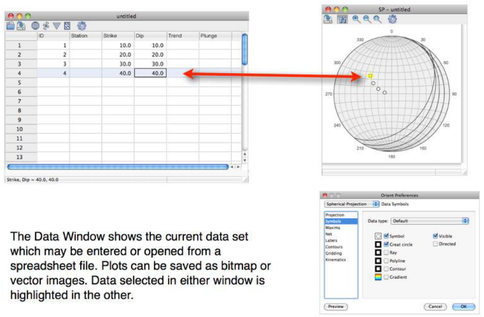
Orient 3.4

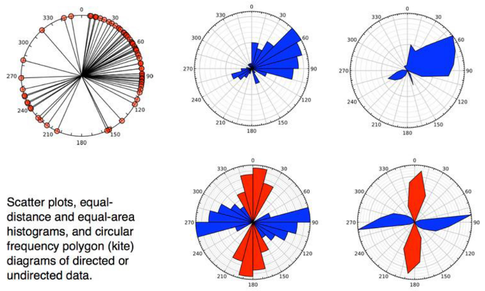
- Simple spreadsheet I/O, vector and raster graphics output
- Interface with Excel, LibreOffice, Adobe Illustrator, InkScape, CorelDRAW, Google Earth
- Fast, professional, easy to use
- *Free* (as in beer)

Interface



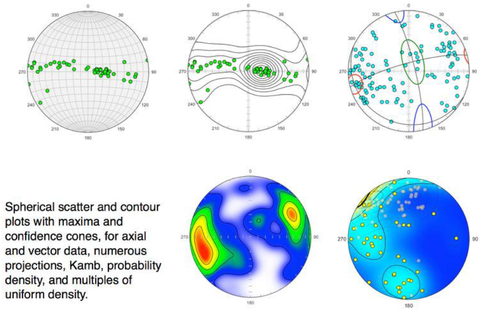
The Data Window shows the current data set which may be entered or opened from a spreadsheet file. Plots can be saved as bitmap or vector images. Data selected in either window is highlighted in the other.

Circular Plots



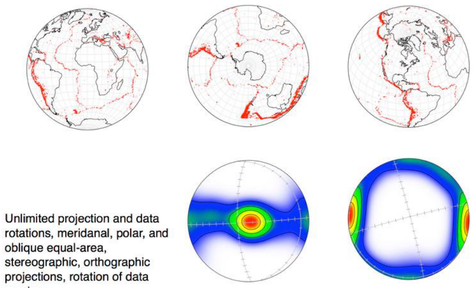
Scatter plots, equal-distance and equal-area histograms, and circular frequency polygon (kite) diagrams of directed or undirected data.

Spherical Plots



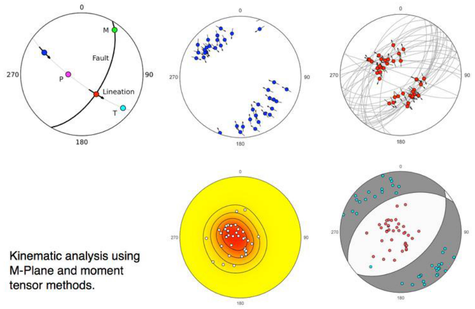
Spherical scatter and contour plots with maxima and confidence cones, for axial and vector data, numerous projections, Kamb, probability density, and multiples of uniform density.

Coordinates and Rotations



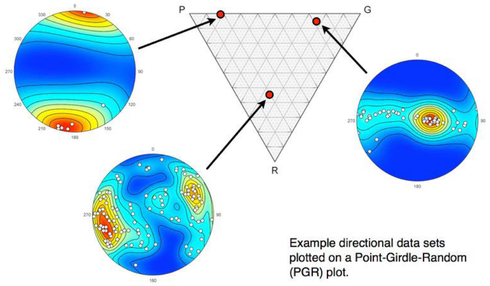
Unlimited projection and data rotations, meridanal, polar, and oblique equal-area, stereographic, orthographic projections, rotation of data maxima.

Kinematic Analysis



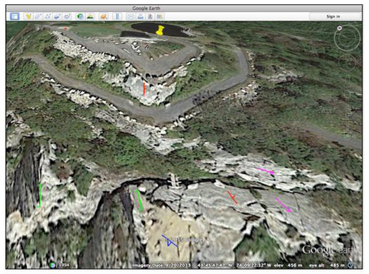
Kinematic analysis using M-Plane and moment tensor methods.

Point-Girdle-Random Plots



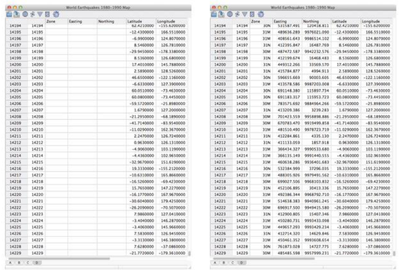
Example directional data sets plotted on a Point-Girdle-Random (PGR) plot.

Google Earth Integration



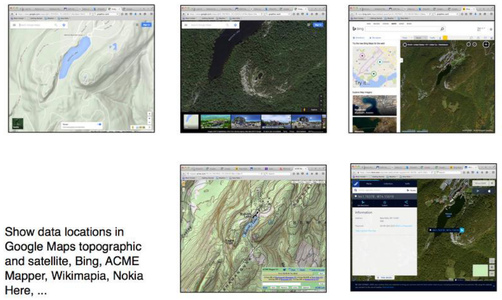
Linear and planar data symbols plotted in Google Earth. Simulated data shown on outcrops at Skytop on the Shawangunk Ridge, New York.

Latitude, Longitude / UTM Conversion



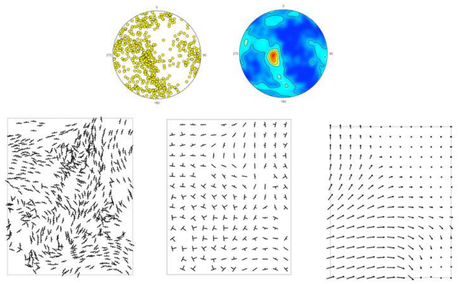
Latitude, longitude to UTM and UTM to latitude, longitude conversions.

Web Map Integration



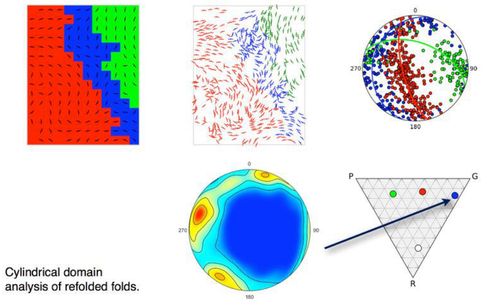
Show data locations in Google Maps topographic and satellite, Bing, ACME Mapper, Wikimapia, Nokia Here, ...

Orientation Fields



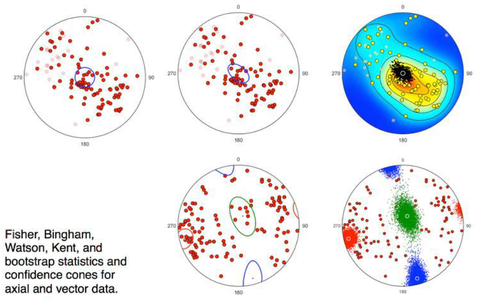
Multiply folded foliation data from Doverfjell Mountains, Norway, showing scatter and contoured Schmidt plots, and raw orientation map, subdomains, and orientation field.

Domain Analysis



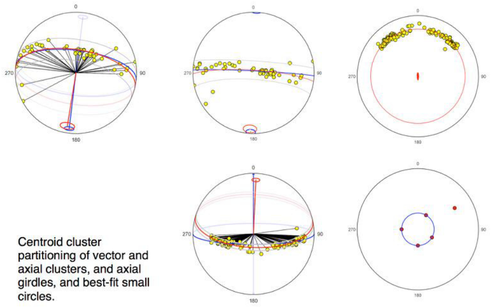
Cylindrical domain analysis of refolded folds.

Confidence & Bootstrap Statistics



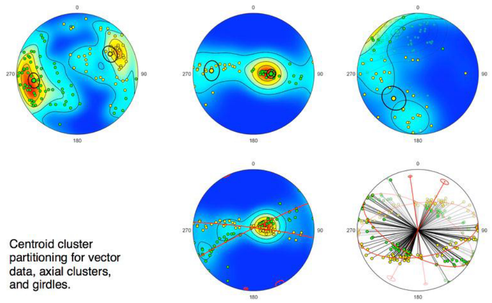
Fisher, Bingham, Watson, Kent, and bootstrap statistics and confidence cones for axial and vector data.

Conical & Small Circle Data



Centroid cluster partitioning of vector and axial clusters, and axial girdles, and best-fit small circles.

Cluster Partitioning



Centroid cluster partitioning for vector data, axial clusters, and girdles.