

Plotting Borehole Rosegrams With RockWorks

Project Folder: C:\Users\Jim\Documents


Summary Dimensions

UTM System WGS-84 1984 (NAD-83) Datum

- Borehole Operations
 - Maps
 - Borehole Map ...**
 - Optional Fields ...
 - Stratigraphy
 - Striplog Map ...

Added 8/15/24

Borehole Location Map

Main Options | Spatial Filter | Time Filter |  Strat. Rules

Symbol Options

- Surface Contours
- Add —————
- Background Image
- Labeled Axes
- Map Overlays
- Other 2D Files
- Peripherals
- Border

Output Options

- Symbols
- Proportional Shapes
- Rosegrams
- Log Traces
- Borehole IDs
- Coordinates
- Elevations
- Collar Elevations
- Total Depths
- Stratigraphy Data
- Aquifer Data
- I-Data
- T-Data
- Optional Fields

Label Options

Data Type


- Lithology
- Stratigraphy

Scaler
Inner Radius

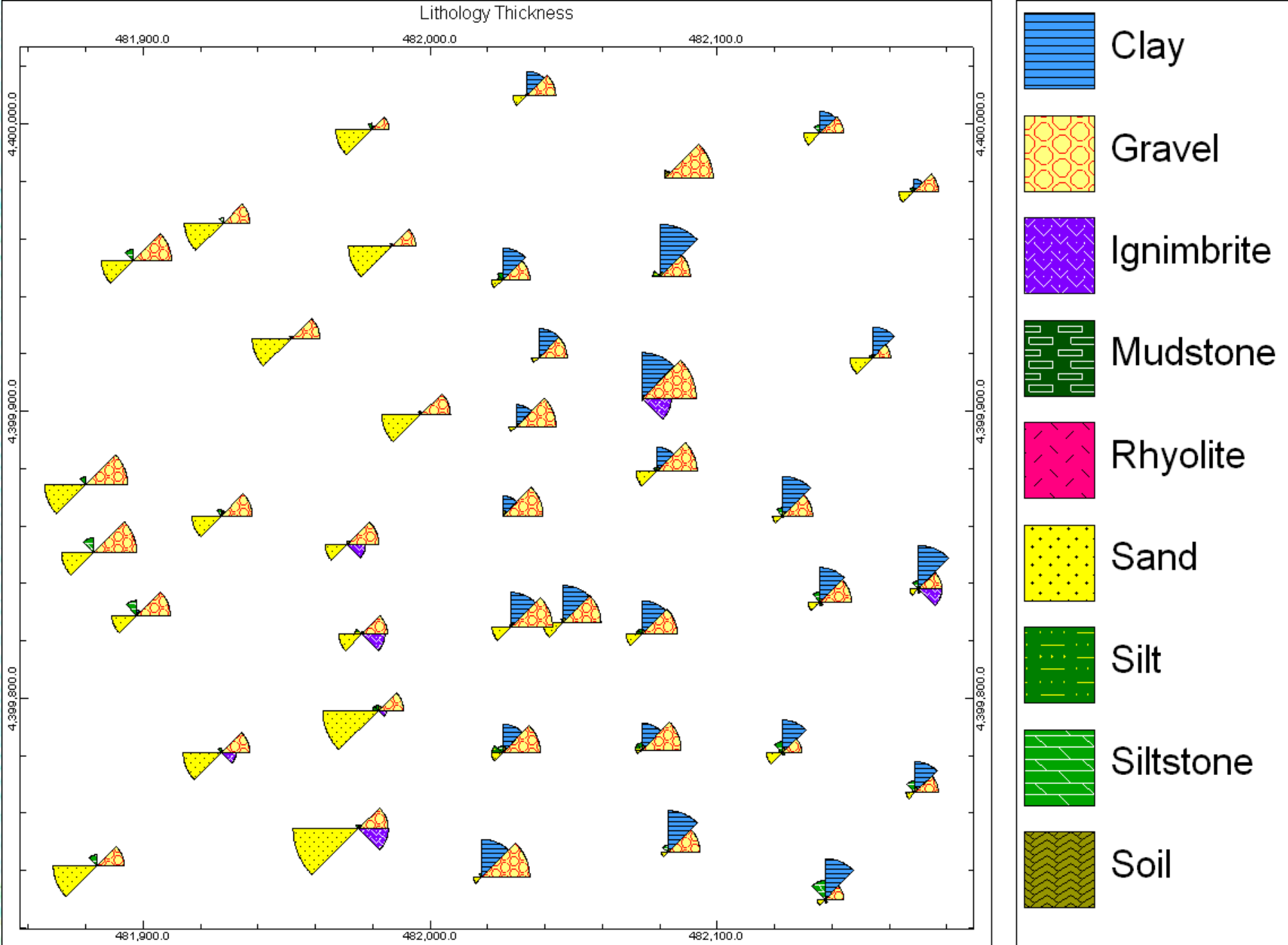
Borders
 Patterns
Density

Labels
Orientation

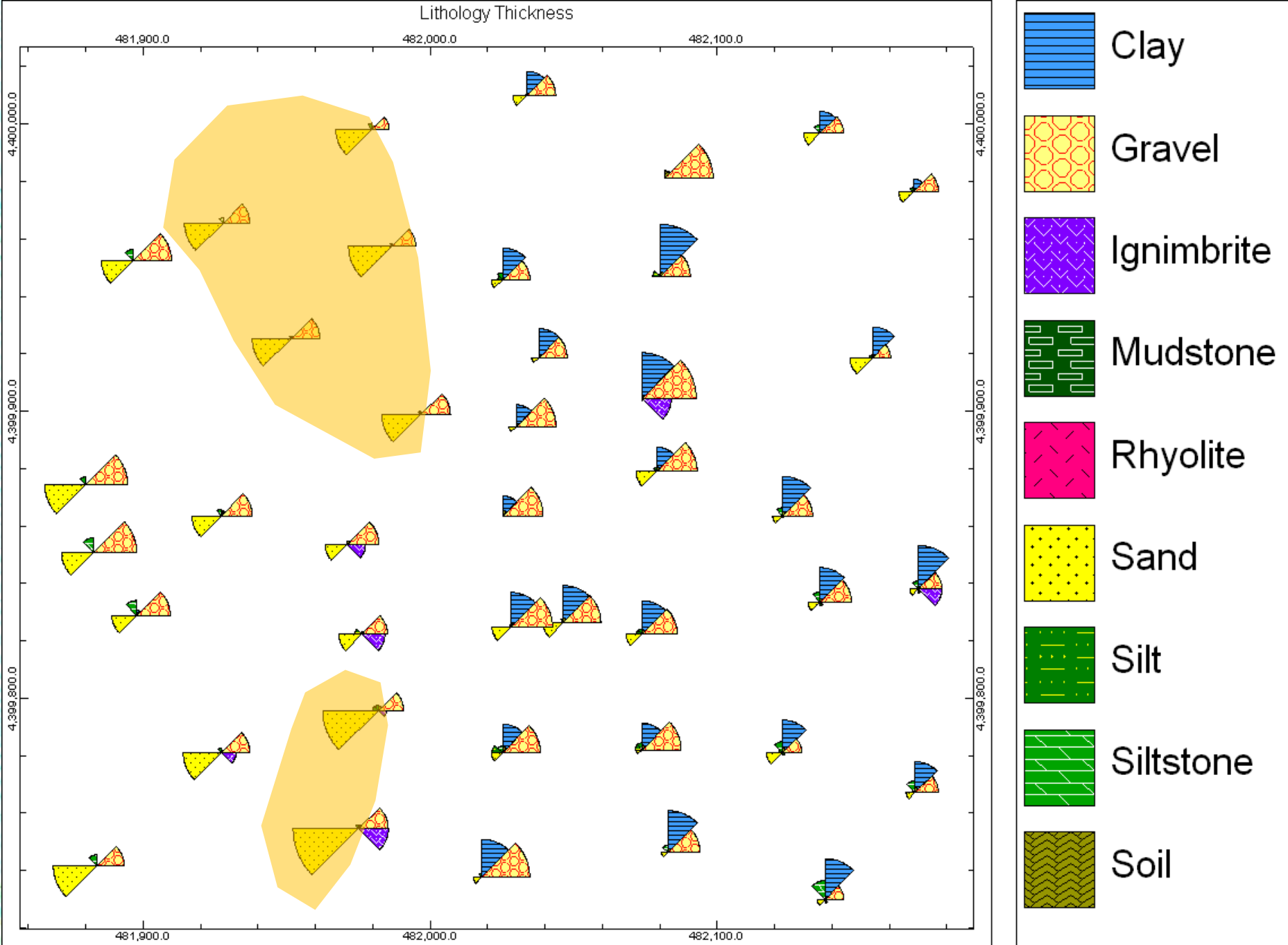
- Radial
- Horizontal

Size
Color 
Offset

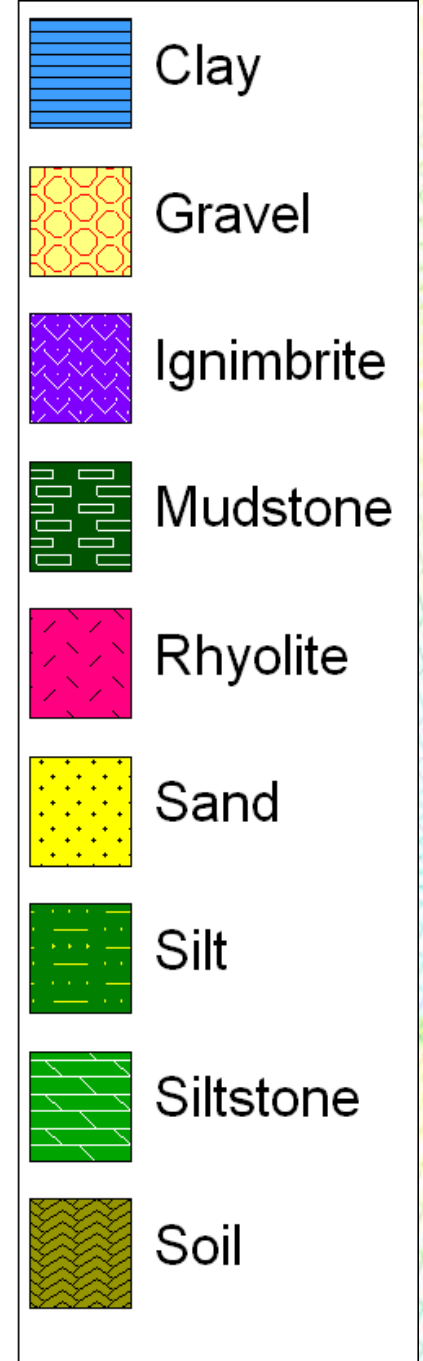
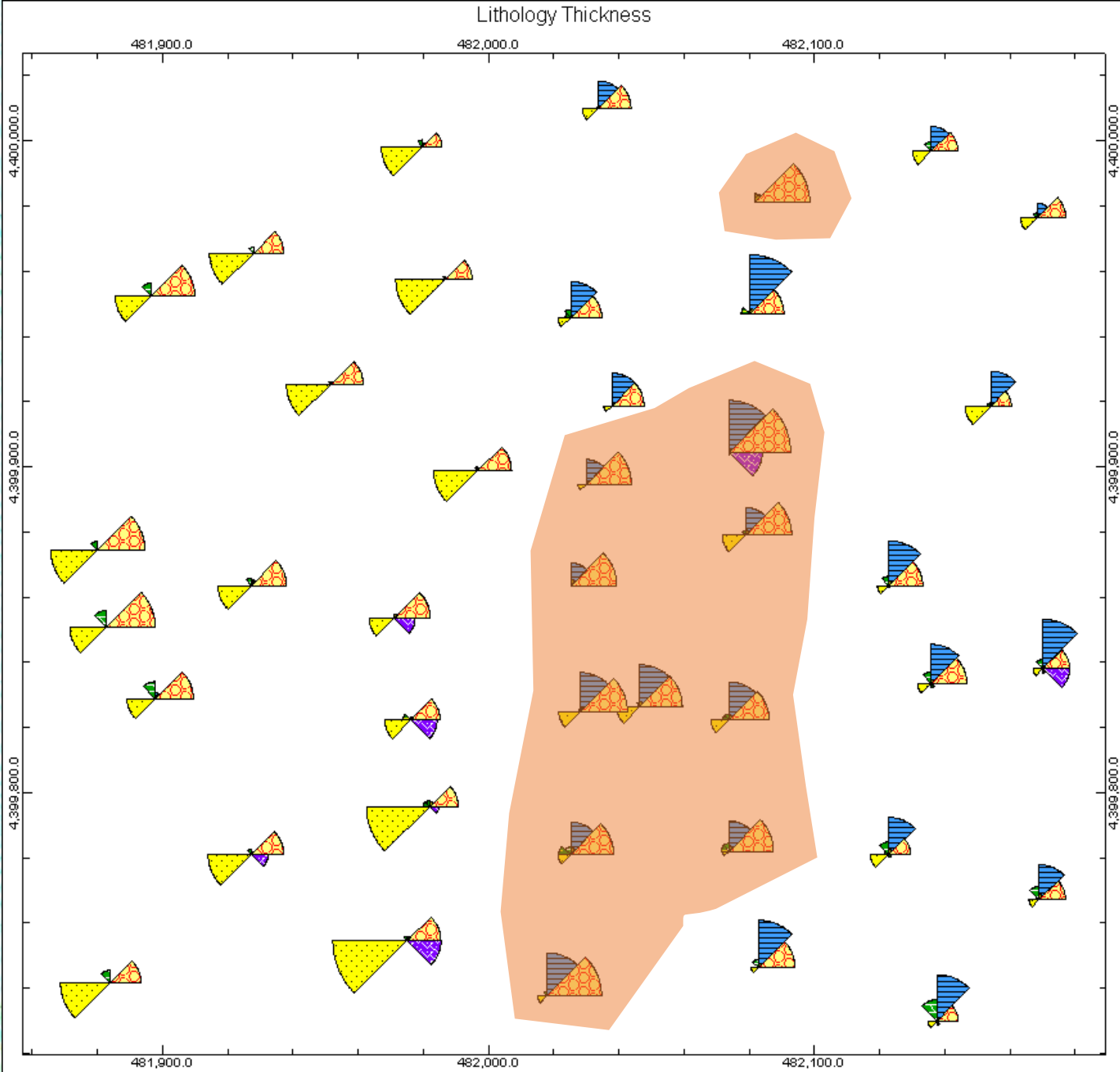
A new option titled "Rosegrams" has been added to the Symbol Options for all programs that create 2D maps from borehole data.



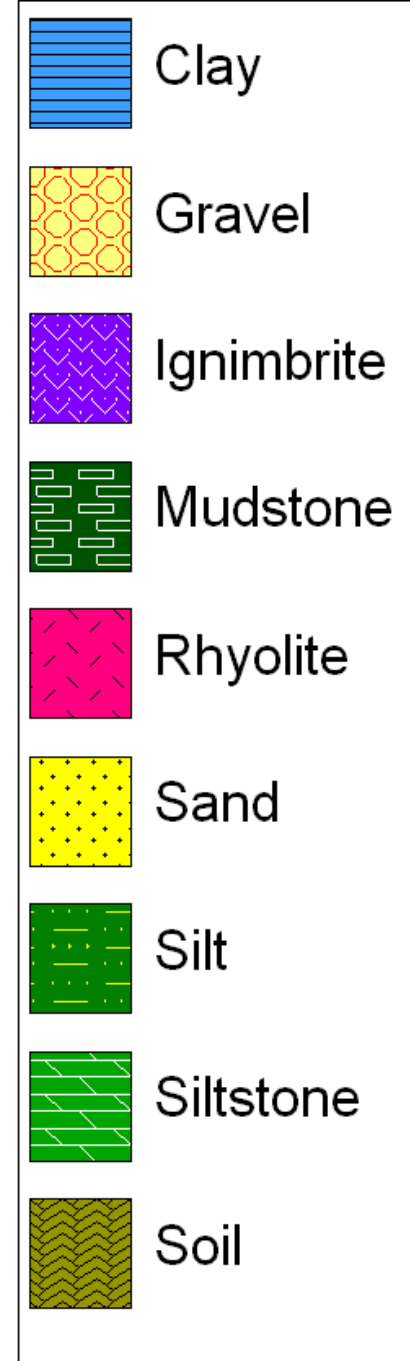
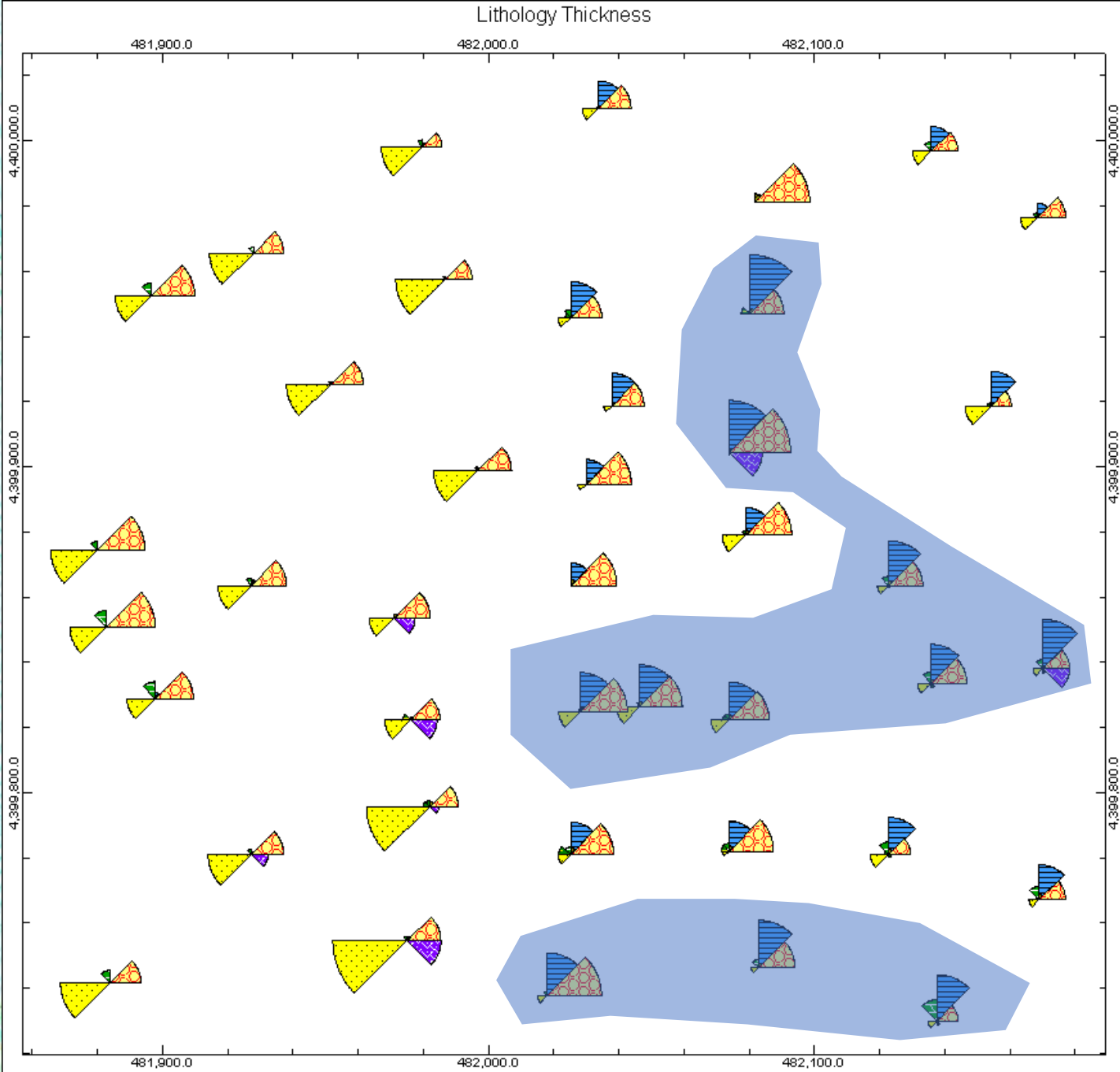
This new capability produces maps that depict lithology or stratigraphy thicknesses without the need for any modeling.



In this example, we can see that there's a lot of sand in these regions, ...












... thick gravels in these areas, and ...



... thick clay in these regions.

Litho Types

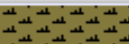




File Edit Density Units: Grams Per Cubic Centimeter Pattern Assistant

G-Value	Keyword	Pattern	Fill Percent	Density	Show in Legend
2.0	Clay		100	2.2	<input checked="" type="checkbox"/>
5.0	Gravel		100	2.8	<input checked="" type="checkbox"/>
9.0	Ignimbrite		100	2.5	<input checked="" type="checkbox"/>
6.0	Mudstone		100	2.6	<input checked="" type="checkbox"/>
8.0	Rhyolite		100	2.1	<input checked="" type="checkbox"/>
4.0	Sand		100	2.7	<input checked="" type="checkbox"/>
3.0	Silt		100	2.1	<input checked="" type="checkbox"/>
7.0	Siltstone		100	2.5	<input checked="" type="checkbox"/>
1.0	Soil		100	2.6	<input checked="" type="checkbox"/>

Close Help

Strata Types










File Edit Density Units: Grams Per Cubic Centimeter Pattern Assistant

Order	Formation	Pattern	Fill Percent	Density	Show in Legend
1.0	A-Horizon		100	1.0	<input checked="" type="checkbox"/>
2.0	Spergen Fm.		100	0.2	<input checked="" type="checkbox"/>
3.0	Leadville Ls.		100	1.0	<input checked="" type="checkbox"/>
4.0	Potosi Fm.		100	1.0	<input checked="" type="checkbox"/>
5.0	Basement		100	1.0	<input checked="" type="checkbox"/>

Close Help

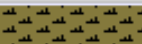




The number of petals that are depicted within the diagrams are determined by the Litho Types and Strata Types tables.

Litho Types Density Units: Grams Per Cubic Centimeter Pattern Assistant

G-Value	Keyword	Pattern	Fill Percent	Density	Show in Legend
2.0	Clay		100	2.2	<input checked="" type="checkbox"/>
5.0	Gravel		100	2.8	<input checked="" type="checkbox"/>
9.0	Ignimbrite		100	2.5	<input checked="" type="checkbox"/>
6.0	Mudstone		100	2.6	<input checked="" type="checkbox"/>
8.0	Rhyolite		100	2.1	<input checked="" type="checkbox"/>
4.0	Sand		100	2.7	<input checked="" type="checkbox"/>
3.0	Silt		100	2.1	<input checked="" type="checkbox"/>
7.0	Siltstone		100	2.5	<input checked="" type="checkbox"/>
1.0	Soil		100	2.6	<input checked="" type="checkbox"/>

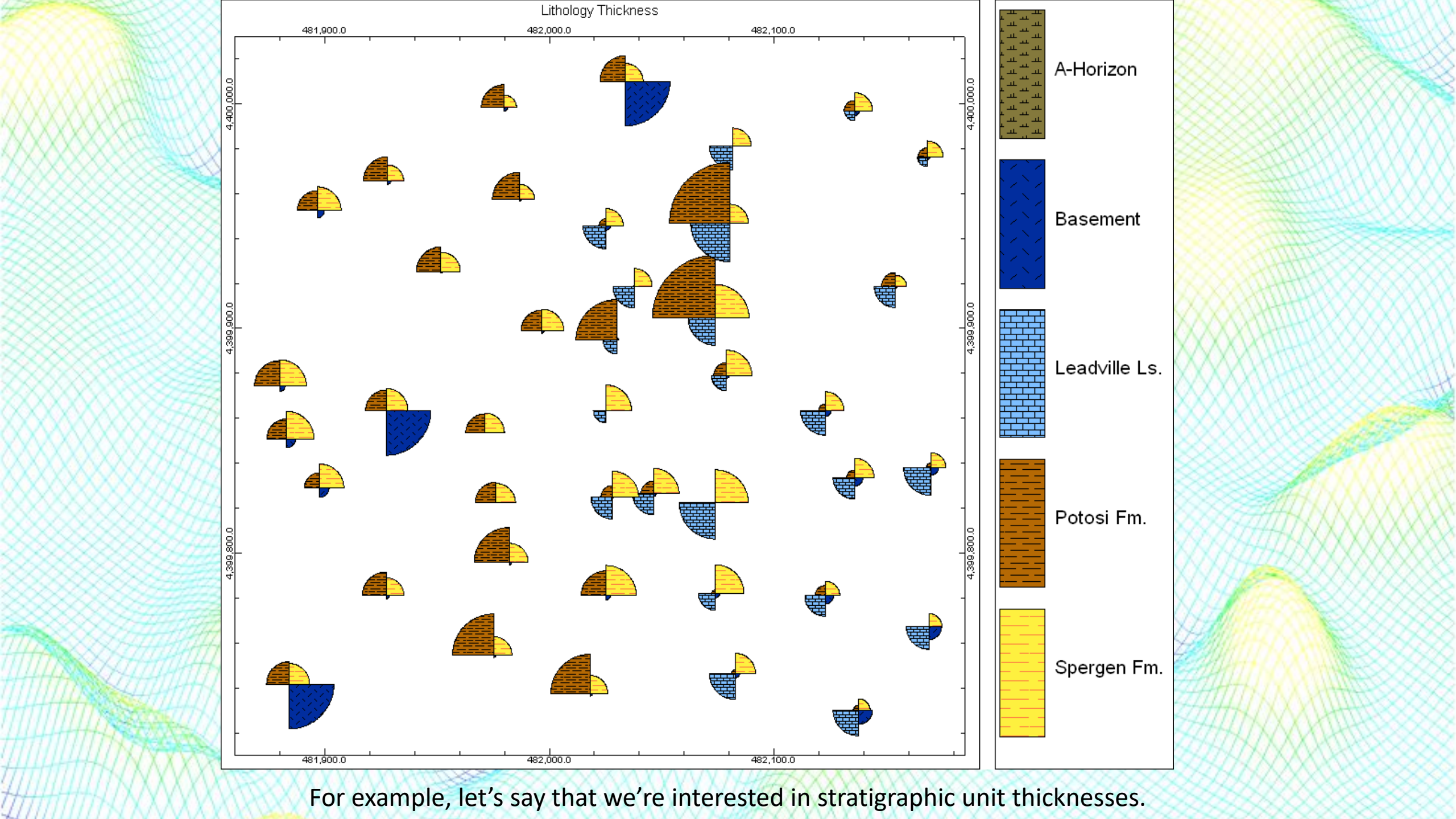
Close Help

Strata Types Density Units: Grams Per Cubic Centimeter Pattern Assistant

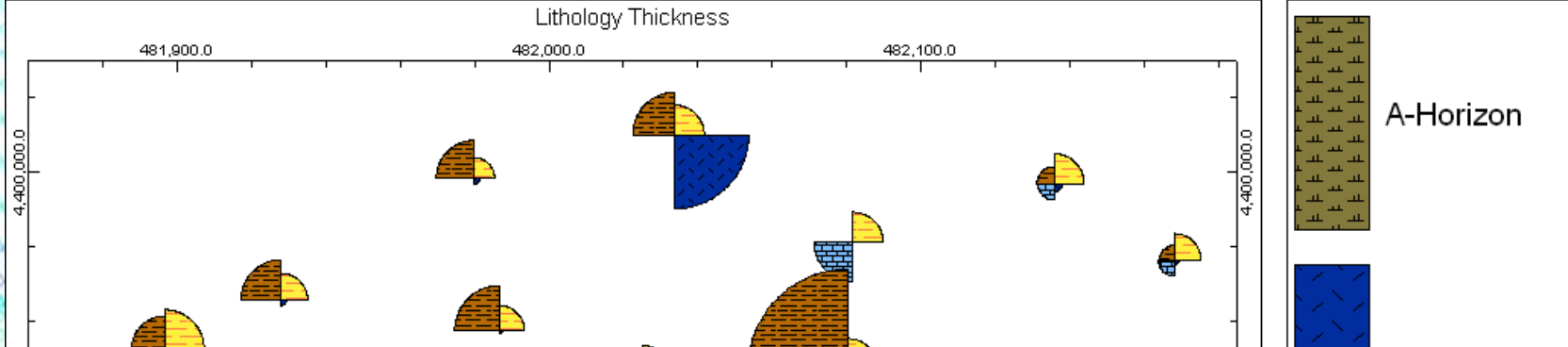
Order	Formation	Pattern	Fill Percent	Density	Show in Legend
1.0	A-Horizon		100	1.0	<input checked="" type="checkbox"/>
2.0	Spergen Fm.		100	0.2	<input checked="" type="checkbox"/>
3.0	Leadville Ls.		100	1.0	<input checked="" type="checkbox"/>
4.0	Potosi Fm.		100	1.0	<input checked="" type="checkbox"/>
5.0	Basement		100	1.0	<input checked="" type="checkbox"/>

Close Help

Items that are checked within the "Show in Legend" column will be included within the rosegrams.



For example, let's say that we're interested in stratigraphic unit thicknesses.



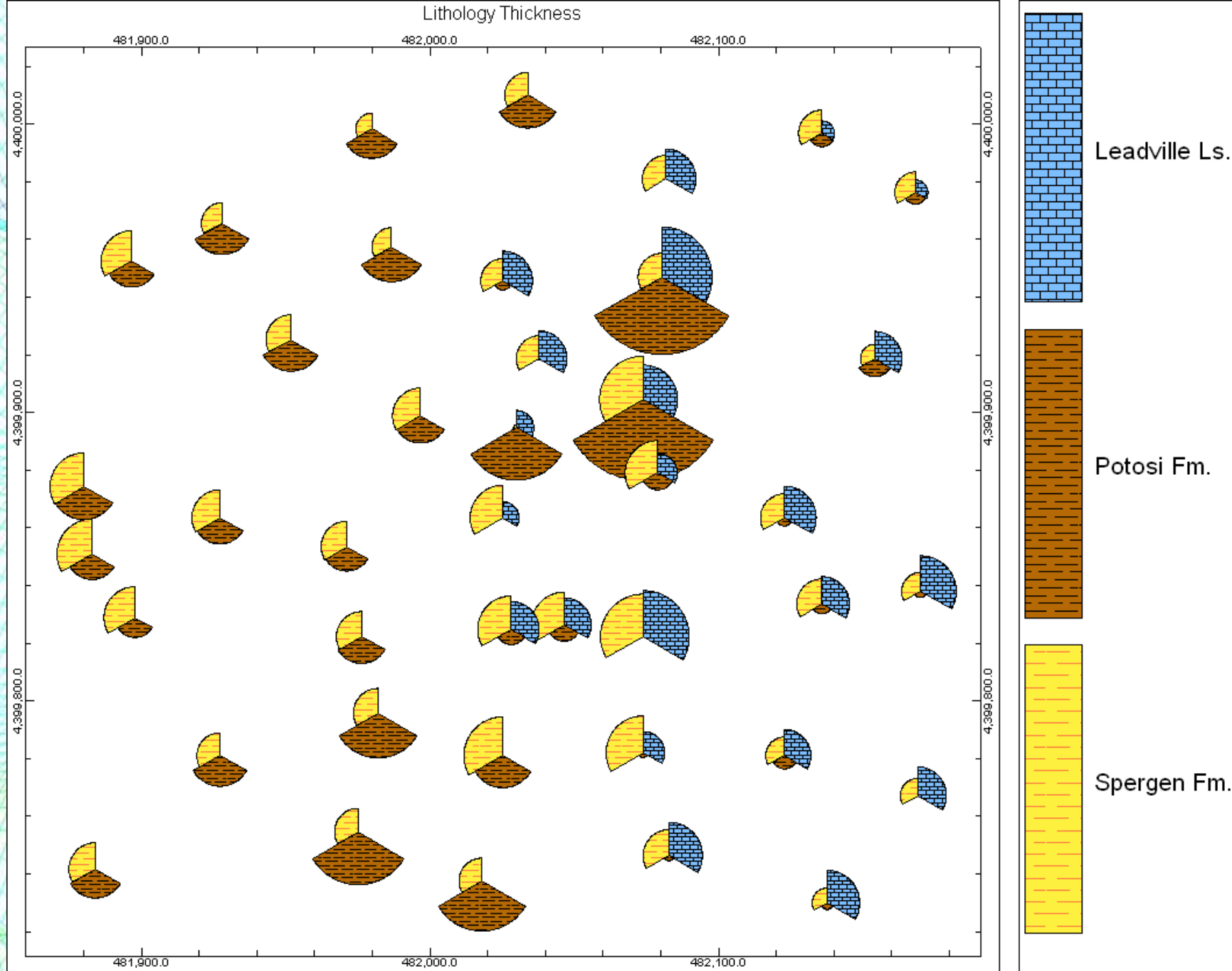
Strata Types

File Edit Density Units: Grams Per Cubic Centimeter Pattern Assistant

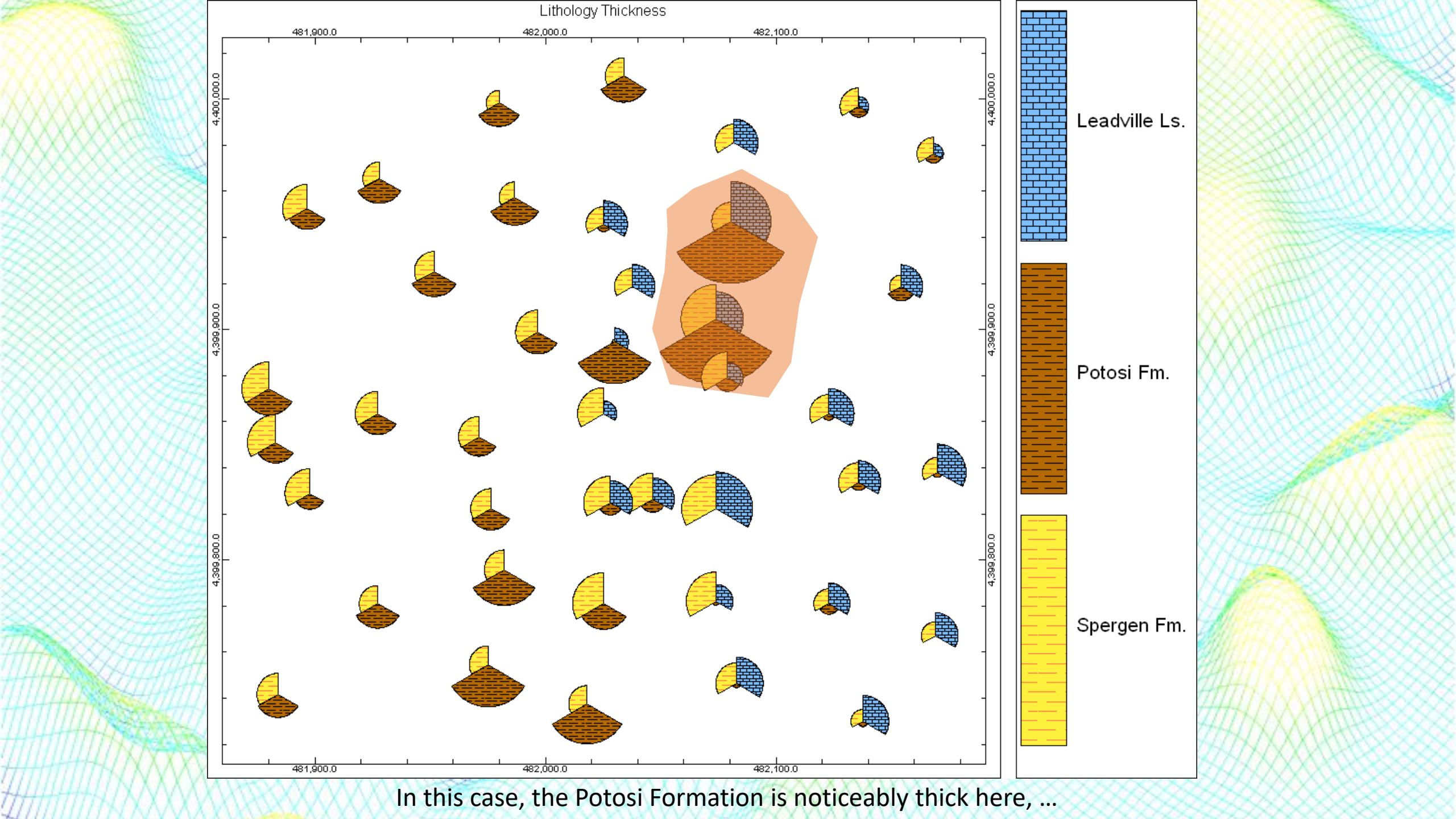
Order	Formation	Pattern	Fill Percent	Density	Show in Legend
I 1.0	A-Horizon		100	1.0	<input type="checkbox"/>
2.0	Spergen Fm.		100	0.2	<input checked="" type="checkbox"/>
3.0	Leadville Ls.		100	1.0	<input checked="" type="checkbox"/>
4.0	Potosi Fm.		100	1.0	<input checked="" type="checkbox"/>
5.0	Basement		100	1.0	<input type="checkbox"/>

Close Help

By un-checking the units that we're not interested in within the Strata Types table, ...



... thickness variations become very obvious.



481,900.0

482,000.0

482,100.0

4,400,000.0

4,400,000.0

4,399,900.0

4,399,900.0

4,399,800.0

4,399,800.0

481,900.0

482,000.0

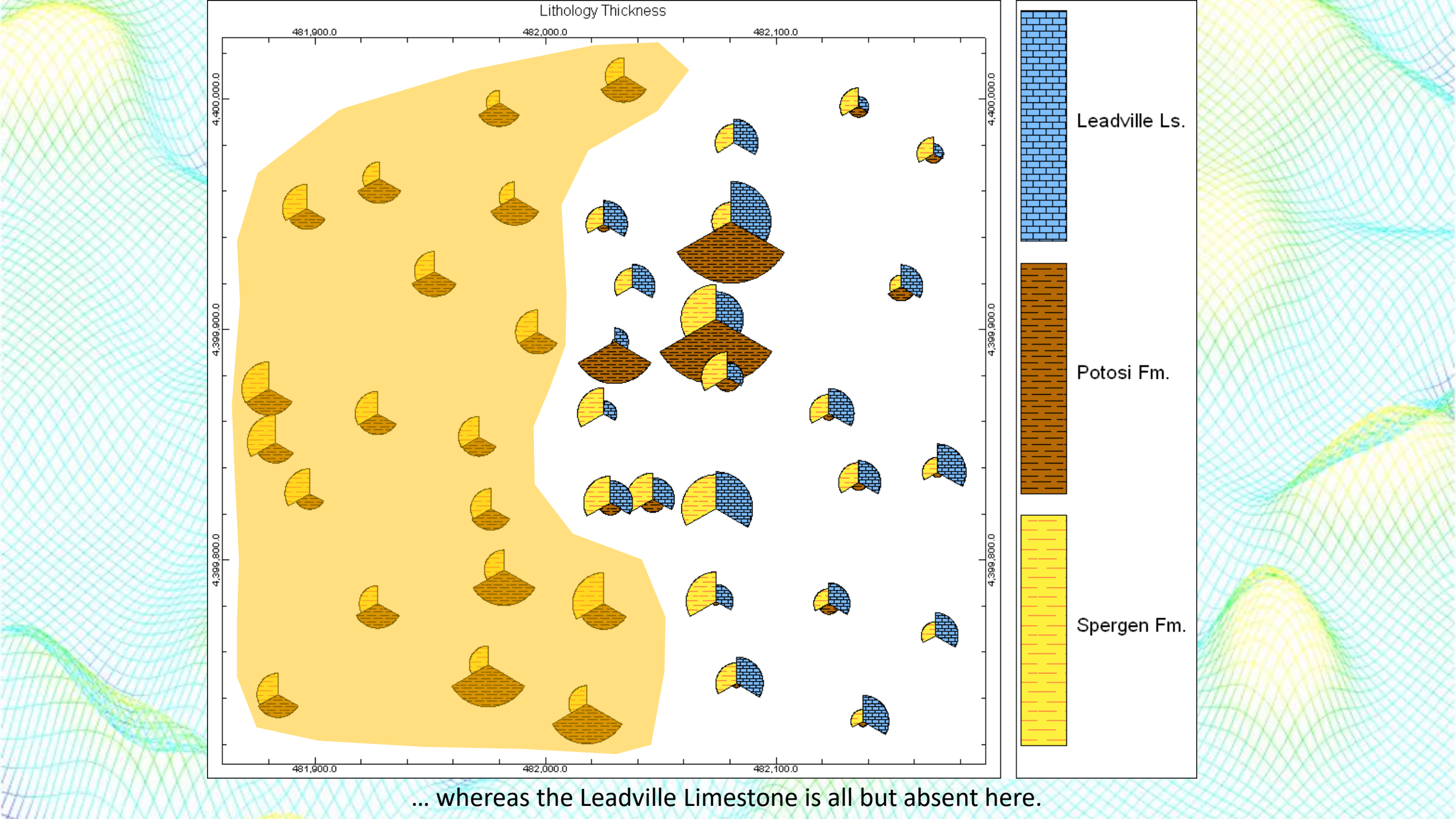
482,100.0

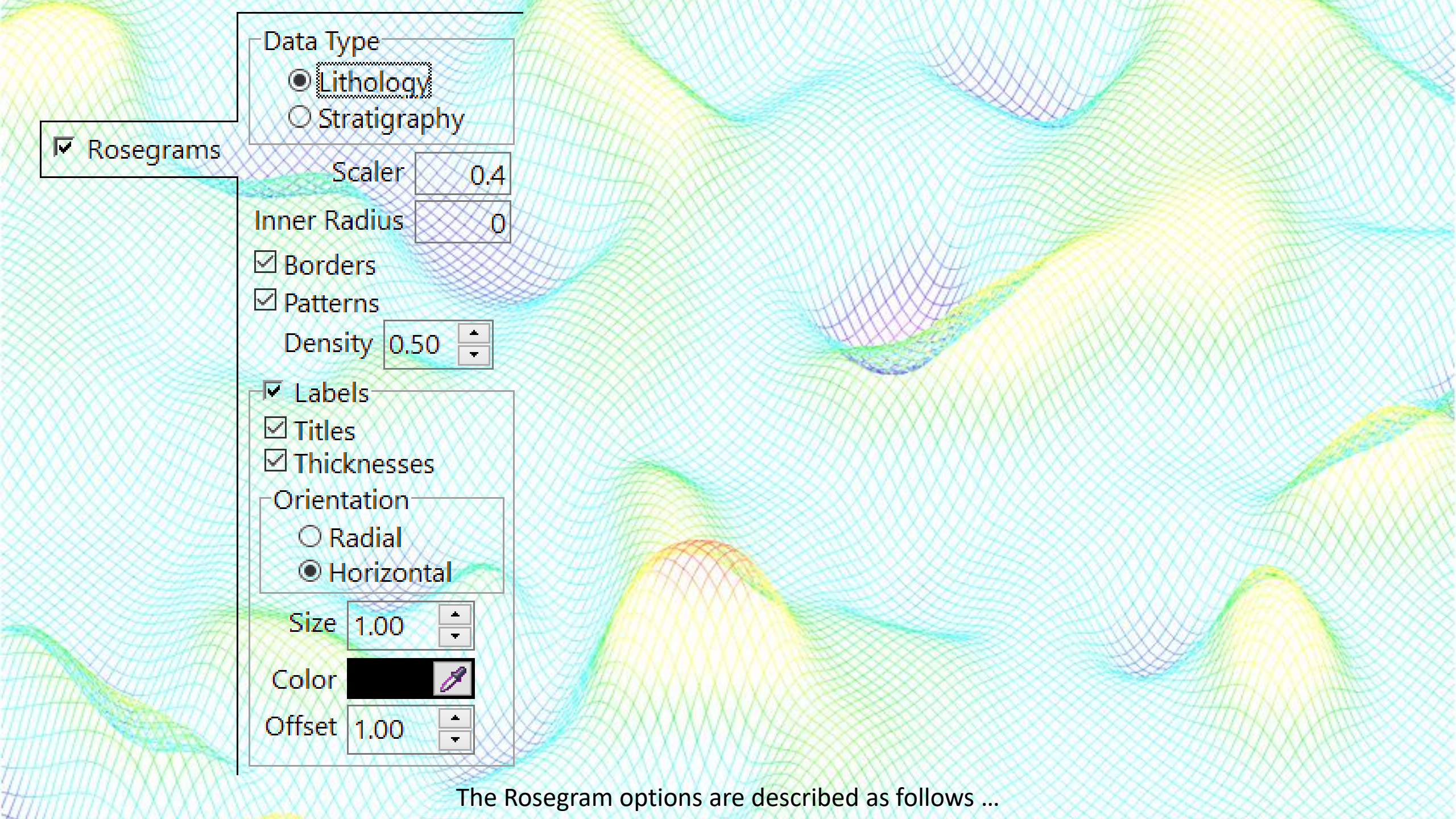
Leadville Ls.

Potosi Fm.

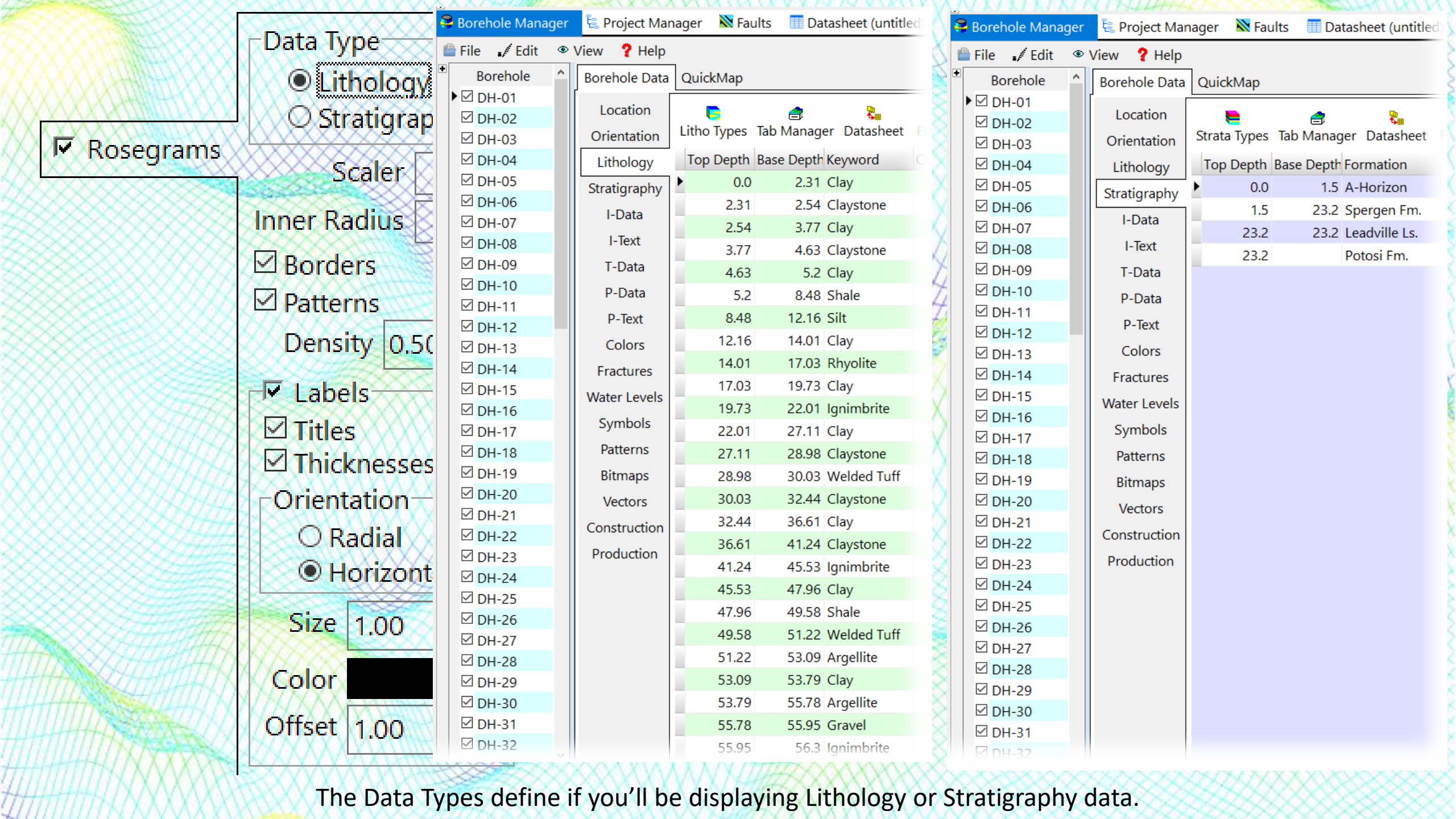
Spergen Fm.

In this case, the Potosi Formation is noticeably thick here, ...





The Rosegram options are described as follows ...



Rosegrams

Data Type

Lithology

Stratigraphy

Scaler

Inner Radius

Borders

Patterns

Density 0.50

Labels

Titles

Thicknesses

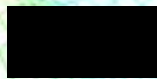
Orientation

Radial

Horizontal

Size 1.00

Color



Offset 1.00

Borehole Manager Project Manager Faults Datasheet (untitled)

File Edit View Help

Borehole	Location	Orientation	Litho Types	Tab Manager	Datasheet
<input checked="" type="checkbox"/> DH-01					
<input checked="" type="checkbox"/> DH-02					
<input checked="" type="checkbox"/> DH-03					
<input checked="" type="checkbox"/> DH-04					
<input checked="" type="checkbox"/> DH-05					
<input checked="" type="checkbox"/> DH-06					
<input checked="" type="checkbox"/> DH-07					
<input checked="" type="checkbox"/> DH-08					
<input checked="" type="checkbox"/> DH-09					
<input checked="" type="checkbox"/> DH-10					
<input checked="" type="checkbox"/> DH-11					
<input checked="" type="checkbox"/> DH-12					
<input checked="" type="checkbox"/> DH-13					
<input checked="" type="checkbox"/> DH-14					
<input checked="" type="checkbox"/> DH-15					
<input checked="" type="checkbox"/> DH-16					
<input checked="" type="checkbox"/> DH-17					
<input checked="" type="checkbox"/> DH-18					
<input checked="" type="checkbox"/> DH-19					
<input checked="" type="checkbox"/> DH-20					
<input checked="" type="checkbox"/> DH-21					
<input checked="" type="checkbox"/> DH-22					
<input checked="" type="checkbox"/> DH-23					
<input checked="" type="checkbox"/> DH-24					
<input checked="" type="checkbox"/> DH-25					
<input checked="" type="checkbox"/> DH-26					
<input checked="" type="checkbox"/> DH-27					
<input checked="" type="checkbox"/> DH-28					
<input checked="" type="checkbox"/> DH-29					
<input checked="" type="checkbox"/> DH-30					
<input checked="" type="checkbox"/> DH-31					
<input checked="" type="checkbox"/> DH-32					

Borehole Data QuickMap

Lithology	Top Depth	Base Depth	Keyword
Stratigraphy	0.0	2.31	Clay
I-Data	2.31	2.54	Claystone
I-Text	2.54	3.77	Clay
T-Data	3.77	4.63	Claystone
P-Data	4.63	5.2	Clay
P-Text	5.2	8.48	Shale
Colors	8.48	12.16	Silt
Fractures	12.16	14.01	Clay
Water Levels	14.01	17.03	Rhyolite
Symbols	17.03	19.73	Clay
Patterns	19.73	22.01	Ignimbrite
Bitmaps	22.01	27.11	Clay
Vectors	27.11	28.98	Claystone
Construction	28.98	30.03	Welded Tuff
Production	30.03	32.44	Claystone
	32.44	36.61	Clay
	36.61	41.24	Claystone
	41.24	45.53	Ignimbrite
	45.53	47.96	Clay
	47.96	49.58	Shale
	49.58	51.22	Welded Tuff
	51.22	53.09	Argellite
	53.09	53.79	Clay
	53.79	55.78	Argellite
	55.78	55.95	Gravel
	55.95	56.3	Ignimbrite

Borehole Manager Project Manager Faults Datasheet (untitled)

File Edit View Help

Borehole	Location	Orientation	Strata Types	Tab Manager	Datasheet
<input checked="" type="checkbox"/> DH-01					
<input checked="" type="checkbox"/> DH-02					
<input checked="" type="checkbox"/> DH-03					
<input checked="" type="checkbox"/> DH-04					
<input checked="" type="checkbox"/> DH-05					
<input checked="" type="checkbox"/> DH-06					
<input checked="" type="checkbox"/> DH-07					
<input checked="" type="checkbox"/> DH-08					
<input checked="" type="checkbox"/> DH-09					
<input checked="" type="checkbox"/> DH-10					
<input checked="" type="checkbox"/> DH-11					
<input checked="" type="checkbox"/> DH-12					
<input checked="" type="checkbox"/> DH-13					
<input checked="" type="checkbox"/> DH-14					
<input checked="" type="checkbox"/> DH-15					
<input checked="" type="checkbox"/> DH-16					
<input checked="" type="checkbox"/> DH-17					
<input checked="" type="checkbox"/> DH-18					
<input checked="" type="checkbox"/> DH-19					
<input checked="" type="checkbox"/> DH-20					
<input checked="" type="checkbox"/> DH-21					
<input checked="" type="checkbox"/> DH-22					
<input checked="" type="checkbox"/> DH-23					
<input checked="" type="checkbox"/> DH-24					
<input checked="" type="checkbox"/> DH-25					
<input checked="" type="checkbox"/> DH-26					
<input checked="" type="checkbox"/> DH-27					
<input checked="" type="checkbox"/> DH-28					
<input checked="" type="checkbox"/> DH-29					
<input checked="" type="checkbox"/> DH-30					
<input checked="" type="checkbox"/> DH-31					
<input checked="" type="checkbox"/> DH-32					

Borehole Data QuickMap

Lithology	Top Depth	Base Depth	Formation
Stratigraphy	0.0	1.5	A-Horizon
I-Data	1.5	23.2	Spergen Fm.
I-Text	23.2	23.2	Leadville Ls.
T-Data	23.2		Potosi Fm.
P-Data			
P-Text			
Colors			
Fractures			
Water Levels			
Symbols			
Patterns			
Bitmaps			
Vectors			
Construction			
Production			

The Data Types define if you'll be displaying Lithology or Stratigraphy data.

Rosegrams

Data Type
 Lithology
 Stratigraphy

Scaler

Inner Radius

Borders

Patterns

Density

Labels

Titles

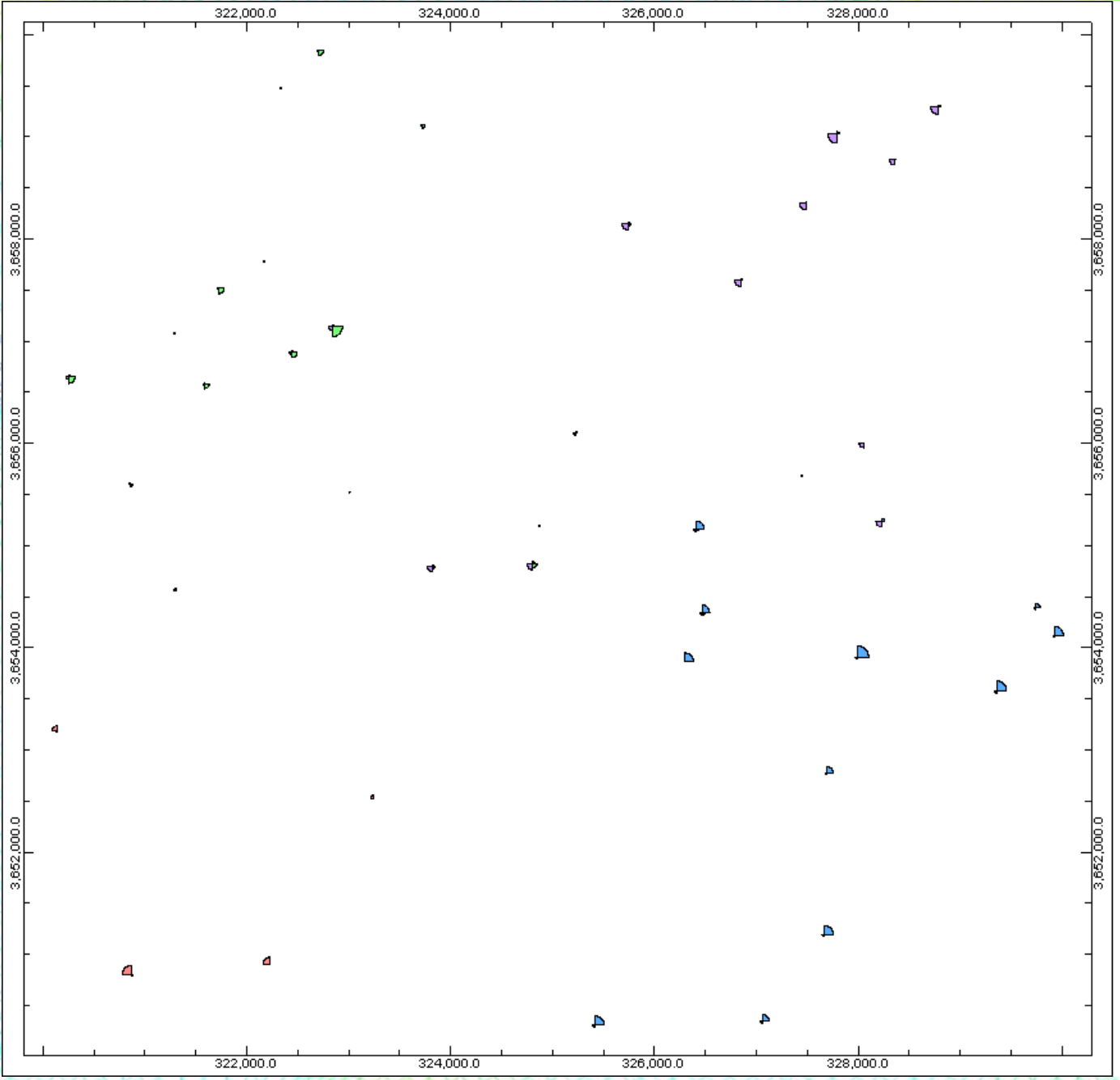
Thicknesses

Orientation
 Radial
 Horizontal

Size

Color

Offset



Lithology

- Blue Clay
- Green Clay
- Purple Clay
- Red Clay

The Scaler is used to enlarge or reduce the rosegrams.

Rosegrams

Data Type
 Lithology
 Stratigraphy

Scaler

Inner Radius

Borders

Patterns

Density

Labels

Titles

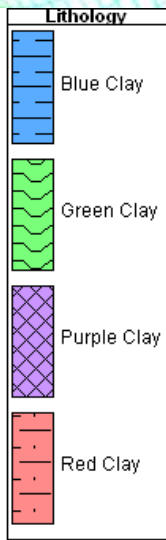
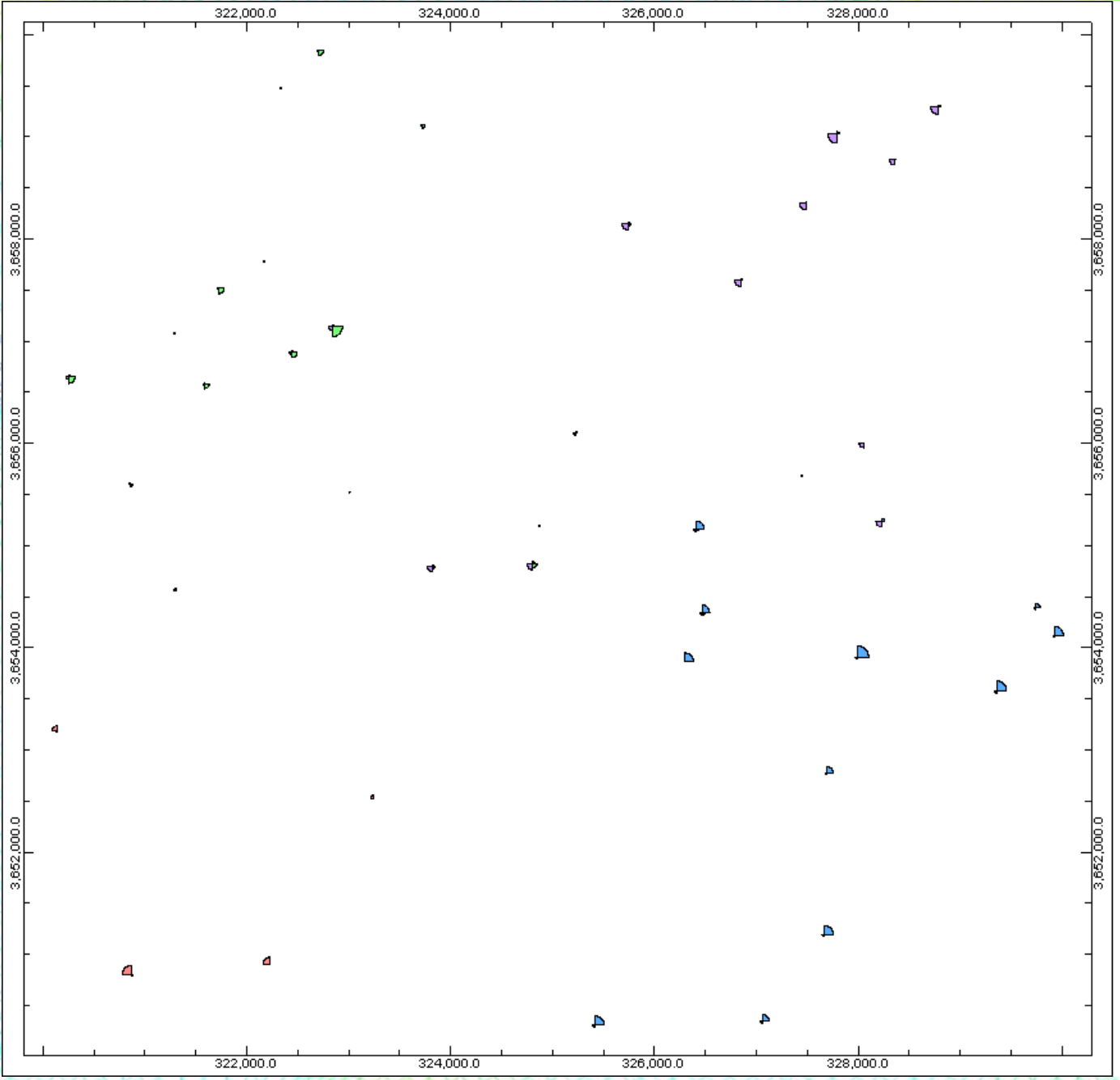
Thicknesses

Orientation
 Radial
 Horizontal

Size

Color

Offset



In this example, the Scaler was set to 2.0 which is obviously too small.

Rosegrams

Data Type
 Lithology
 Stratigraphy

Scaler

Inner Radius

Borders

Patterns

Density

Labels

Titles

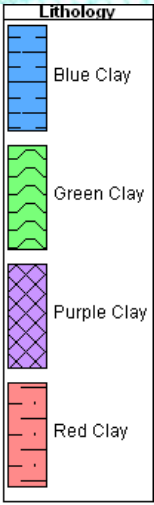
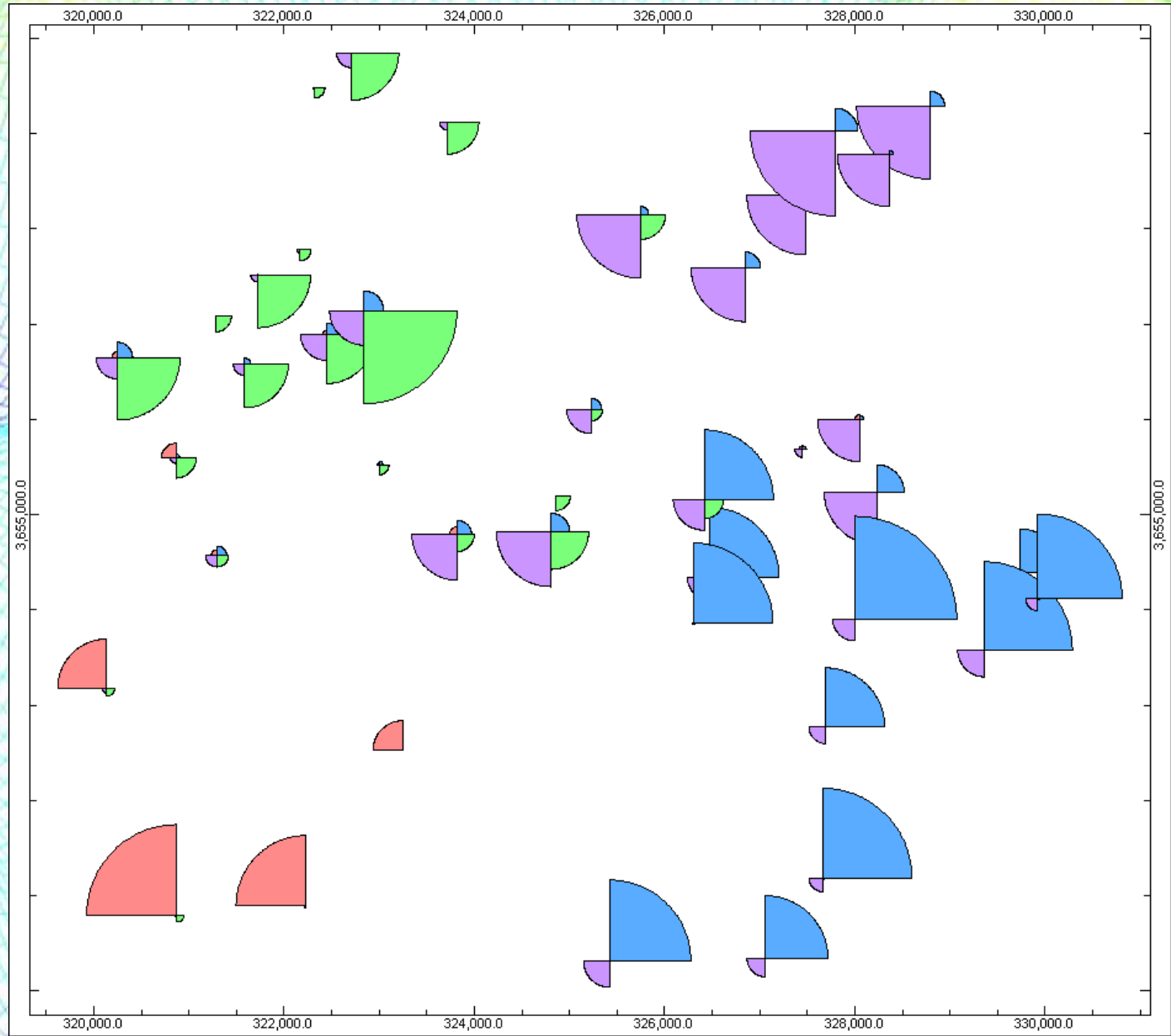
Thicknesses

Orientation
 Radial
 Horizontal

Size

Color

Offset



In this example, the Scaler was set to 20 which is too big because some diagrams are overplotting adjacent diagrams.

Rosegrams

Data Type

- Lithology
 Stratigraphy

Scaler

Inner Radius

Borders

Patterns

Density

Labels

Titles

Thicknesses

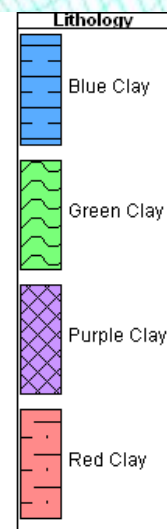
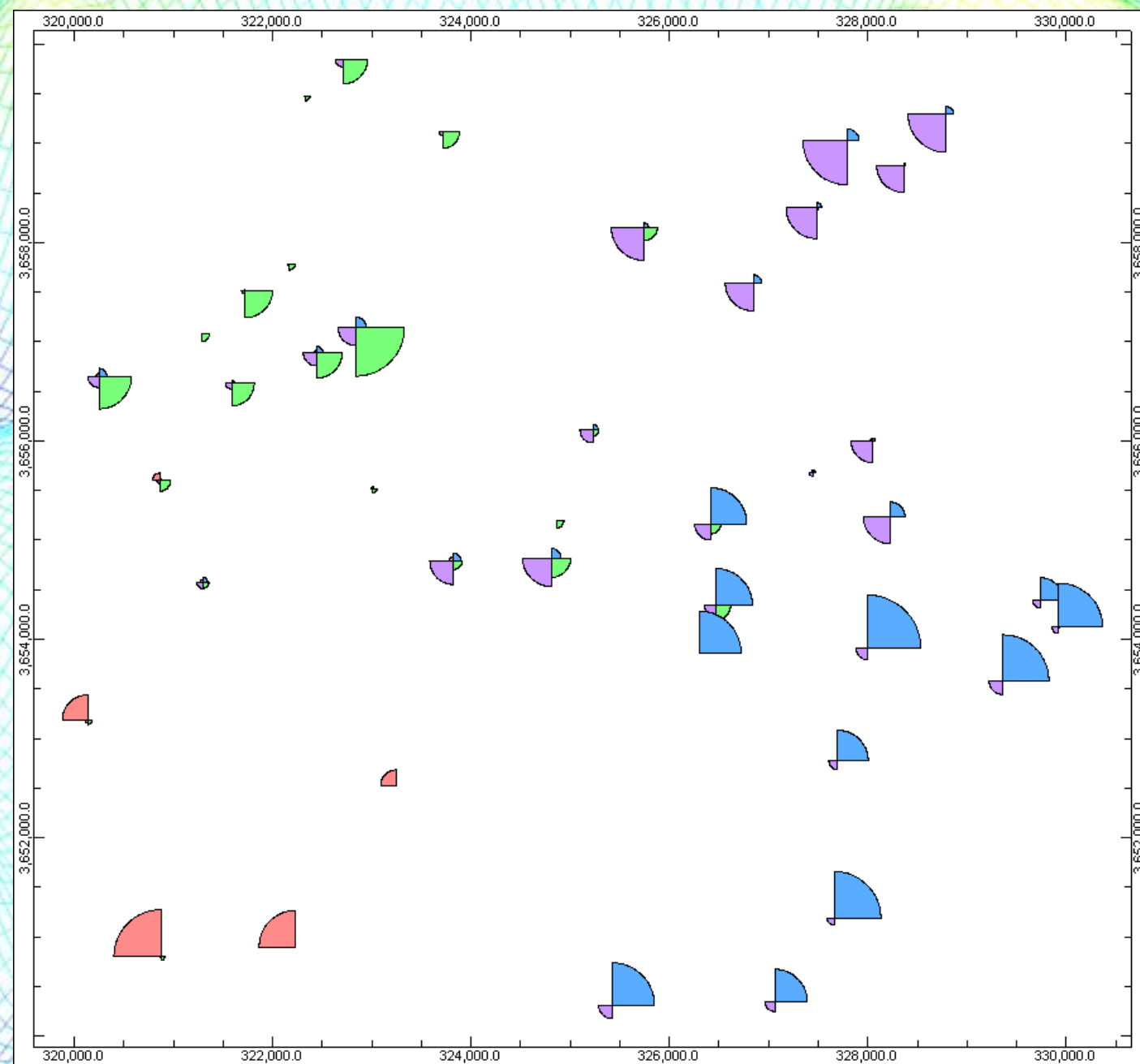
Orientation

- Radial
 Horizontal

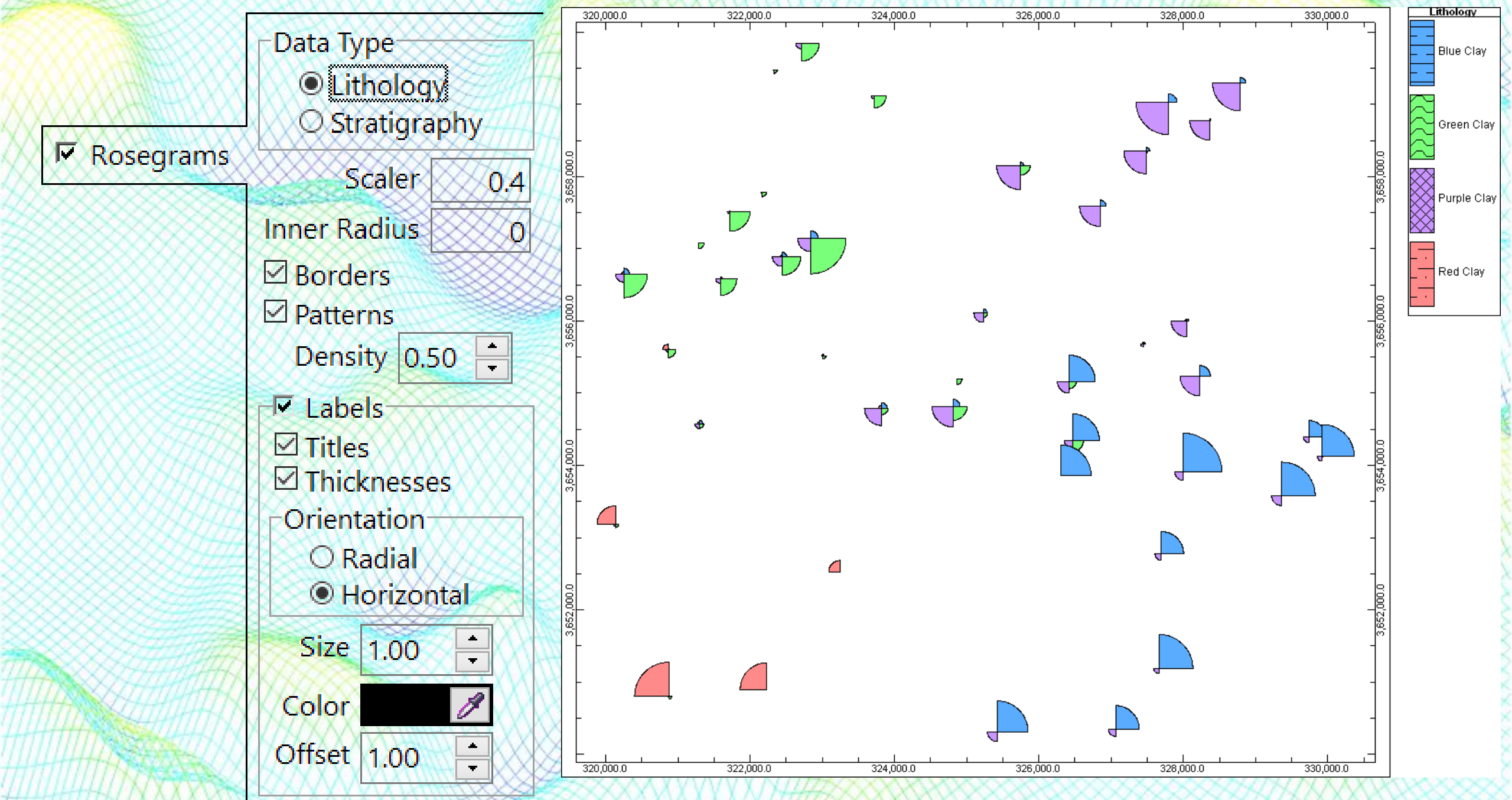
Size

Color

Offset



A scaler of 10 turned out to be the “Goldilocks” setting for this particular data set.



It will invariably require some experimentation to get just the right size for your rosegrams based on the borehole density.

Rosegrams

Data Type

- Lithology
 Stratigraphy

Scaler 0.4

Inner Radius 0

Borders

Patterns

Density 0.50

Labels

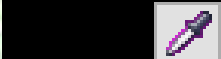
Titles

Thicknesses

Orientation

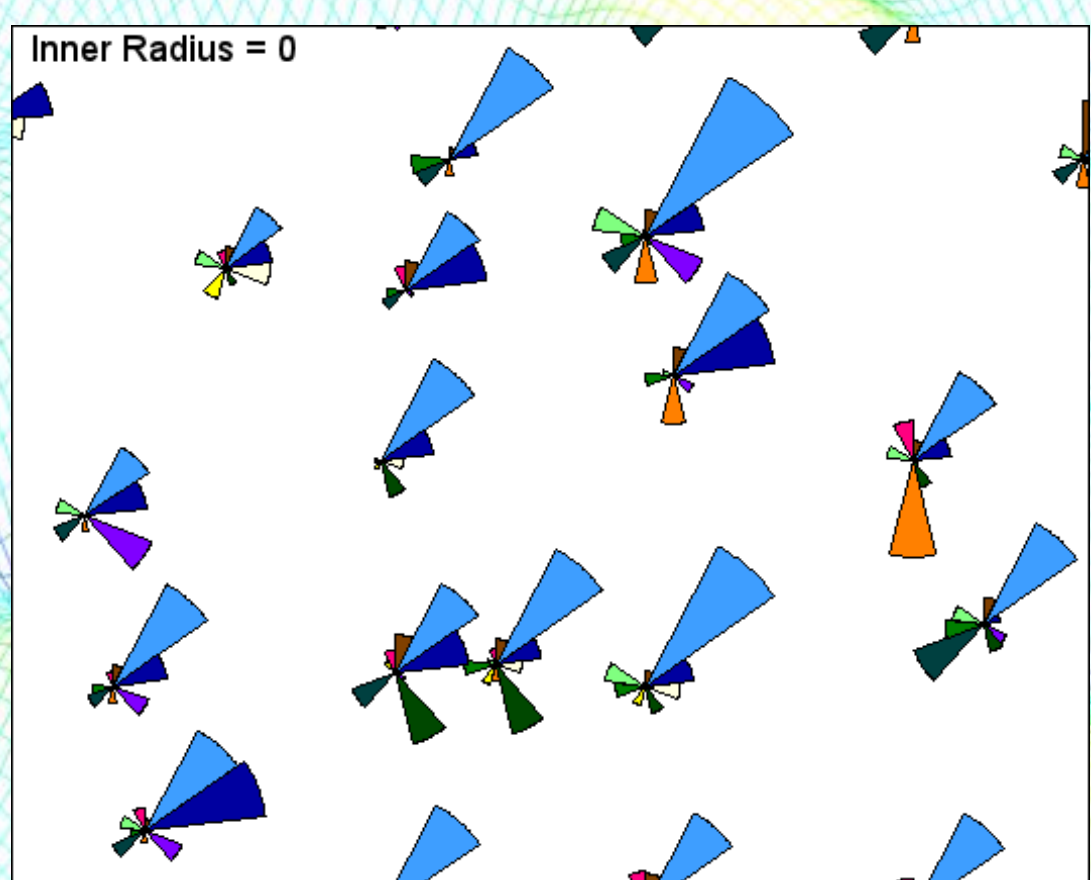
- Radial
 Horizontal

Size 1.00

Color 

Offset 1.00

Inner Radius = 0



If the Inner Radius is set to zero, the wedges will converge at the borehole collar locations.

Rosegrams

Data Type

- Lithology
 Stratigraphy

Scaler 0.4

Inner Radius 0

Borders

Patterns

Density 0.50

Labels


Titles

Thicknesses

Orientation

- Radial
 Horizontal

Size 1.00

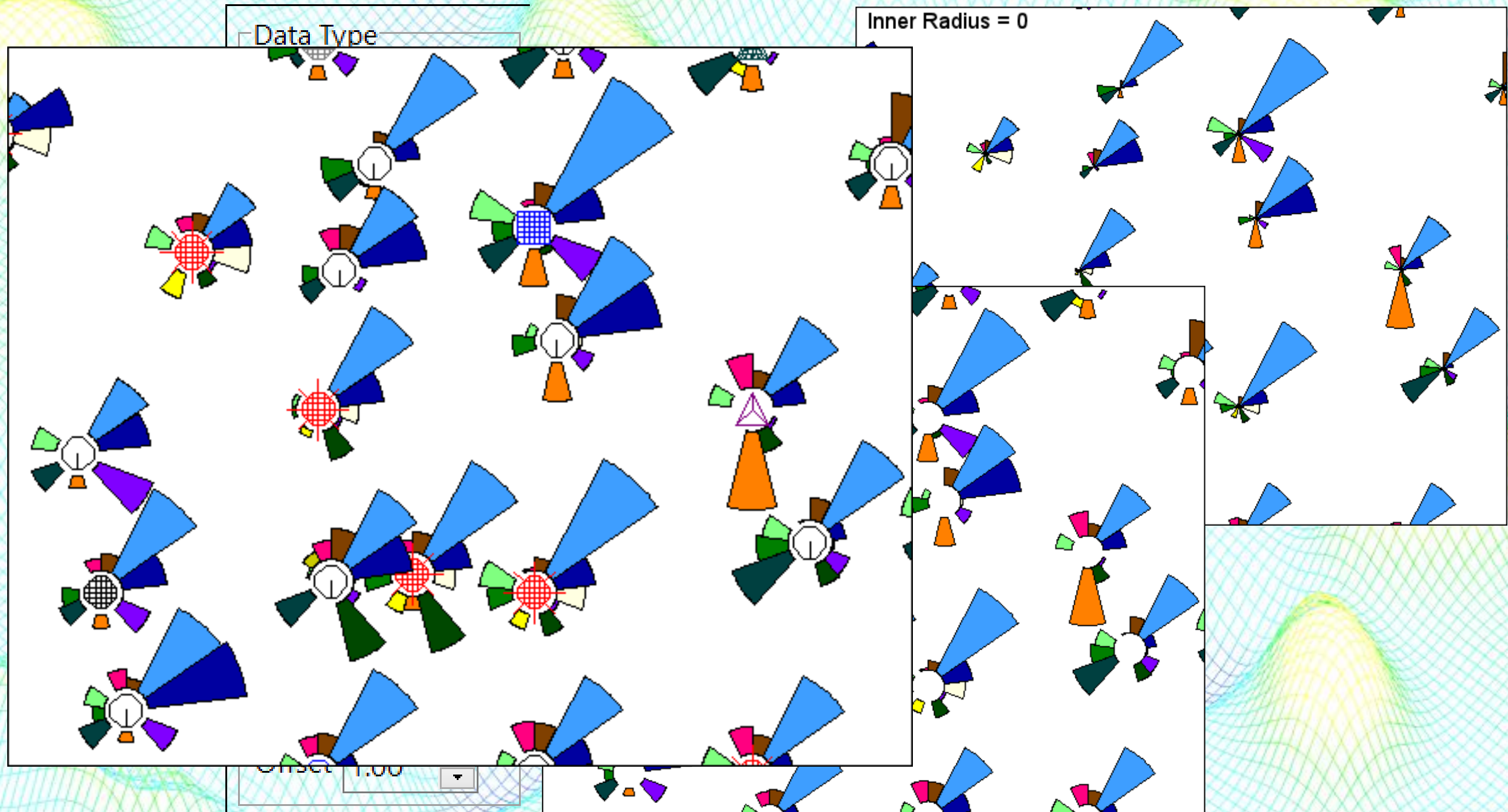
Color 

Offset 1.00

Inner Radius = 0

Inner Radius = 5

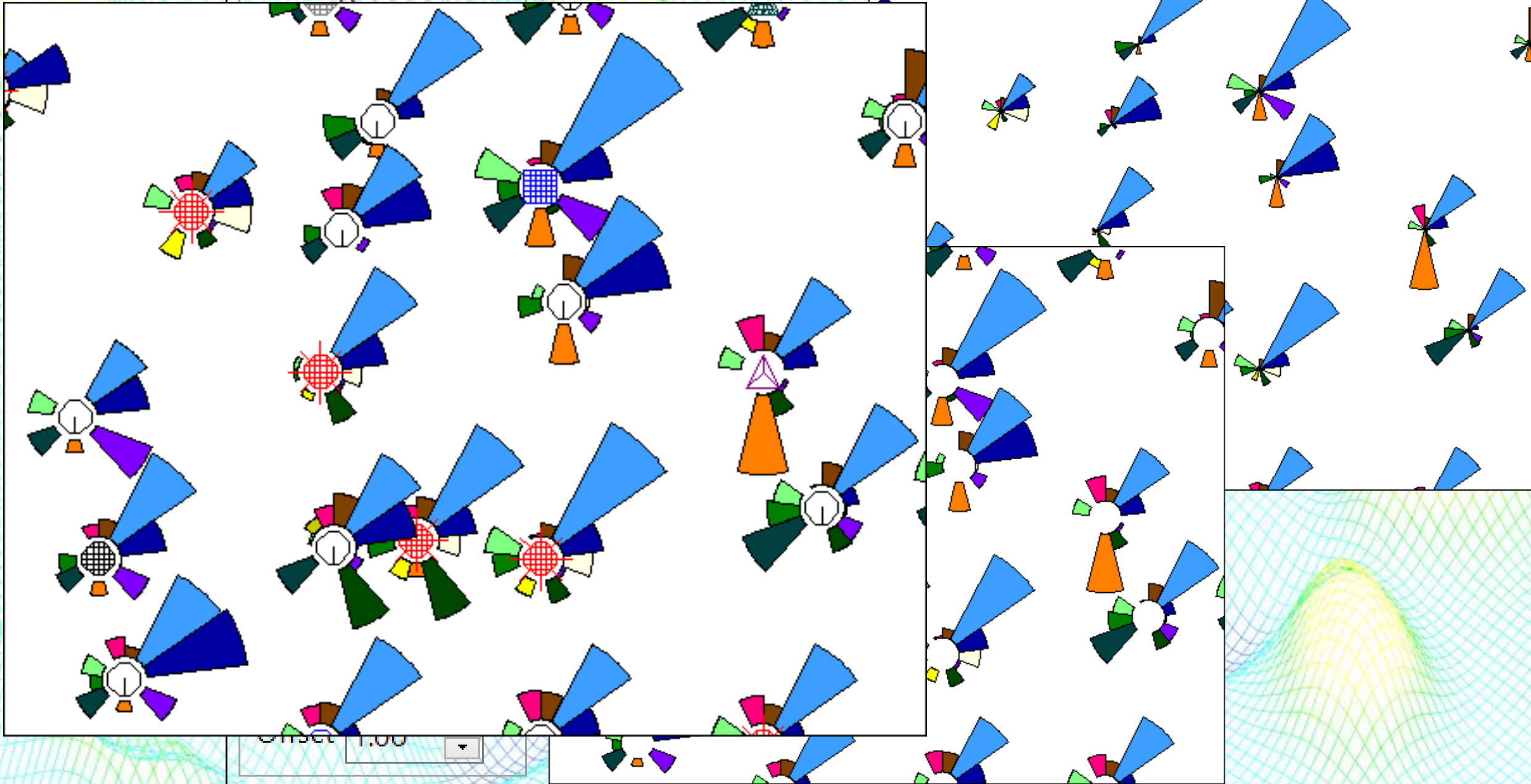
Otherwise, the rose “petals” will be offset outward from the collar locations to produce circular gaps within the diagrams.



When plotted in combination with other symbol map options, these gaps can be used to depict other types of information.

Data Type

Inner Radius = 0



In this example, the symbols within the circular gaps depict the well types.

Rosegrams

Data Type
 Lithology
 Stratigraphy

Scaler 0.4

Inner Radius 0

Borders

Patterns

Density 0.50

Labels

Titles

Thicknesses

Orientation

Radial

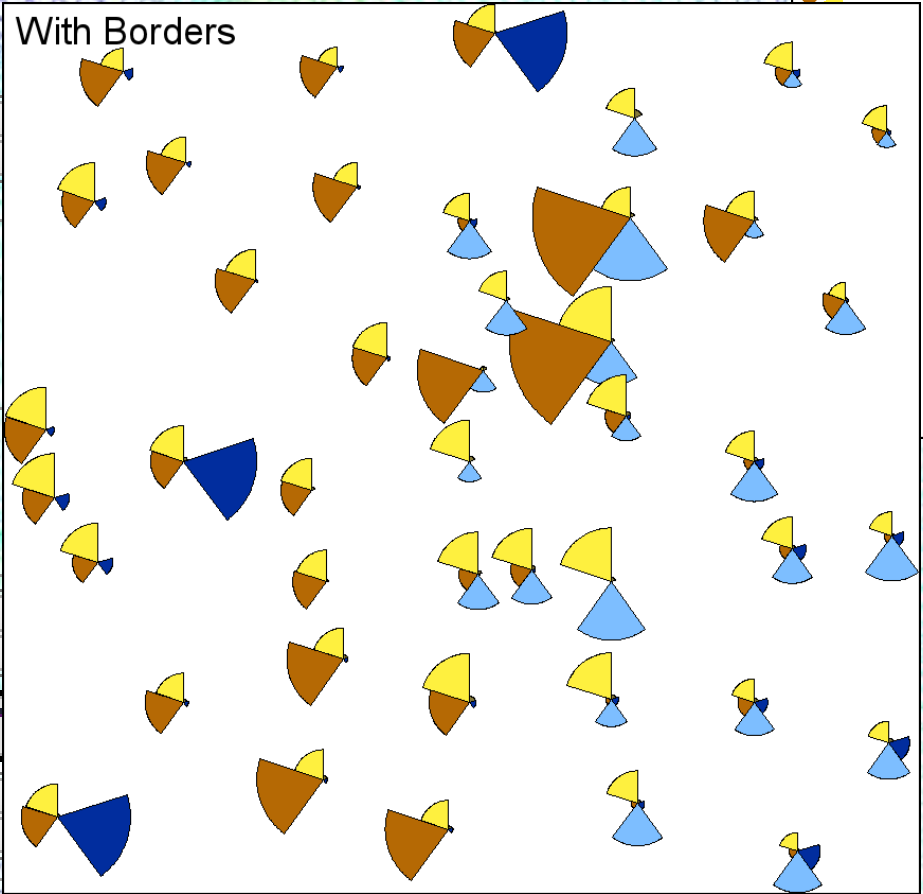
Horizontal

Size 1.00

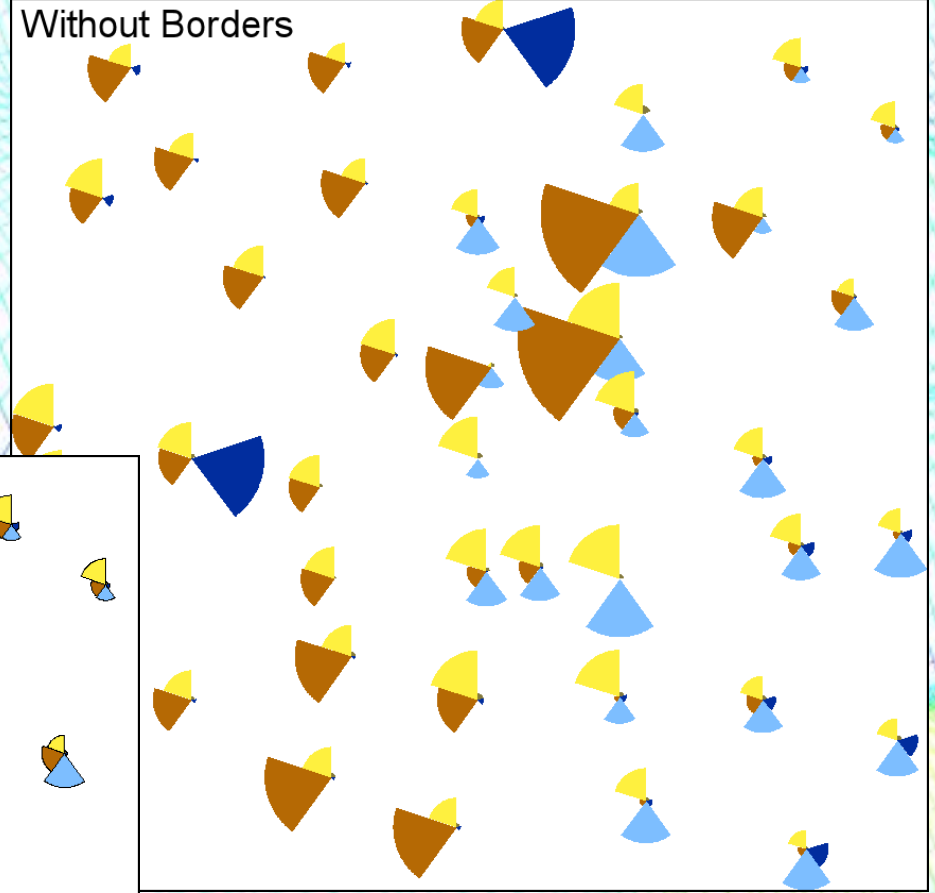
Color 

Offset 1.00

With Borders



Without Borders



The Borders setting defines if the wedges will include a thin black perimeter.

Rosegrams

Data Type
 Lithology
 Stratigraphy

Scaler 0.4

Inner Radius 0

Borders

Patterns

Density 0.50

Labels

Titles

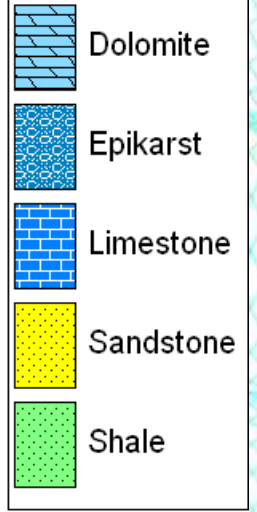
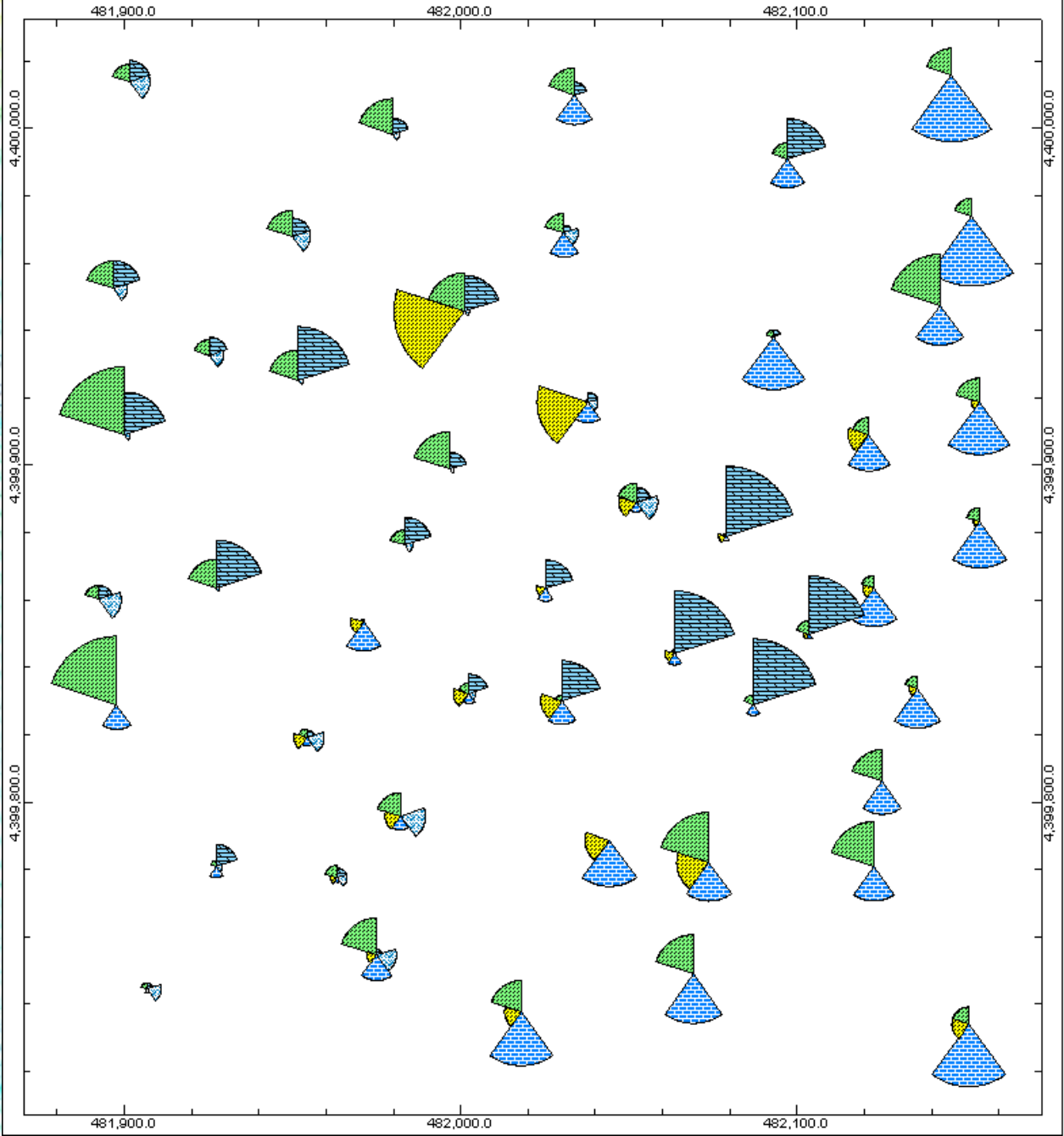
Thicknesses

Orientation
 Radial
 Horizontal

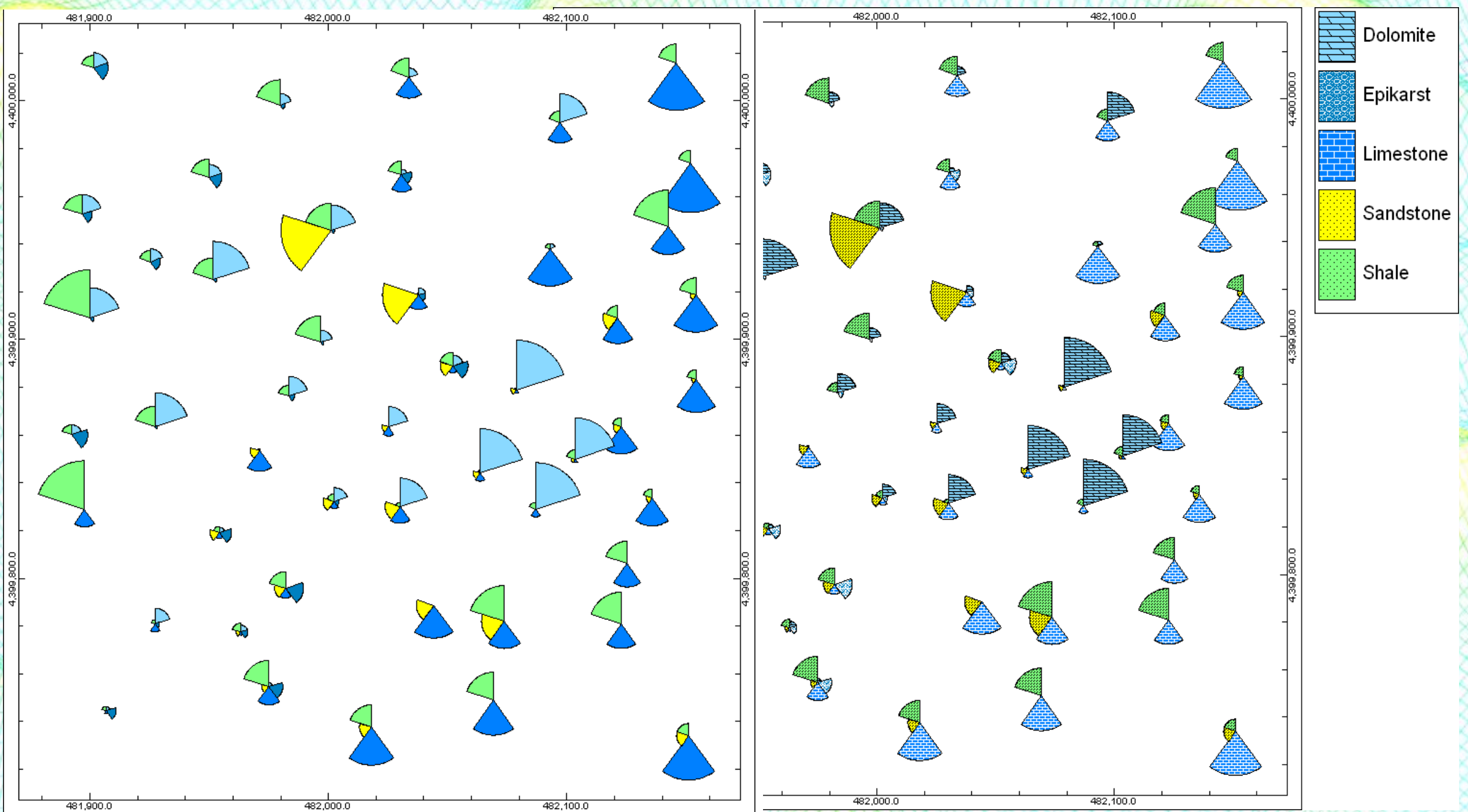
Size 1.00

Color 

Offset 1.00



The Patterns option determines if the wedges will be filled with the associated patterns.



Disabling the pattern-fills will produce diagrams that only use the specified pattern background colors.

Rosegrams

Data Type

- Lithology
 Stratigraphy

Scaler 0.4

Inner Radius 0

Borders

Patterns

Density 0.50

Labels

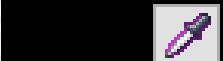
Titles

Thicknesses

Orientation

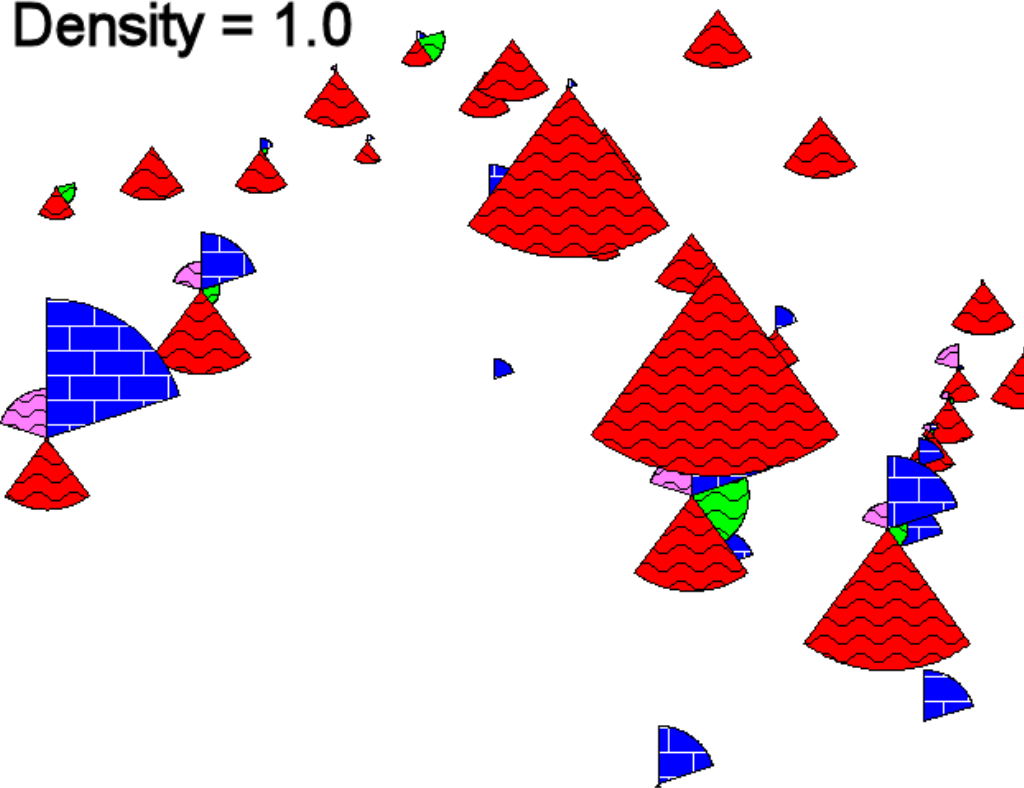
- Radial
 Horizontal

Size 1.00

Color 

Offset 1.00

Density = 1.0



If patterns are to be included, their densities can be increased or decreased by adjusting the Density setting.

Rosegrams

Data Type

- Lithology
 Stratigraphy

Scaler 0.4

Inner Radius 0

Borders

Patterns

Density 0.50

Labels

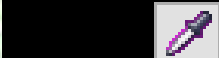
Titles

Thicknesses

Orientation

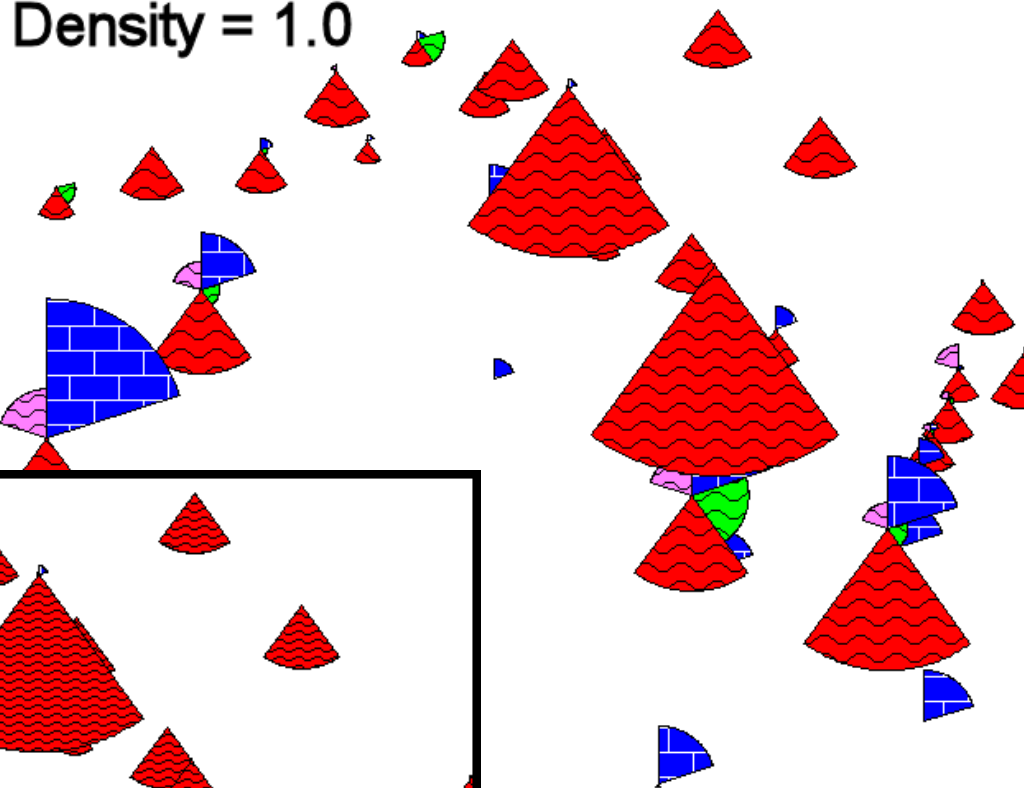
- Radial
 Horizontal

Size 1.00

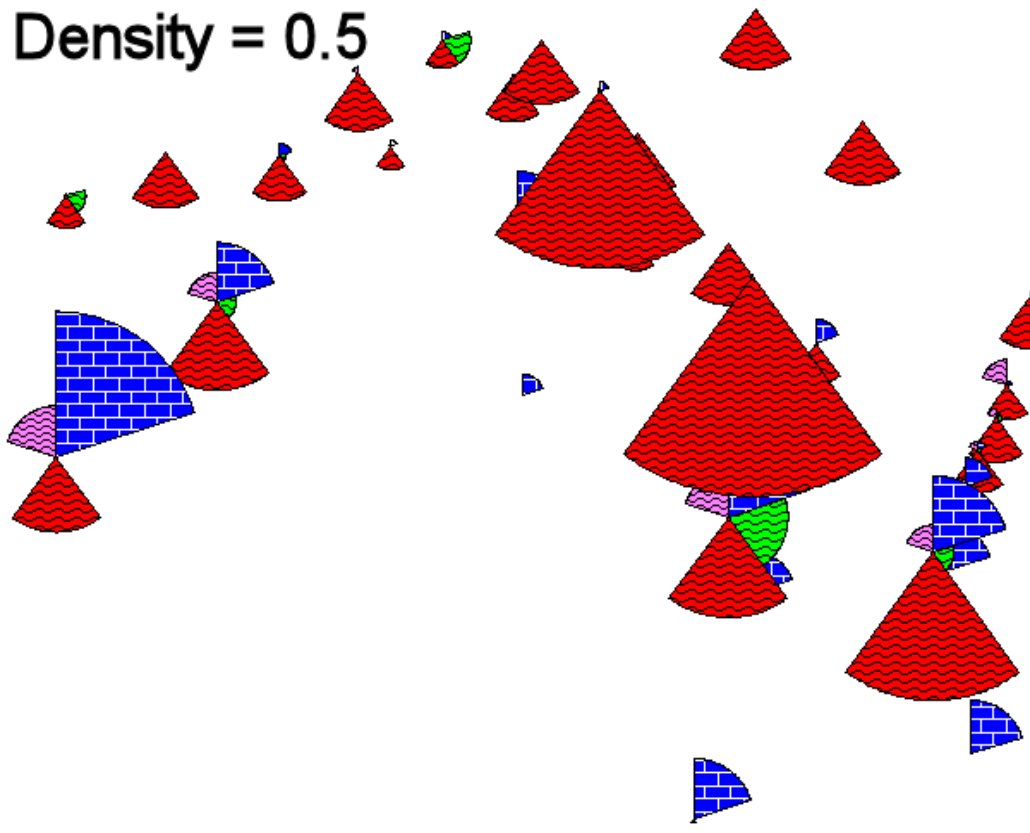
Color 

Offset 1.00

Density = 1.0



Density = 0.5



For example, the map in the upper-right corner depicts the patterns at a density of 1.0, ...

Rosegrams

Data Type

- Lithology
 Stratigraphy

Scaler 0.4

Inner Radius 0

Borders

Patterns

Density 0.50

Labels

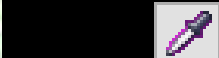
Titles

Thicknesses

Orientation

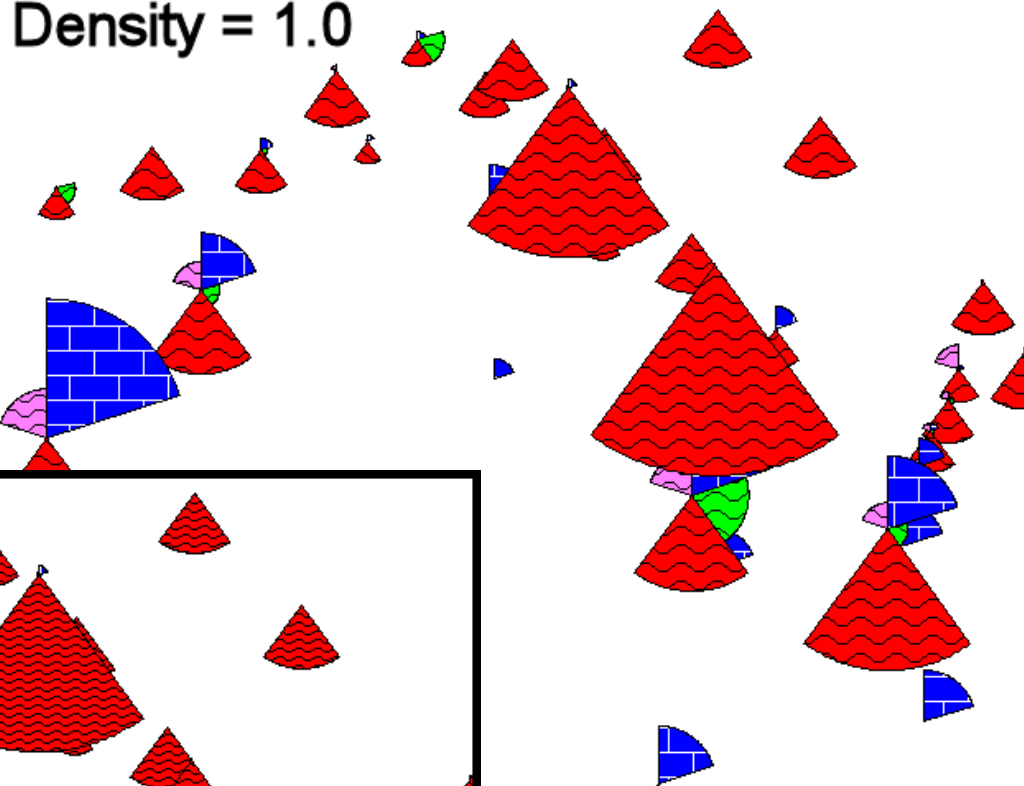
- Radial
 Horizontal

Size 1.00

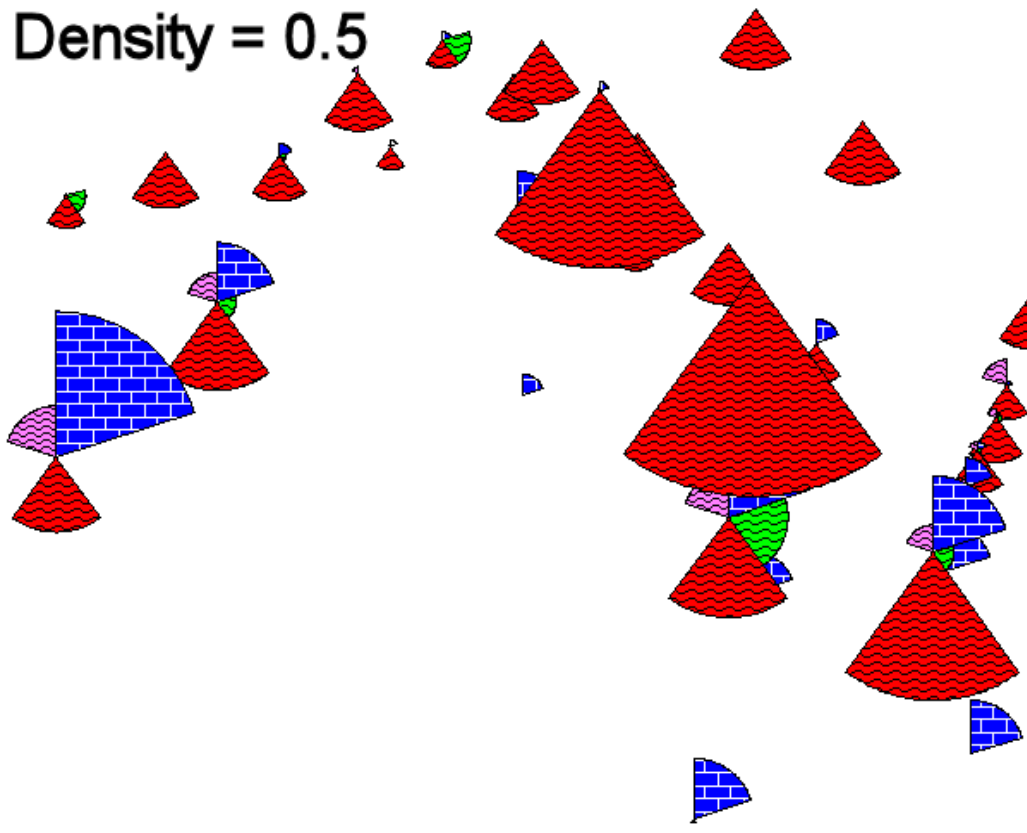
Color 

Offset 1.00

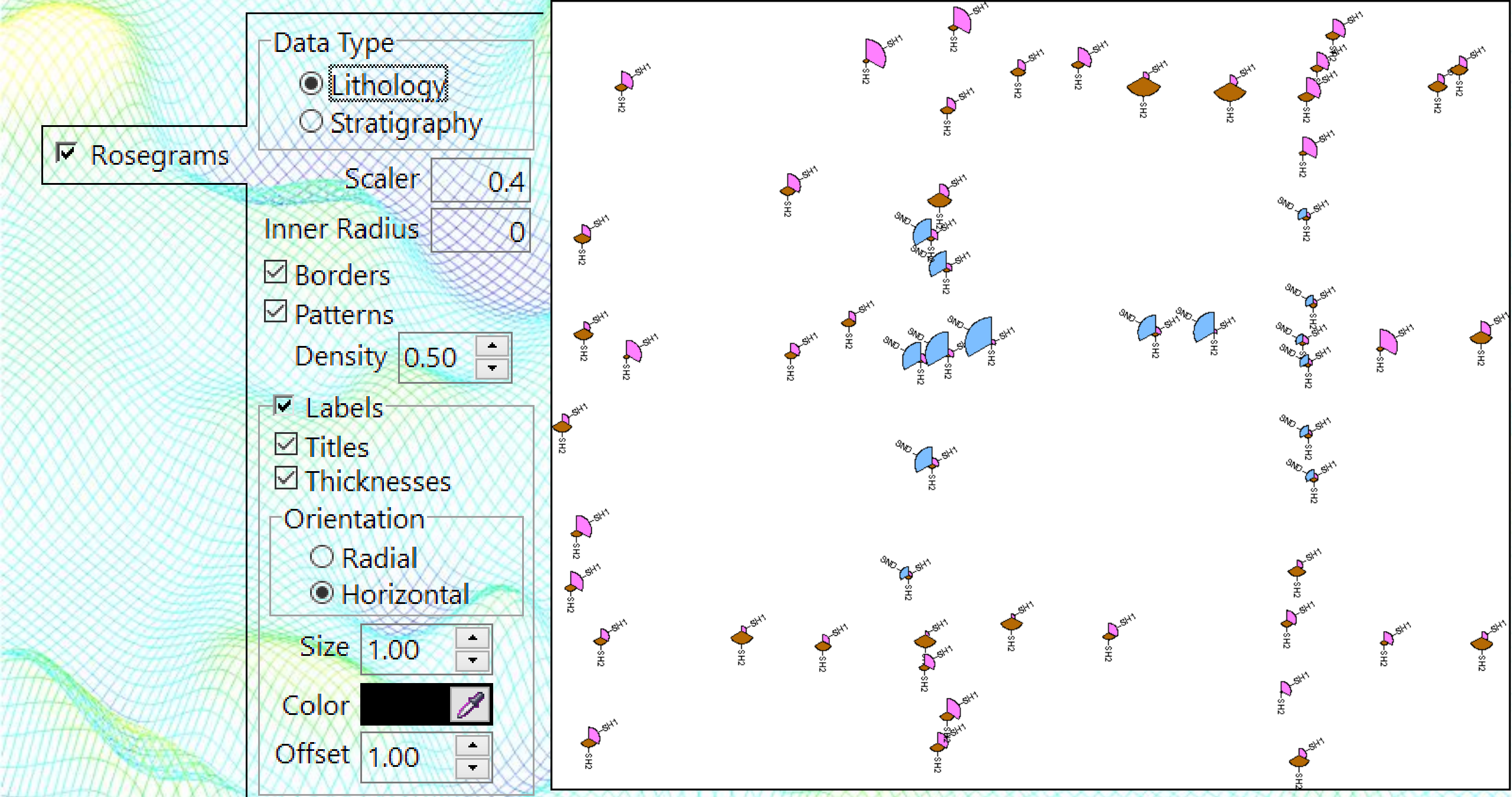
Density = 1.0



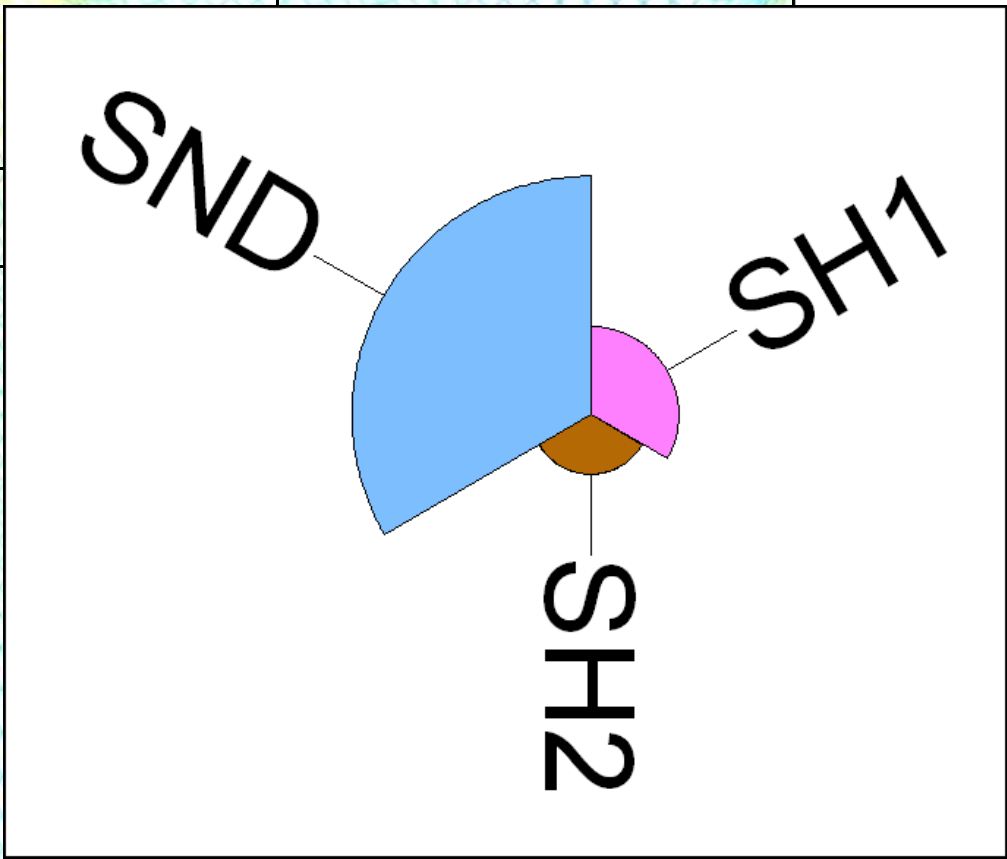
Density = 0.5



... while this map uses a density factor of 0.5 to produce finer patterns.



At the risk of too-much-clutter, the wedges can be labeled.

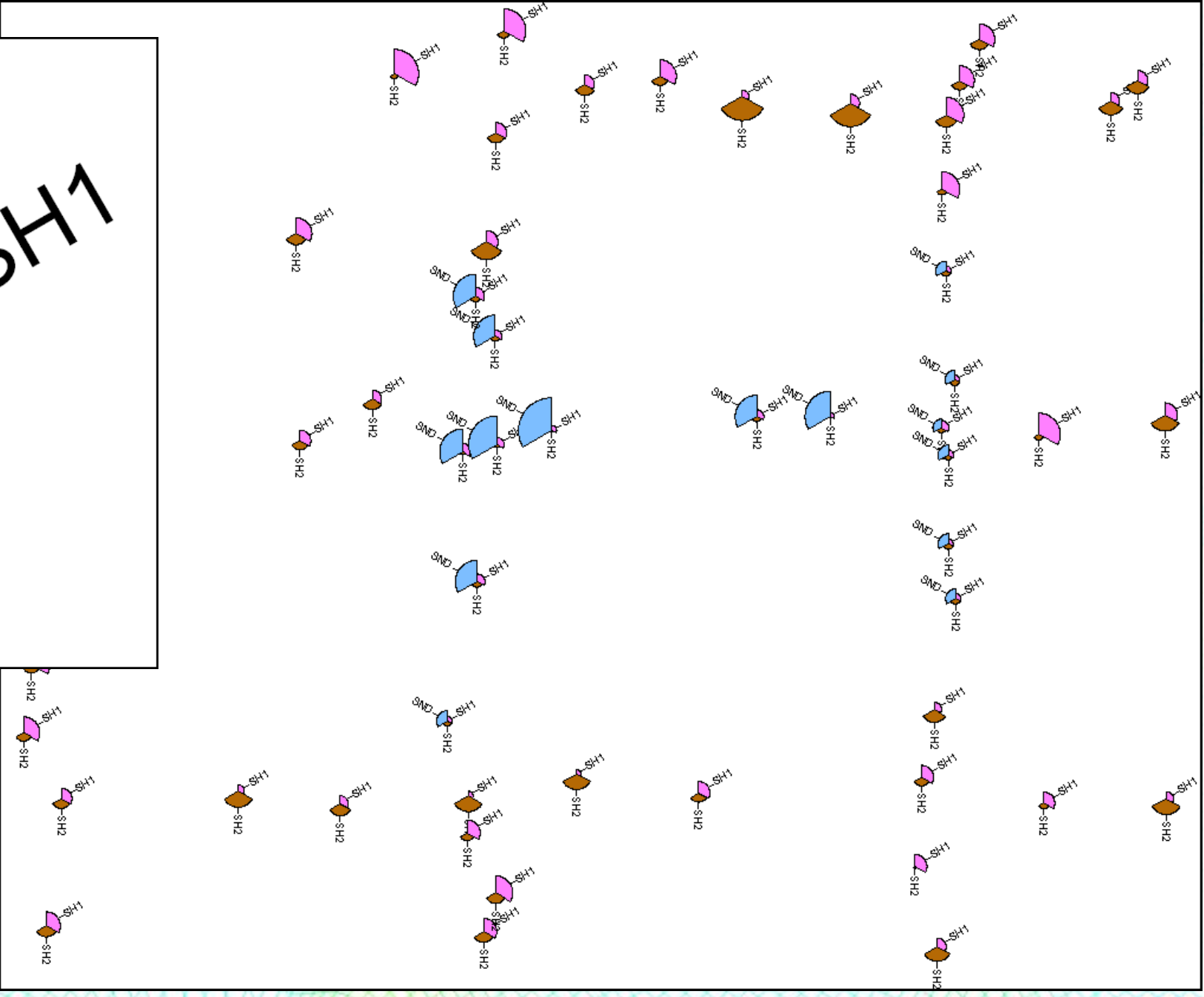


Radial
 Horizontal

Size

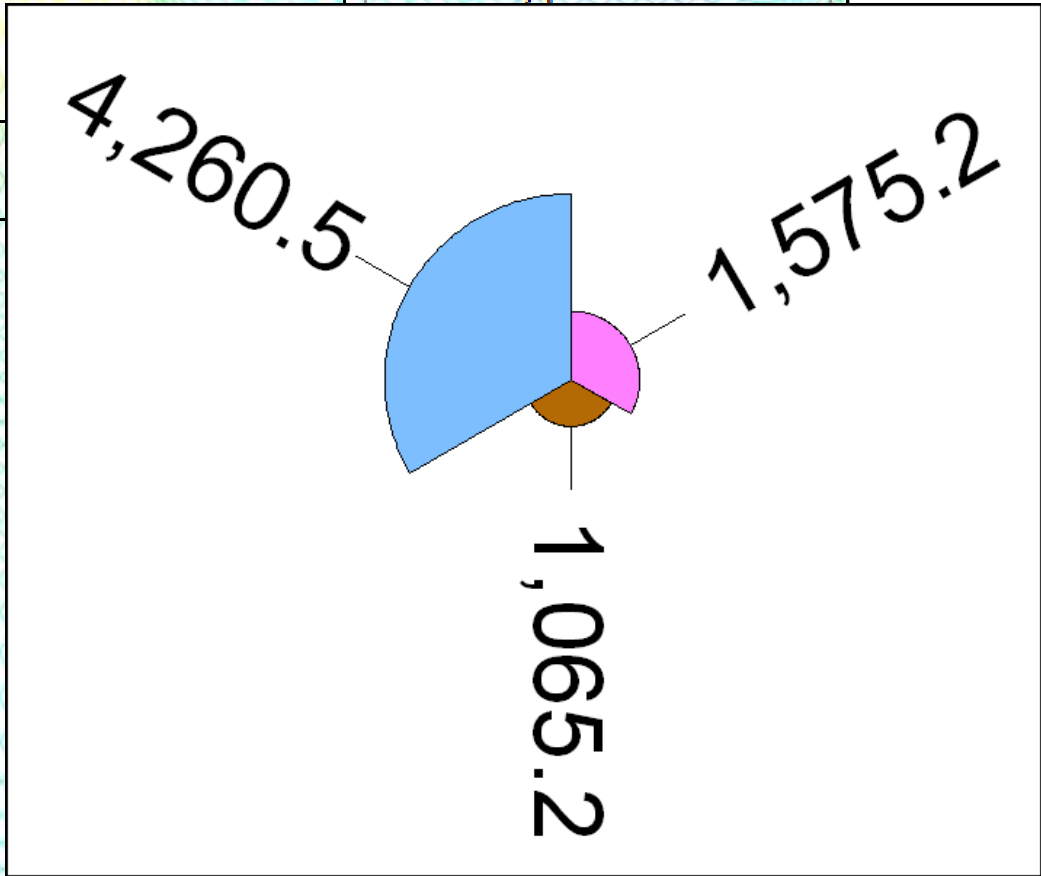
Color

Offset



These labels can depict the names of the lithology types or the stratigraphic units, or ...

Data Type

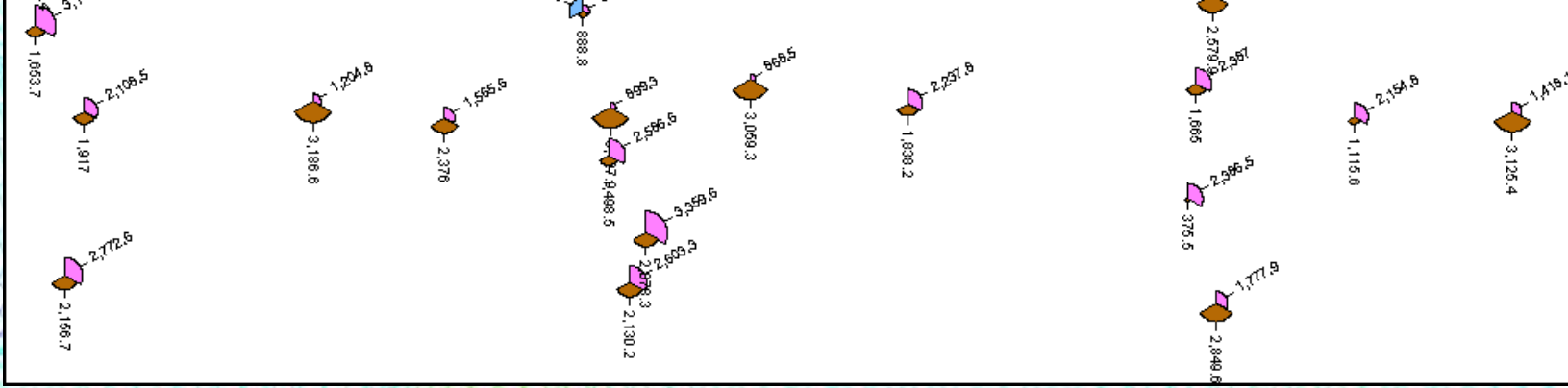


Horizontal

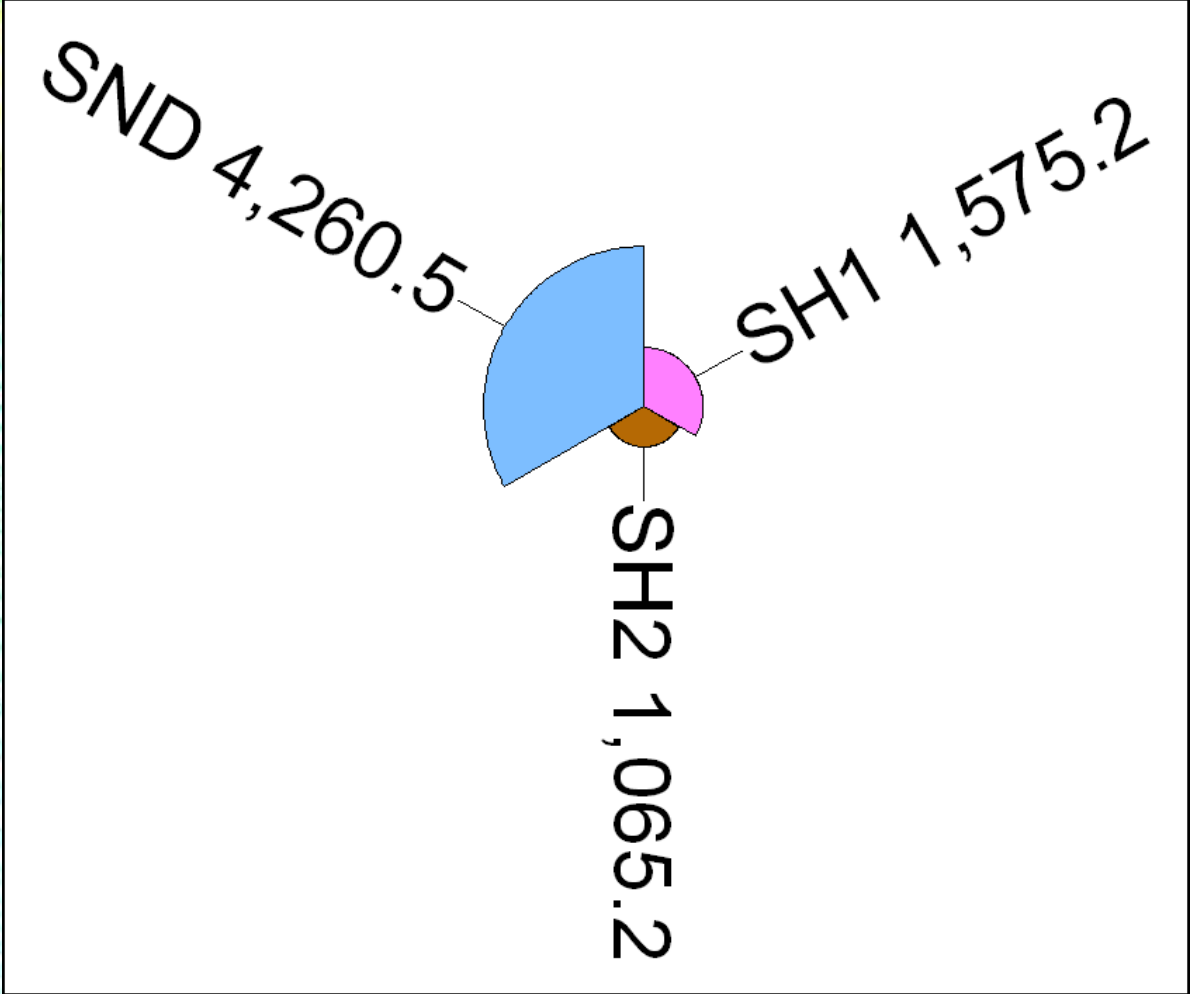
Size

Color

Offset



... they can show the total thicknesses for the units, or ...

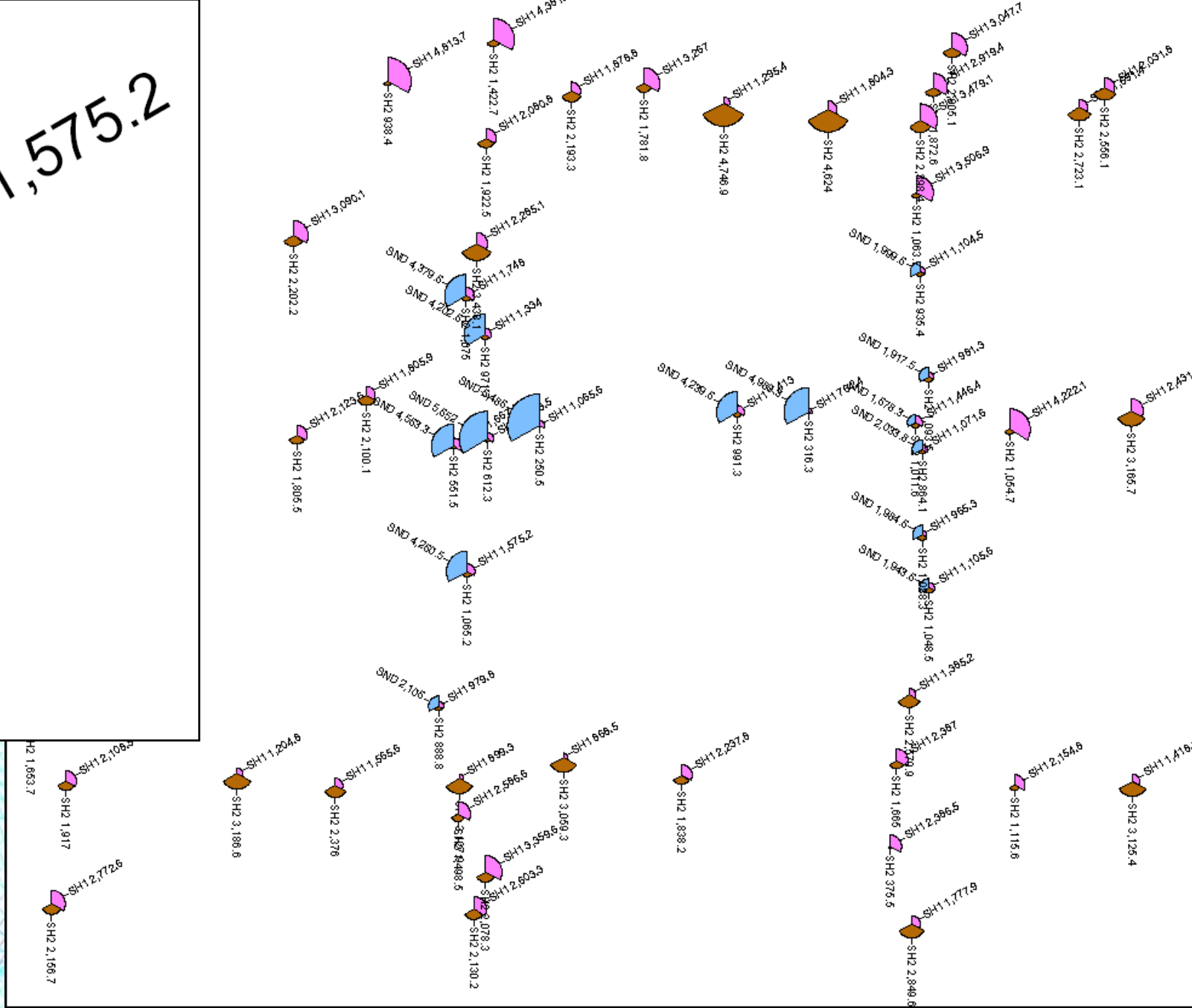


Horizontal

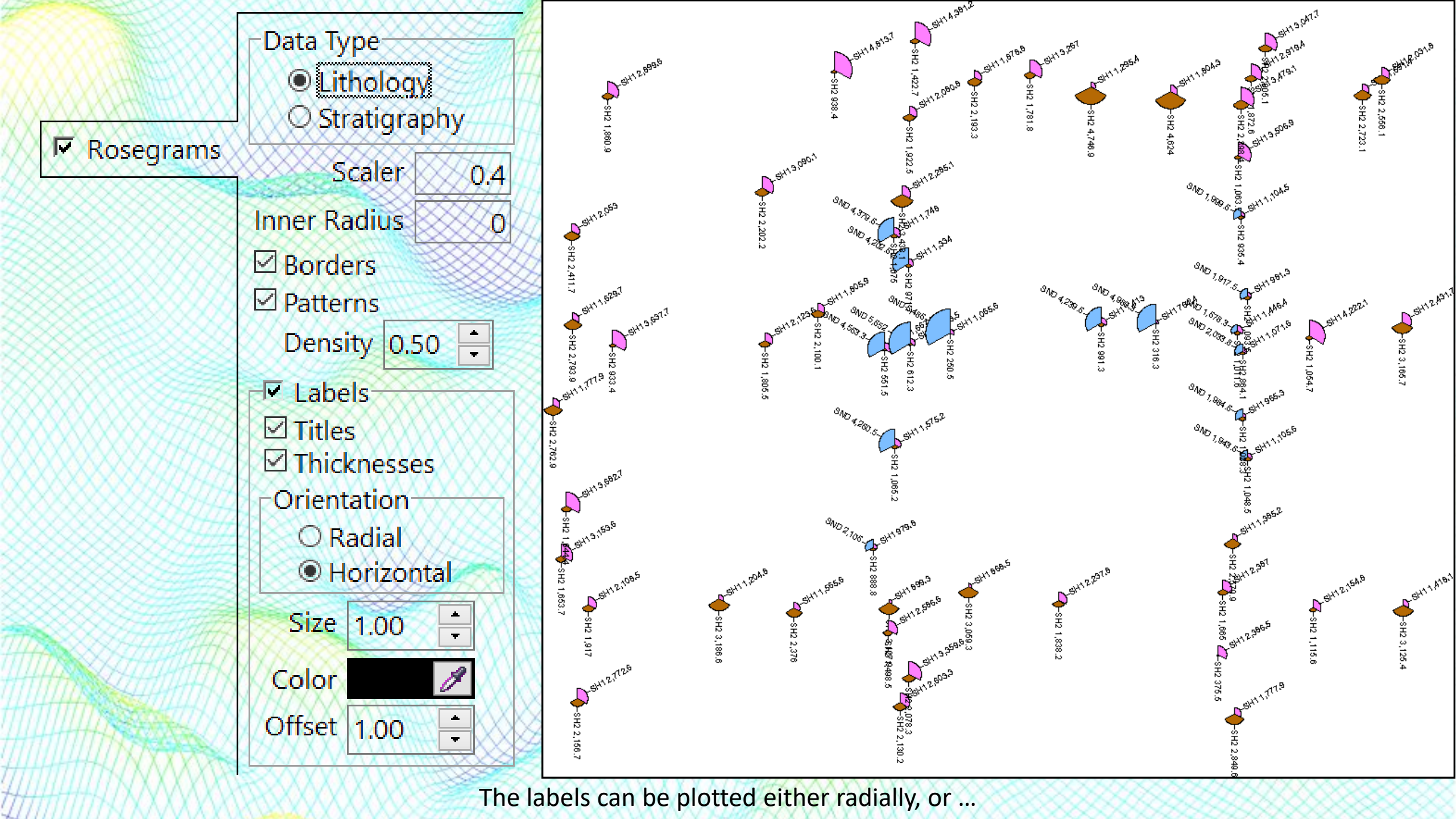
Size 1.00

Color 

Offset 1.00



... they can show both.



Data Type
 Lithology
 Stratigraphy

Rosegrams

Scaler

Inner Radius

Borders

Patterns

Density

Labels

Titles

Thicknesses

Orientation
 Radial
 Horizontal

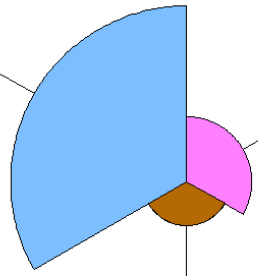
Size

Color

Offset

The labels can be plotted either radially, or ...

SND 4,260.5



SH1 1,575.2

SH2 1,065.2

Patterns
Density 0.50

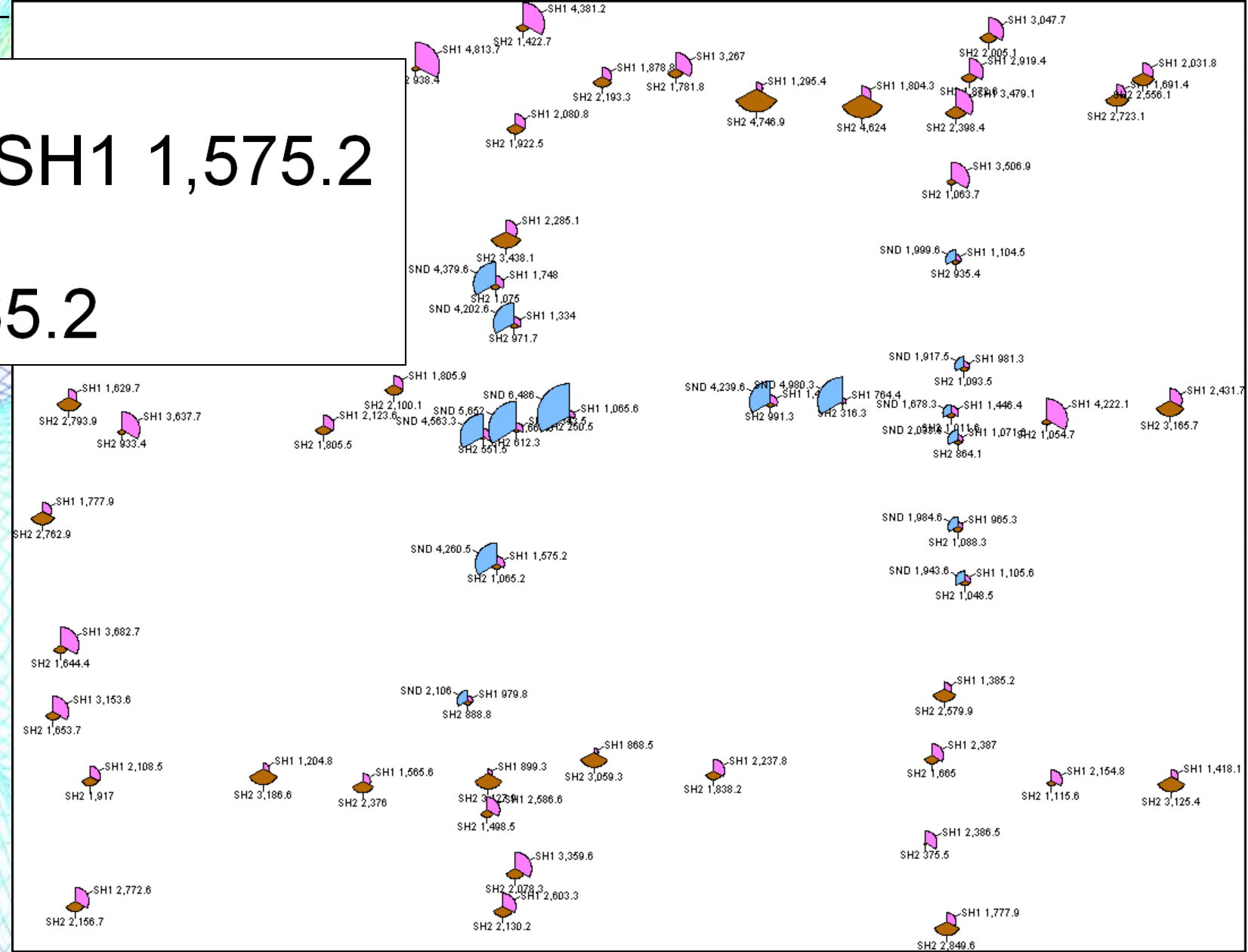
Labels
 Titles
 Thicknesses

Orientation
 Radial
 Horizontal

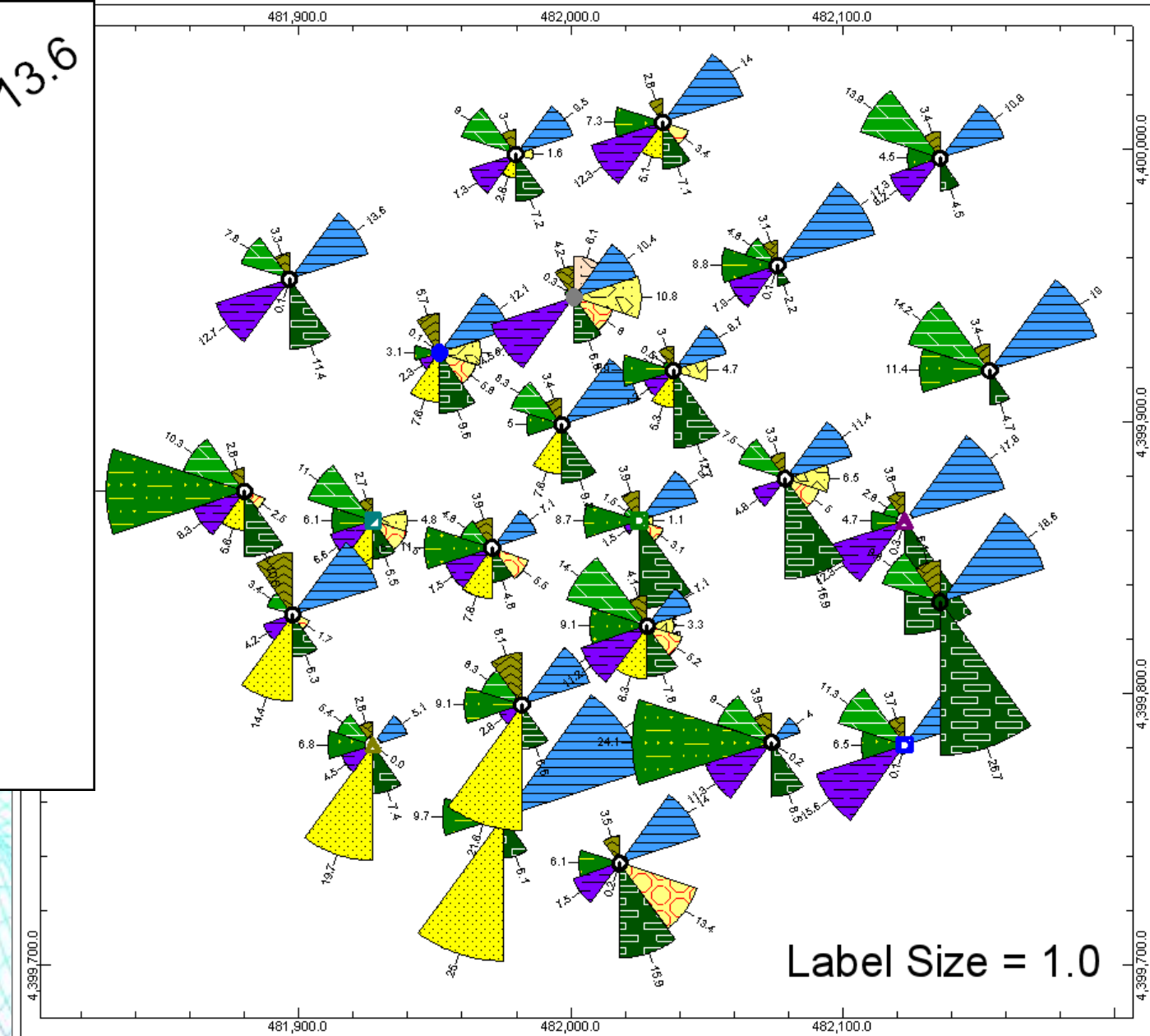
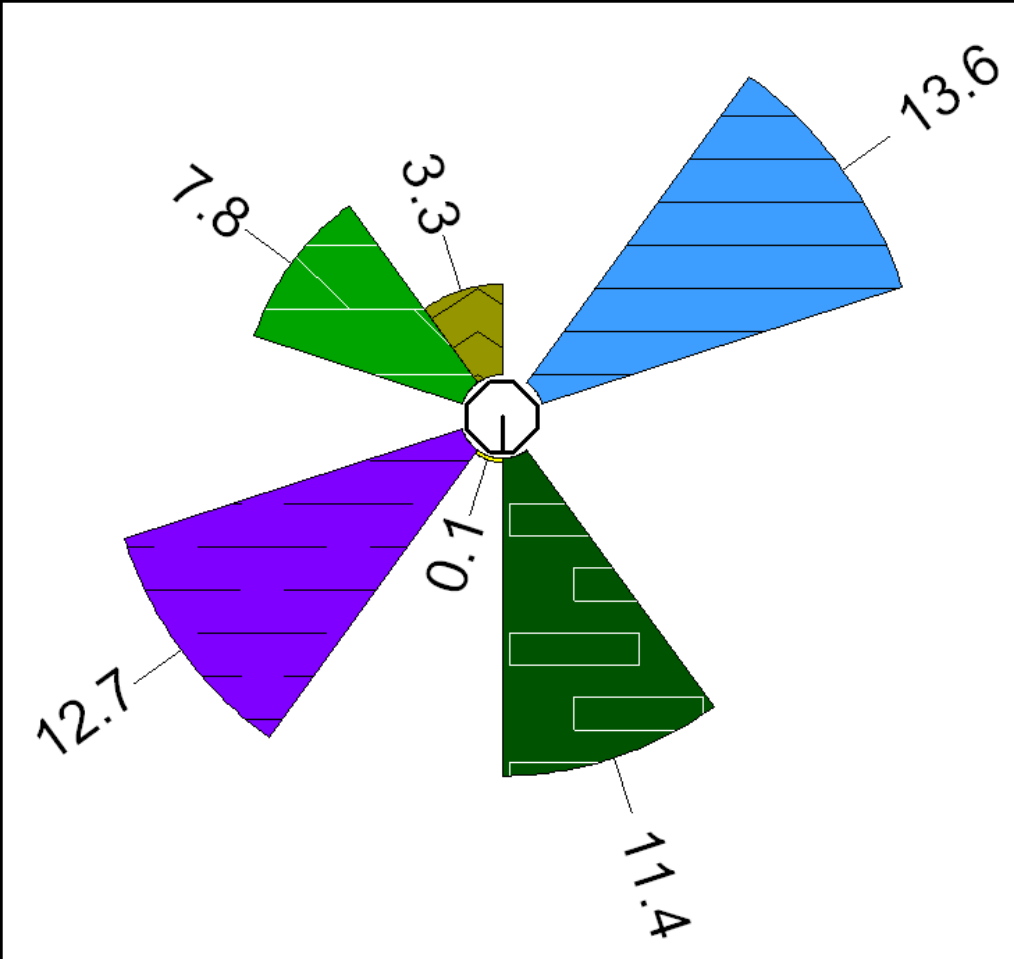
Size 1.00

Color

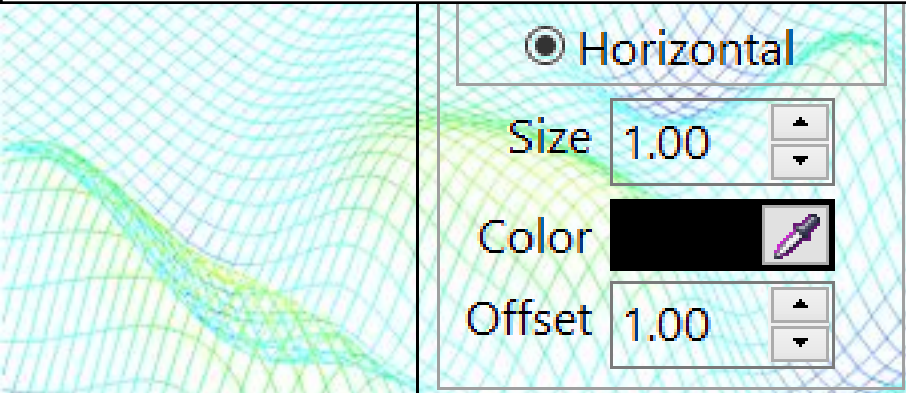
Offset 1.00



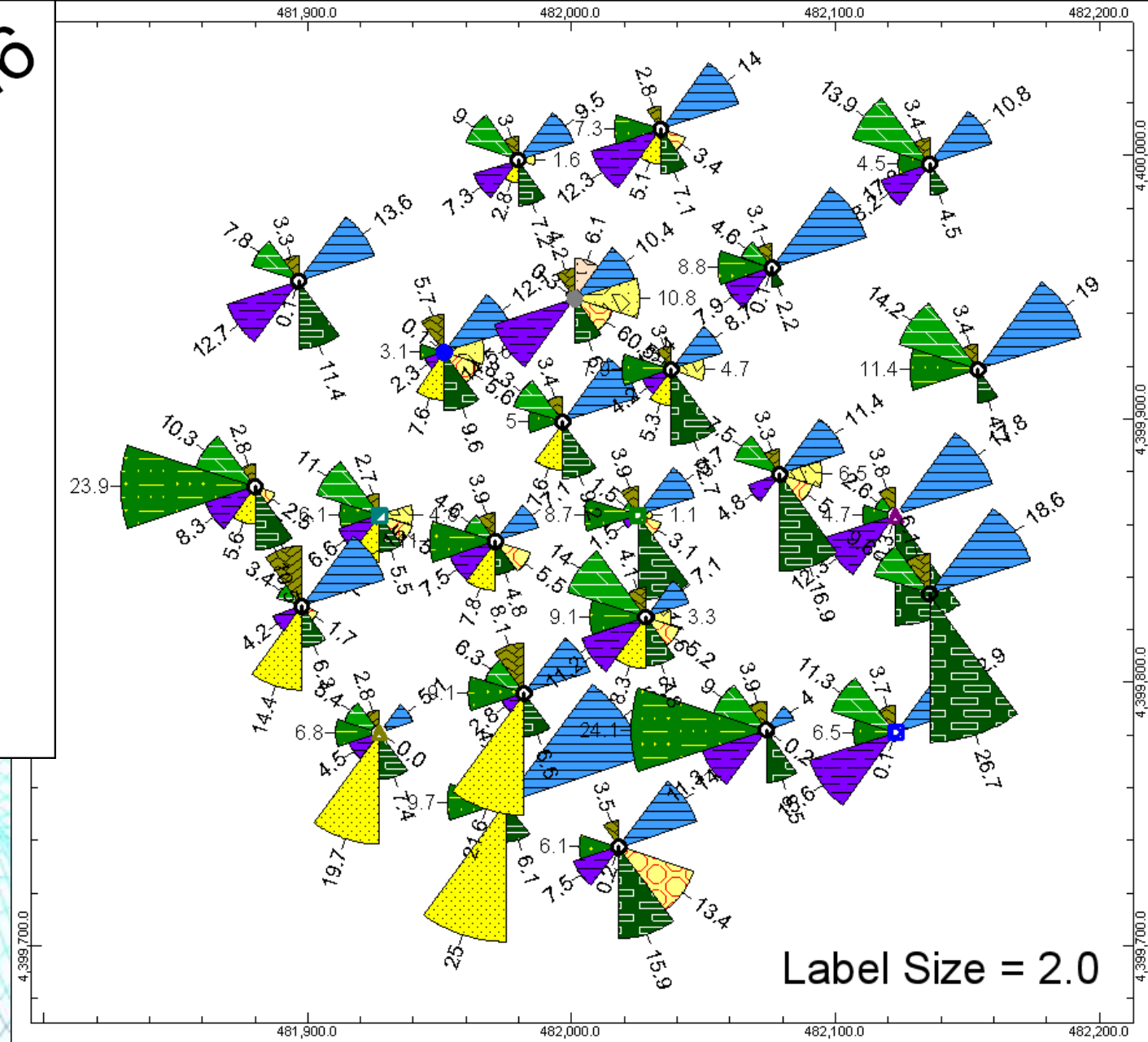
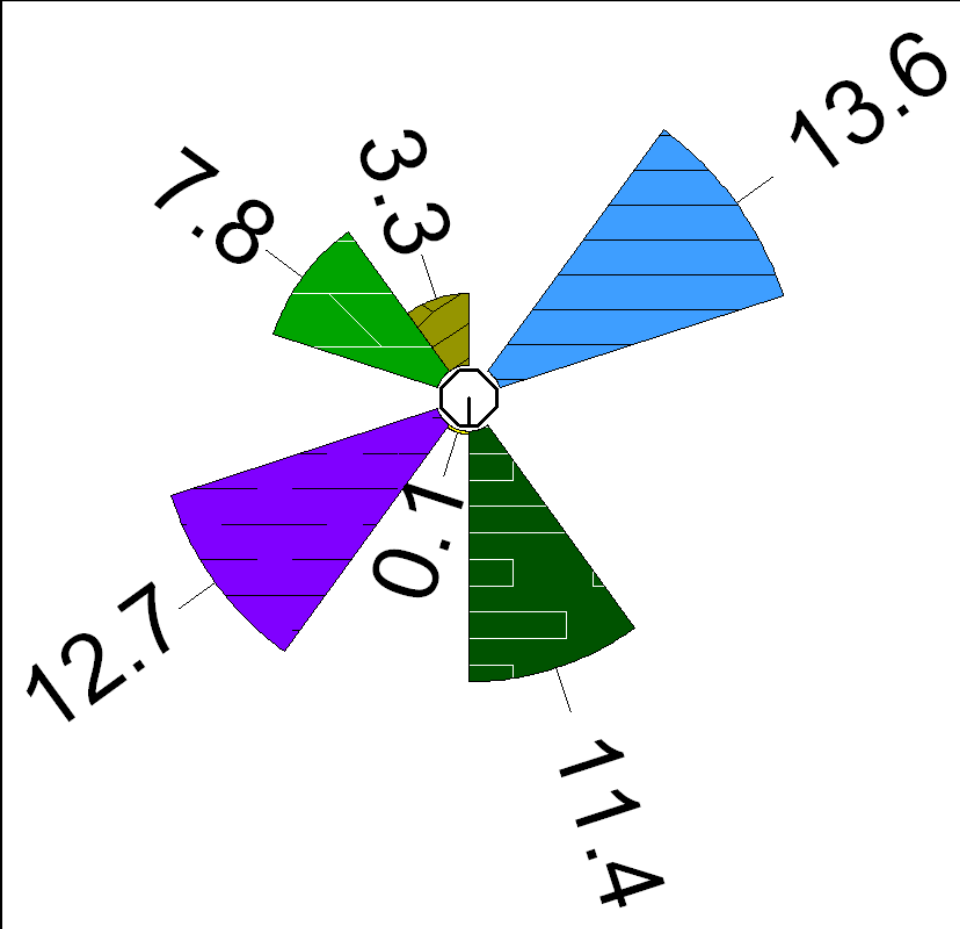
horizontally.



- Lithology**
- Arkose
 - Clay
 - Conglomerate
 - Gravel
 - Mudstone
 - Sand
 - Shale
 - Silt
 - Siltstone
 - Soil



The size of the label font is expressed as a percentage of the map size.



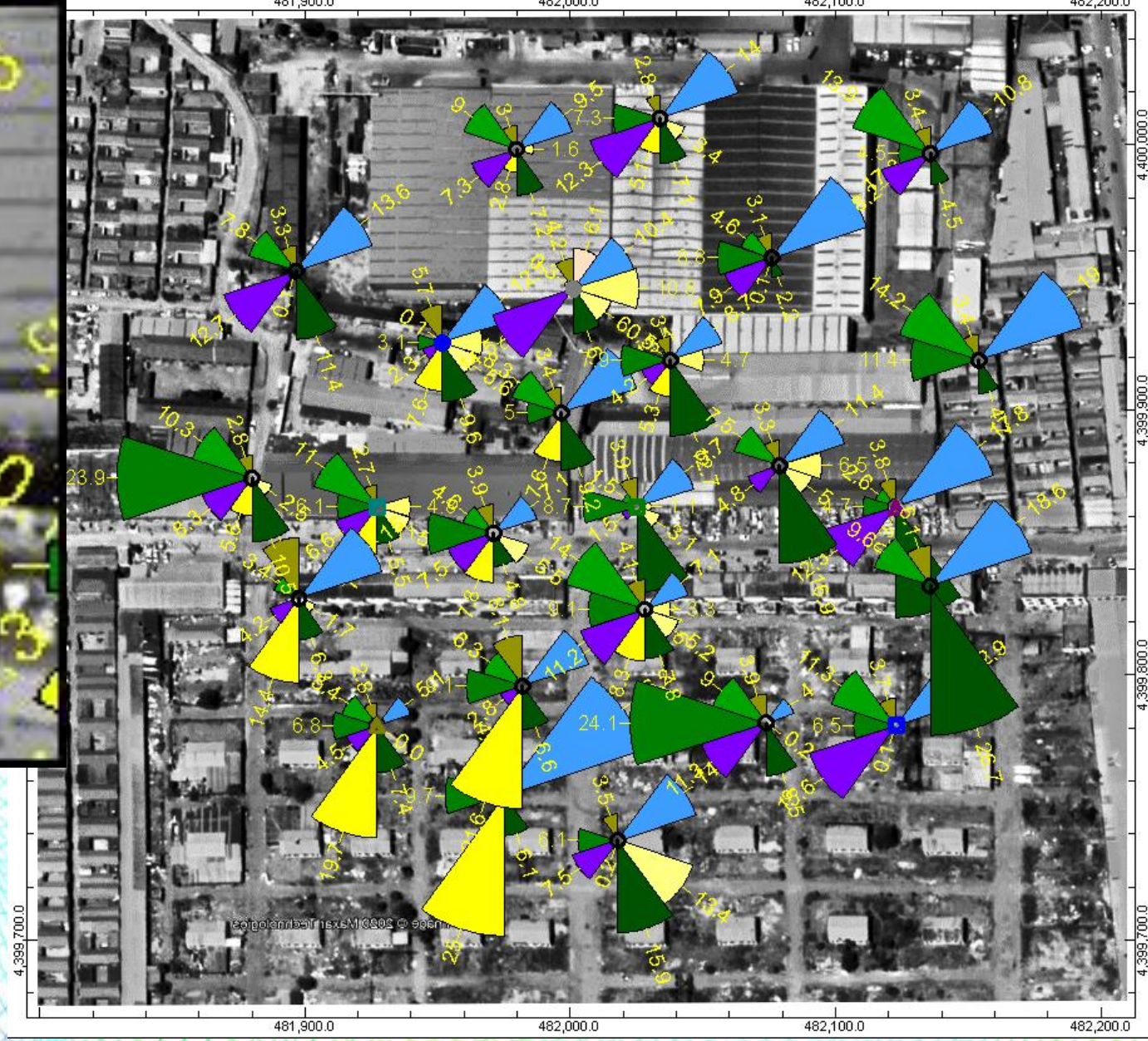
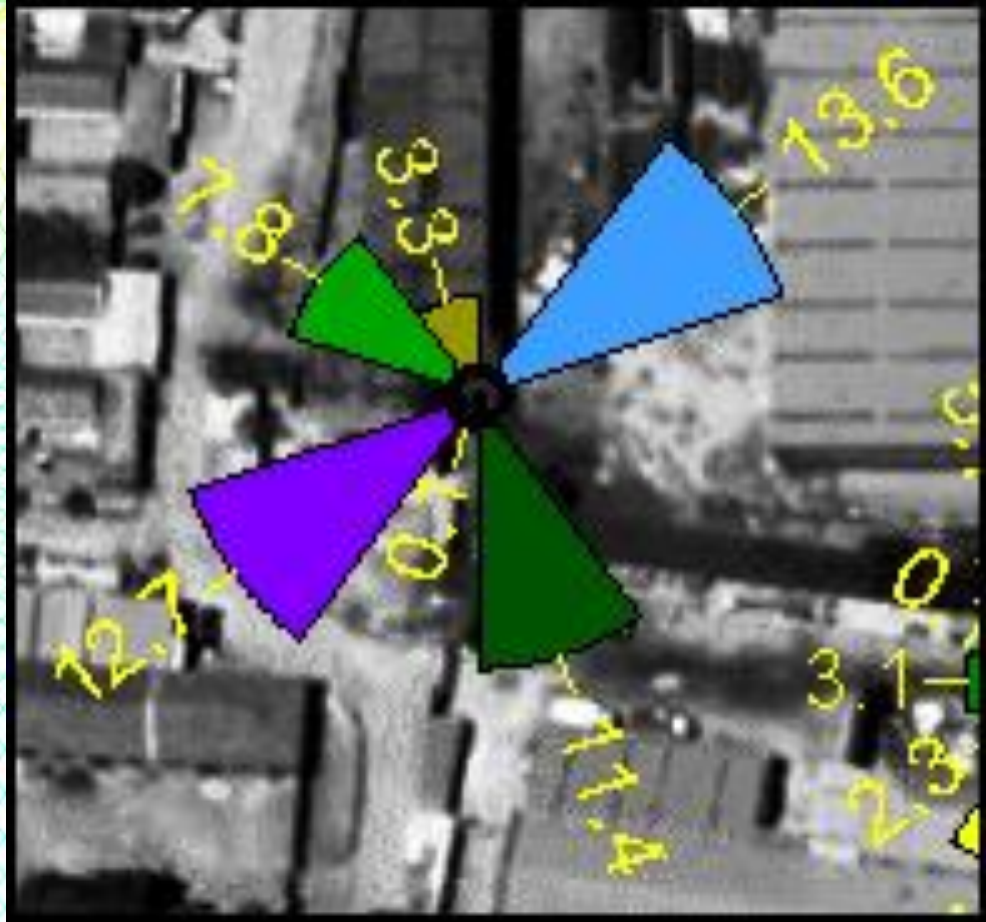
○ Radial
● Horizontal











Size 1.00

Color

Offset 1.00


Optimizing the font size typically involves some experimentation.



- Lithology**
-  Arkose
 -  Clay
 -  Conglomerate
 -  Gravel
 -  Mudstone
 -  Sand
 -  Shale
 -  Silt
 -  Siltstone
 -  Soil

Radial
 Horizontal

Size

Color 

Offset

The ability to change the font color is important when the background isn't white.

Rosegrams

Data Type

- Lithology
- Stratigraphy

Scaler

Inner Radius

Borders

Patterns

Density

Labels

Titles

Thicknesses

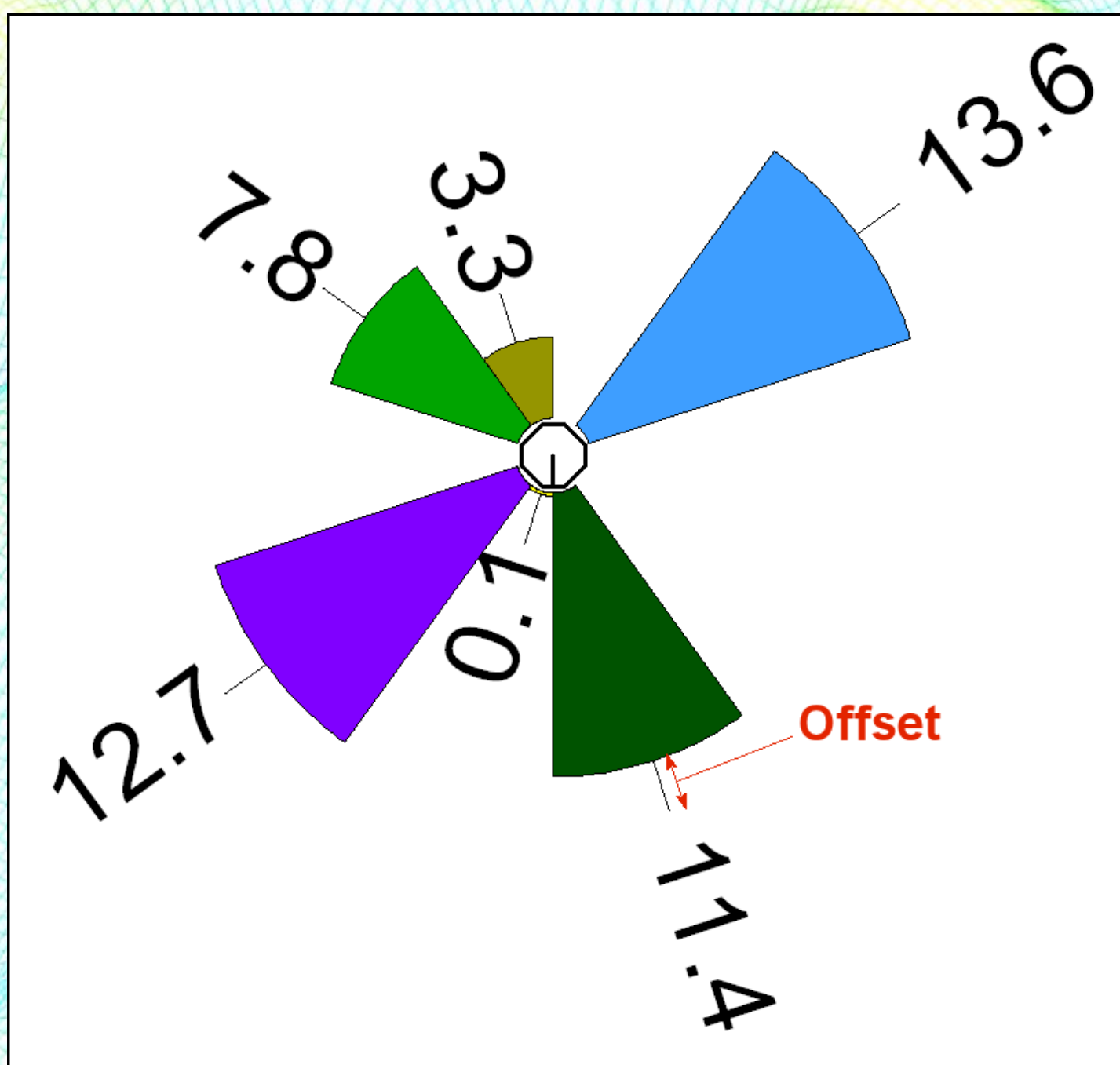
Orientation

- Radial
- Horizontal

Size

Color

Offset



The offset defines the distance from the outside of the wedge to the label.

Rosegrams

Data Type

- Lithology
- Stratigraphy

Scaler

Inner Radius

Borders

Patterns

Density

Labels

Titles

Thicknesses

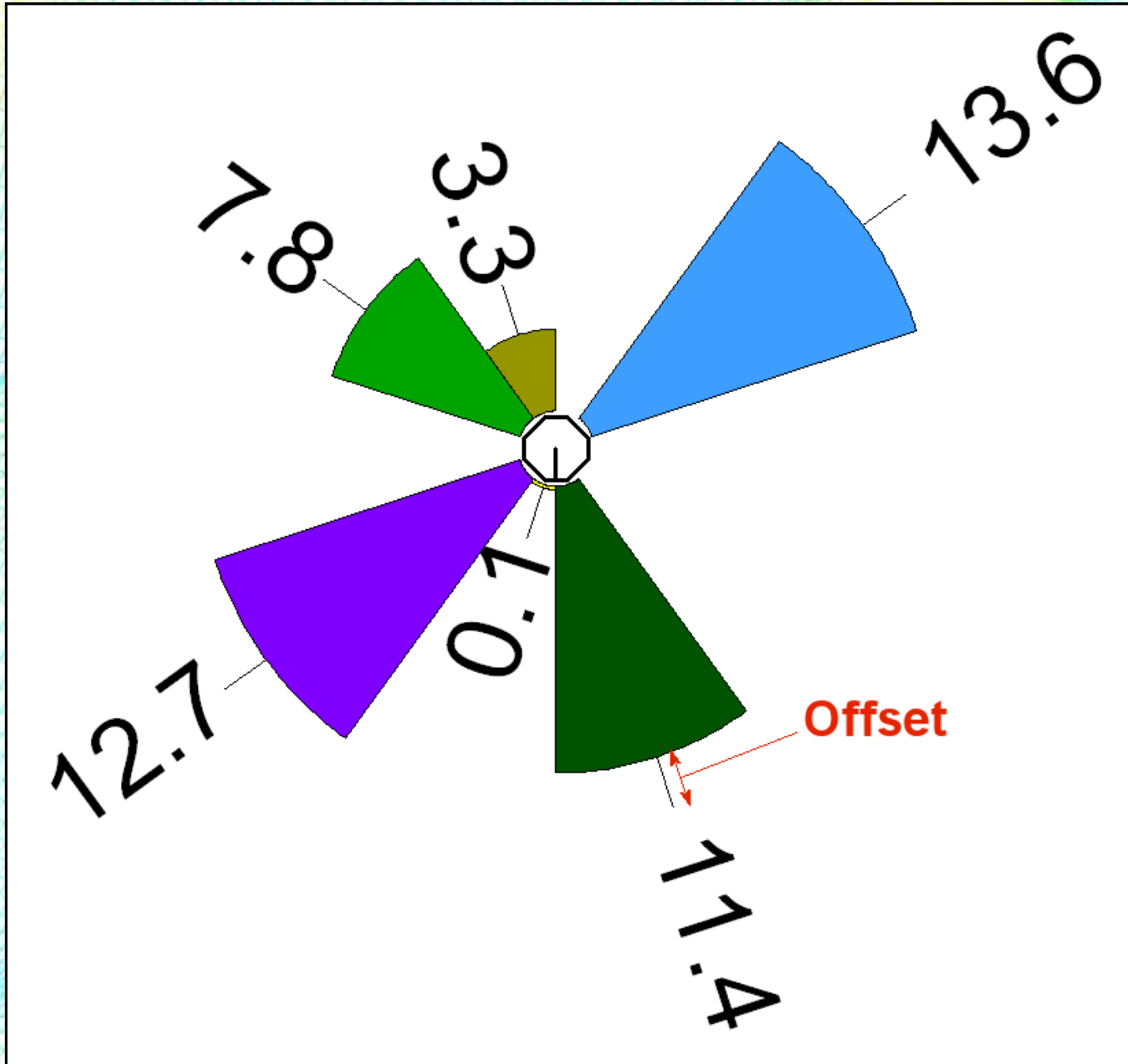
Orientation

- Radial
- Horizontal

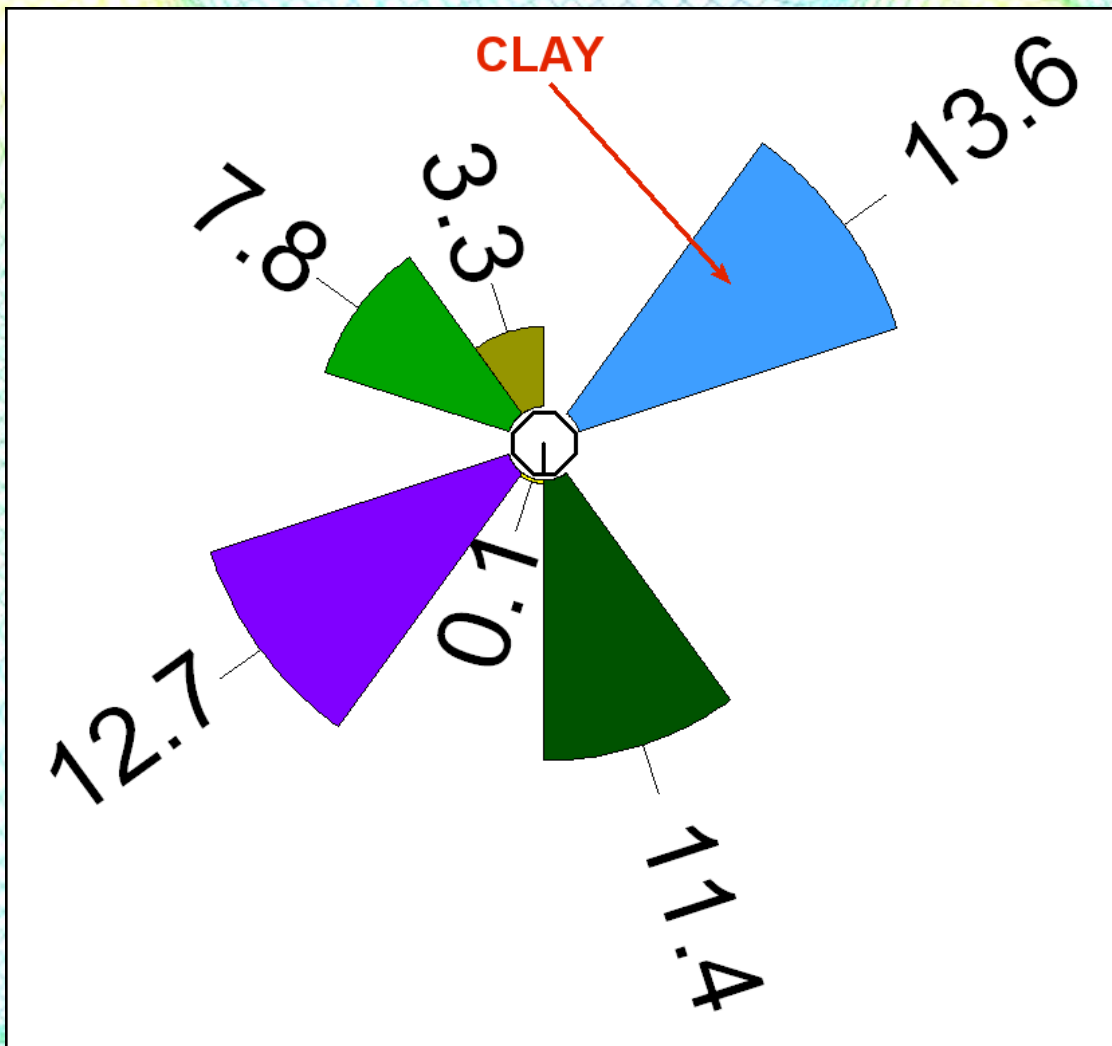
Size

Color

Offset



This, in turn, defines the length of the leader line that connects the wedge to the label.



Borehole Manager Project Manager Faults Datasheet (untitled)

File Edit View Help

Borehole Data QuickMap

Borehole

- MW-01
- MW-02
- MW-03
- MW-04
- MW-05
- MW-06
- MW-07
- MW-08
- MW-09
- MW-10
- MW-11
- MW-12
- MW-13
- MW-14
- MW-15
- MW-16
- MW-17
- MW-18
- MW-19
- MW-20

Borehole Data

Location

Orientation

Lithology

Stratigraphy

I-Data

I-Text

T-Data

P-Data

P-Text

Colors

Fractures

Water Levels

Symbols

Patterns

Bitmaps

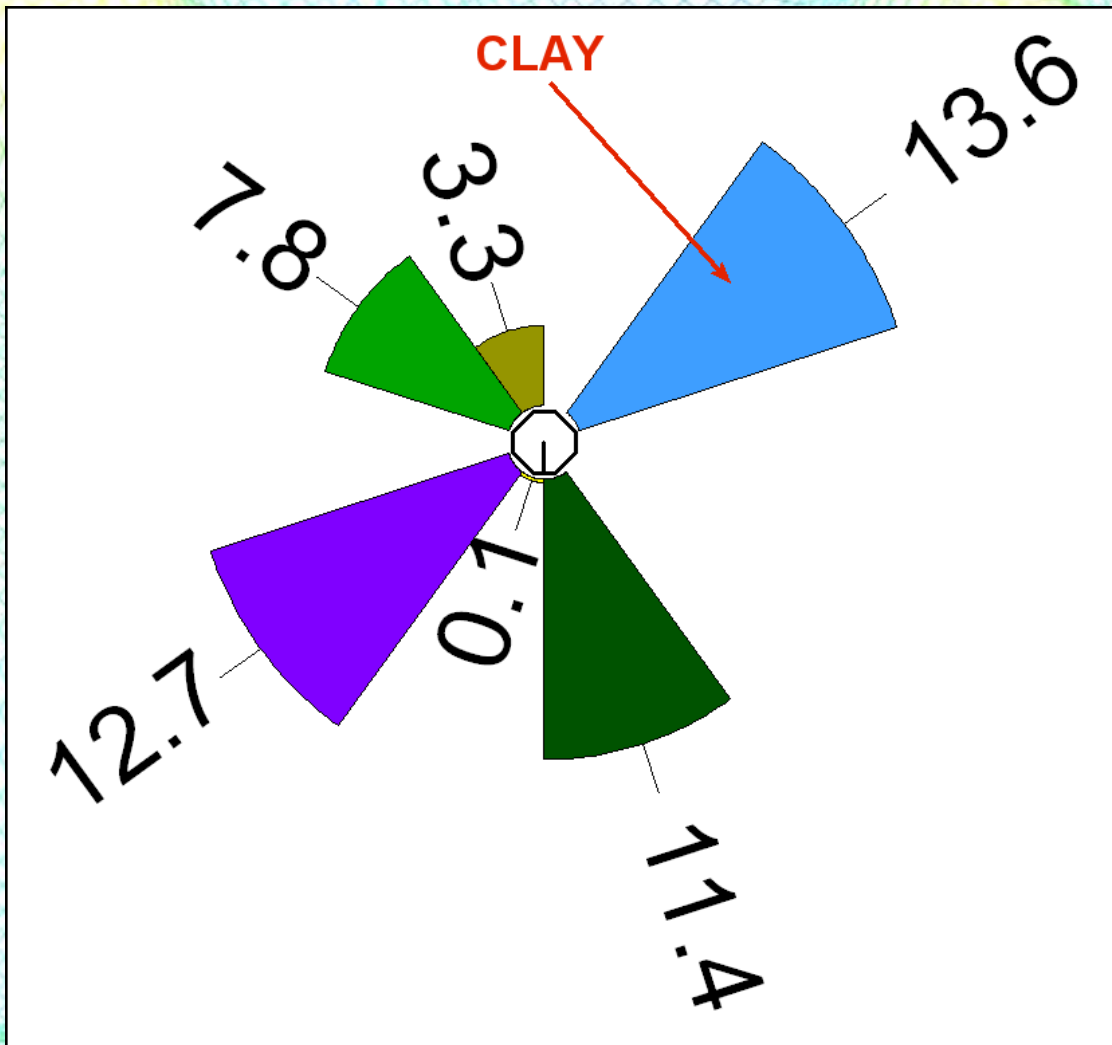
Vectors

QuickMap

Litho Types Tab Manager Datasheet Fro

Top Depth	Base Depth	Keyword	Cor
0.0	3.79	Soil	
3.79	14.63	Clay	
14.63	18.29	Mudstone	
18.29	23.03	Silt	
23.03	26.83	Mudstone	
26.83	27.14	Clay	
27.14	31.16	Sandy Gravel	
31.16	35.76	Clay	
35.76	38.09	Mudstone	
38.09	38.34	Sand	
38.34	47.96	Mudstone	
47.96	54.2	Shale	
54.2	56.23	Clay	
56.23	62.33	Shale	
62.33	64.9	Siltstone	

On a cautionary note, please be aware that the unit thicknesses represent the total thicknesses within each borehole.



Borehole Manager Project Manager Faults Datasheet (untitled)

File Edit View Help

Borehole Data QuickMap

Borehole

- MW-01
- MW-02
- MW-03
- MW-04
- MW-05
- MW-06
- MW-07
- MW-08
- MW-09
- MW-10
- MW-11
- MW-12
- MW-13
- MW-14
- MW-15
- MW-16
- MW-17
- MW-18
- MW-19
- MW-20

Borehole Data

Location

Orientation

Lithology

Stratigraphy

I-Data

I-Text

T-Data

P-Data

P-Text

Colors

Fractures

Water Levels

Symbols

Patterns

Bitmaps

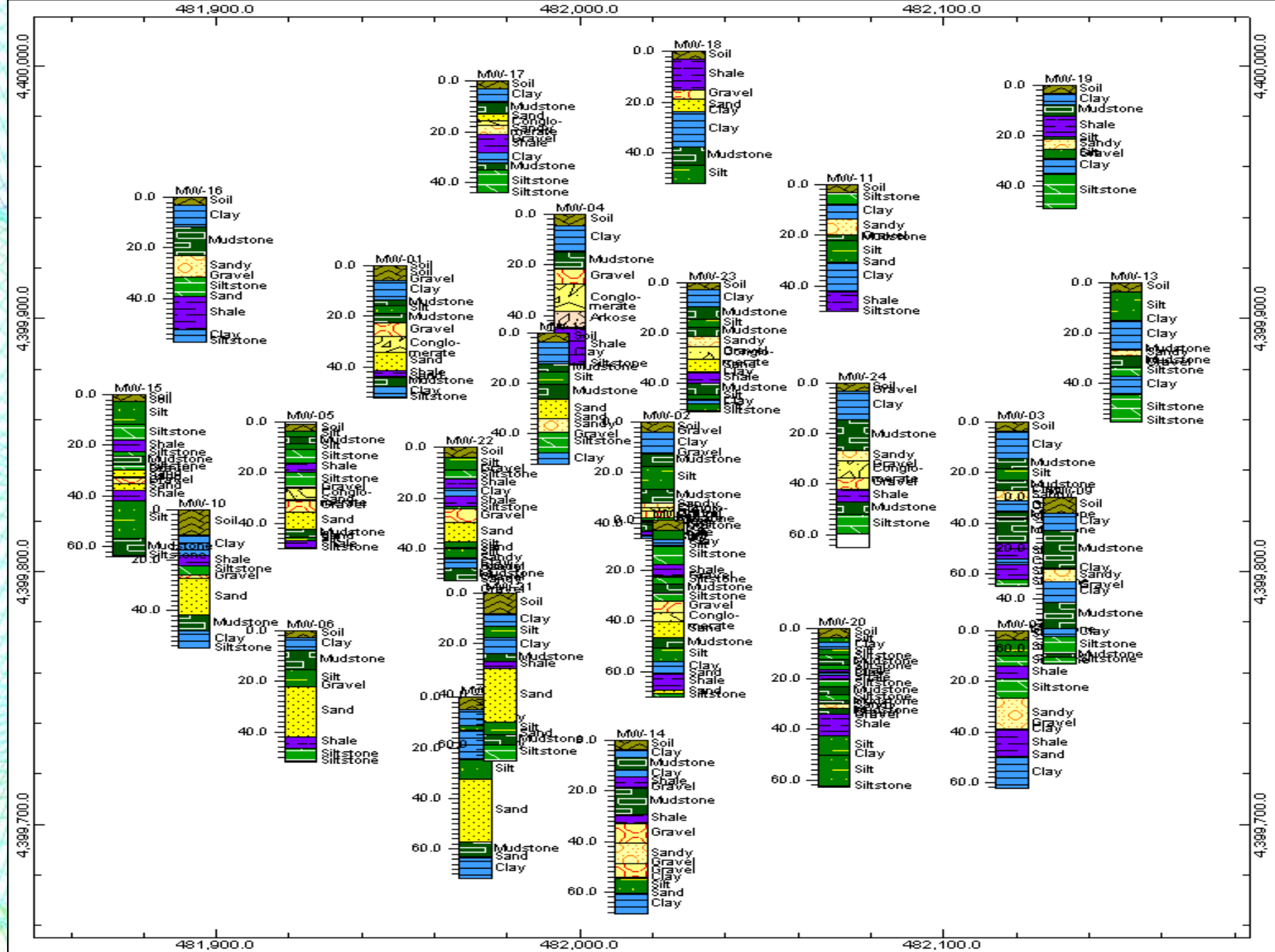
Vectors

QuickMap

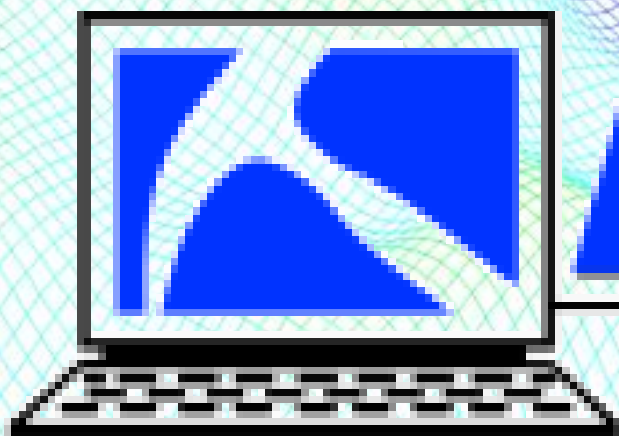
Litho Types Tab Manager Datasheet Fro

Top Depth	Base Depth	Keyword	Cor
0.0	3.79	Soil	
3.79	14.63	Clay	
14.63	18.29	Mudstone	
18.29	23.03	Silt	
23.03	26.83	Mudstone	
26.83	27.14	Clay	
27.14	31.16	Sandy Gravel	
31.16	35.76	Clay	
35.76	38.09	Mudstone	
38.09	38.34	Sand	
38.34	47.96	Mudstone	
47.96	54.2	Shale	
54.2	56.23	Clay	
56.23	62.33	Shale	
62.33	64.9	Siltstone	

They do not represent the total contiguous thicknesses.



If this is important, you may want to consider using the RockWorks Striplog Map program instead.



RockWare®

Earth Science Software