
Tutorial 6 – Area of Interest

Point counting is a statistical analysis: it is a means of describing a rock in an unbiased and quantitative way. We look at a large number of points on the slide, recording exactly what is seen at each point and then assembling a description from all the information recorded. In order to be a statistically valid representation, the number of points described is typically 300 – 500.

The question is, how to choose which points?

Moving the slide that number of times, and ensuring the same point is not described more than once, is a significant task. About 40 years ago, Swift Engineering developed a device which moved the slide in equal increments along a line; at the end of a line, the petrographer would re-set it to the start and move it up a line, much as typist performed a “carriage return and line feed” operation.

Using this device, the choice of points is determined by the starting location and the step size. Step size should be at least 1.5 times the average grain size to minimise the chances of counting any grain more than once. It was therefore normal to set the step size to 1.5 times the grains size, and set off across the slide, not knowing how much of the slide would be described.

This is very inefficient. Consider an example:

- a thin section of 2.5cm x 7.5cm with a 2.5cm label;
- a rock with an average grain size of “fine sand lower” on the Wentworth scale;
- counting 400 points.

A step size of 1.5 times the average grain size will look at roughly 2.5% of the slide; or, if we start at the bottom left (excluding the label) and count the first 400 points, the red portion below:



PETROG does not use step size. PETROG sets an Area of Interest (the useful part of the slide) and divides it optimally. The only pieces of information PETROG needs to know are the number of points to count and where on the slide is good rock material to examine. These are set from main menu:

Sample | Edit Data Entry Methodology | Composition Analysis – Quantitative

(Alternatively, the same dialog can be accessed from main menu:

Sample | Edit Sample Details

and then on tabbed page Data Entry Methods, select

Modal Analysis - Composition – Quantitative

and click the Define button).

In either case, the following form is shown:

PETROG: Define Composition - Quantitative; Well: Demo-1; Depth: 1010.00 m Plug: 3 Code: c

Ticklists

Detrital Grains: Detrital Grain - Default

Bioclastic Grains: Bioclastic Grain - Default

Carbonate Grains: Carbonate Grain - Default

Authigenic Minerals: Authigenic Mineral - Default

Matrix: Matrix - Default

Porosity: Porosity - Default

Organic Materials: Organic Material - Default

Artifacts: Artifact - Default

Microporosity Determination Method

☒ Remainder Microporosity

☐ Calculated Microporosity

☐ Counted Microporosity

Count Target

☒ Fixed Number Count Count: 200

☐ Targetted Count (not available this release)

Setup Stepper

Area of Interest shape: Rectangular

Microscope

Microscope Name: Leica DM LS

Objective: X 10

The count is shown here as 200. This can be set either by typing in the box or by using the scroll arrows.

Access to setting up the Area of Interest is by pressing the button “Setup Stepper” from this form, or directly from the main menu:

Sample | Area of Interest

In either case the window looks like this:

Set Area of Interest

Area of Interest: Bottom, Left: (19010, 14010)
Top, Right: (42255, 33255)

Current Position: x: 18.91495 mm y: 13.93995 mm (19010, 14010)

Single step distances:
x = 1.216885 mm (1223) (Very Coarse Sand Lower)
y = 1.195990 mm (1202) (Very Coarse Sand Lower)


Number of counts (steps) = 300
(with current Aol, steps in x direction = 19, steps in y direction = 16)

Set Area of Interest

Go to (Area of Interest):

Go to (slide):

Set Area of Interest:



On the left hand side is useful information about the current settings. On the right is what is under the microscope objective. The slide can be moved using the arrow buttons (double arrow moves a larger step). The goal is to manoeuvre the slide until it is at the bottom left of the useful rock material, set this as the

bottom left of the Area of Interest, then manoeuvre the slide to the top right of the useful rock material, and set this as the top right of the Area of Interest.

Setting the bottom left and top right is done by pressing the appropriate buttons near the bottom of the left hand side of the window. The two sets of five buttons above these “Set As” buttons provide a means for moving round the slide more quickly than using the arrows. The display in the middle of the left hand side shows where the current AoI is, and where the slide is relative to the microscope objective.

At the top of this window are some useful statistics. In particular, the step sizes (different for x and y) are shown in Wentworth units. If you want to see how big a step this is, press one of the Increment/Decrement buttons, or repeatedly use the “Step” button at the bottom left of the window to complete a line traverse and see the stepper turn the corner and start to step in the opposite direction.

Note: Once an AoI has been set for any slide in a project, the same AoI will be used for every other slide, unless you choose to go into the Set Area of Interest window for a slide and you change it manually.

Area of Interest Shape.

If the sample being described is a plug then a rectangular shape for the Area of Interest will inevitably be wasteful. The set-up window has an option to select Area of Interest shape, from options:

- Rectangular
- Elliptical
- Straight line.

(The last option is included because the rectangular option will complain if the rectangle has no height). To specify an elliptical AoI (or circular as a special case) you will be asked to specify the leftmost point of the slide. If the sample is truly elliptical and the long axis of the ellipse is aligned with the long side of the slide, as would be natural, then the leftmost point will be the left end of the major axis of the ellipse, and this is how the interface refers to the point. Similarly, the topmost point is the upper end of the minor axis.

Running out of Points to Count

Unlike the Prior electro-mechanical stepper, it should not be possible to run out of points, as the stepping pattern was defined from the number of points requested. However, some points will need to be skipped (button “Skip” in the Quantitative Composition window), either because there is no material (this can happen at the edges, if the edge is irregular or the AoI has not been specified accurately, or in the interior of the sample if quality is poor) or because the material is not to be counted (as, for example, in analysis of polished specimens of coal under transmitted light). PETROG will automatically allow a few spare points, either because the optimum arrangement of points isn’t an exact array or because, if it is, the software opts to leave spares anyway. Additionally, under Project Options there is an option to systematically leave a specified percentage of spare points (by default this is greater for polished specimens of coal than for thin sections).

But what happens if these are not enough?

The software will calculate an infill pattern and return to the origin to execute this pattern. This will give approximately twice as many points to choose from. If even this is not enough, the software will run out of ways to help you.