

## Display Tools: Program–**crossplot**

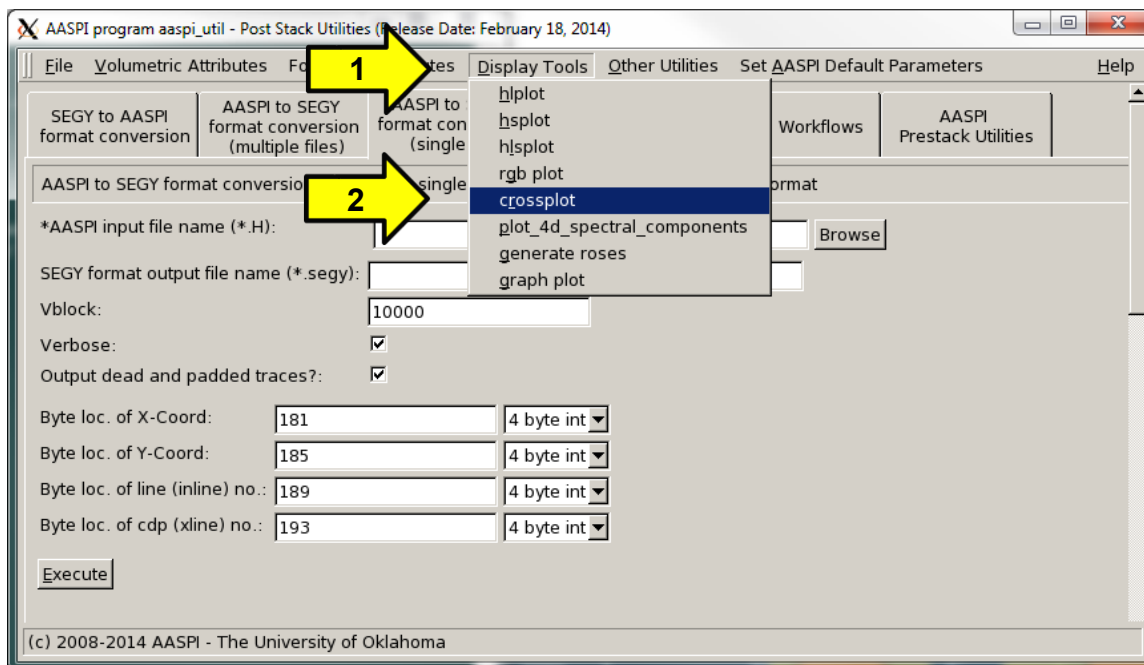
# CROSSPLOTING 2 ATTRIBUTES AGAINST A 2D COLORBAR – PROGRAM **crossplot**

## Contents

Crossplot tool .....	1
References.....	5

## Crossplot tool

We introduced this program to address issues in mapping lambda -rho vs. mu-rho for pre-stack inversion volumes. To initiate **crossplot** return to the **aaspi\_util** window click (1) *Display tools* then scroll down to (2) *crossplot*.



The **crossplot** window shown below will appear. In this example we input (1) the file *Lambda\_Rho.H* in the *x-axis attribute* and (5) the file *Mu\_Rho.H* in the *y-axis attribute*. If the range of values does not automatically appear, click (2) and (5) *Re-scan Attr* to rescan the range of values within the two data volumes. Often you will wish to hand type these values (3) and (6) to clip the range of the data displayed. The maximum number of colors chosen depends on your interpretation software package. Most are limited to 256 colors. In this case, (7) we have used

## Display Tools: Program—crossplot

4096 colors. (8) '2D Color Map Size' allows you to adjust the number of color bins denoted to the x and y- axis. Finally, add a (9) 'Plot title' and a 'Composite output file (\*.H)' name (10).

The screenshot shows the 'AASPI - program crossplot' dialog box. It has a menu bar with 'File' and 'Help'. The main area contains the following fields and controls:

- Input Attribute Plotted Against the X-Axis of the 2D Color Bar:**
  - Input x-axis attribute file name (\*.H): /projects/Lambda\_Rho.H (with a 'Browse' button, callout 1)
  - Title of the x-axis attribute: Lambda\_Rho (with a 'Re-scan Attr' button, callout 2)
  - Minimum attribute value (lower values will be clipped): 0 (callout 3)
  - Maximum attribute value (higher values will be clipped): 150
- Input Attribute Plotted Against the Y-Axis of the 2D Color Bar:**
  - Input y-axis attribute file name (\*.H): /projects/Mu\_Rho.H (with a 'Browse' button, callout 4)
  - Title of the y-axis attribute: Mu\_Rho (with a 'Re-scan Attr' button, callout 5)
  - Minimum attribute value (lower values will be clipped): 0 (callout 6)
  - Maximum attribute value (higher values will be clipped): 1500
- Maximum number of colors:** 4096 (callout 7)  
(256 for petrel, geoviz, geomodeling, seisworks)  
(230 for Kingdom Suite):
- 2D Color Map Size:** (n\_x\_bins \* n\_y\_bins <= max\_colors) (callout 8)
  - No. of x-axis color bins: 65
  - \* No. of y-axis color bins: 63
- Clockwise rotation of 2D color bar:** (Default = 0.0 with Blue up at 0 deg, Red at 120 deg and Green at 240 deg): 0
- Plot title:** Mu\_Rho\_vs\_Lambda\_Rho (callout 9)
- Composite Output File (\*.H):** LMR.H (callout 10)

At the bottom left, it says '(c) 2008-2014 AASPI - The University of Oklahoma'. At the bottom right, there is an 'Execute' button.

Clicking the 'Execute' button will then generate three plots. The first one shows the 2D color bar, with Lambda\_Rho on x-axis and Mu\_Rho on the y-axis. The second plot shows the 2D histogram, which plots the probability density Lambda\_Rho vs. Mu\_Rho against the x and y-axis, respectively. The third plot shows time slices through the 3D crossplotted volume. This can be converted into SEG Y and then be loaded into your interpretation software.

## Display Tools: Program—crossplot

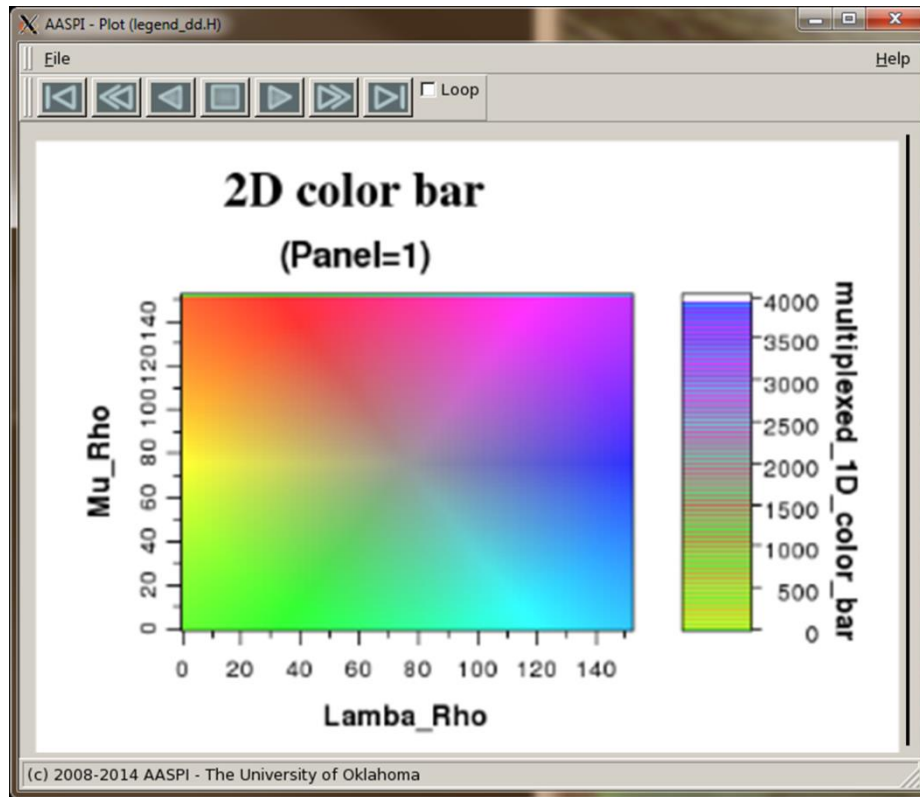


Figure 1. The 2D color bar.

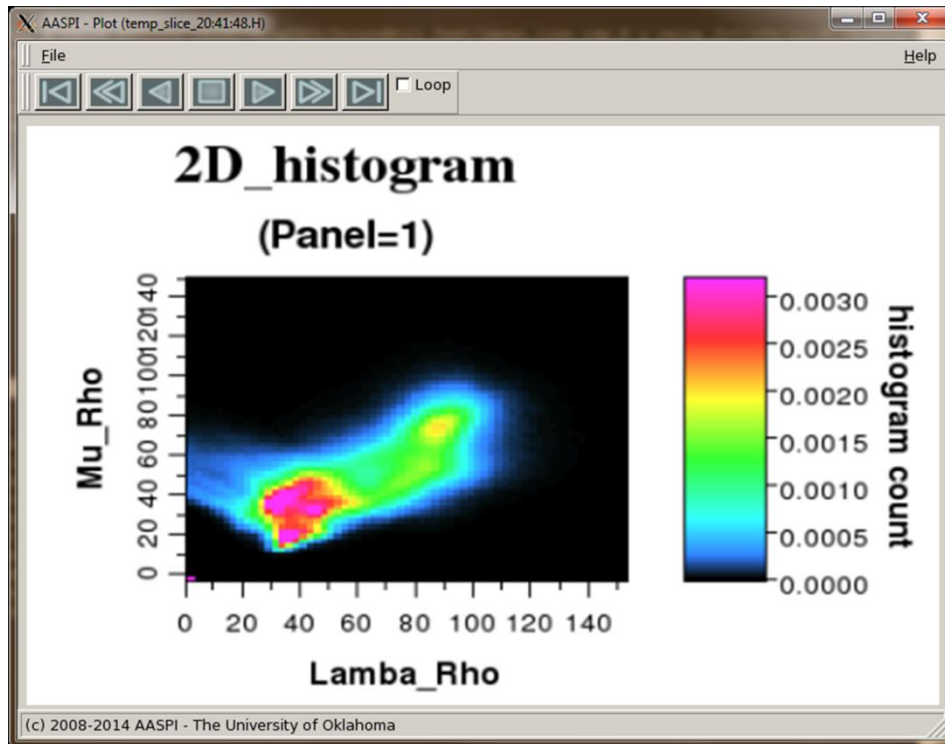


Figure 2. A 2D histogram using the default scaling parameters.

## Display Tools: Program—crossplot

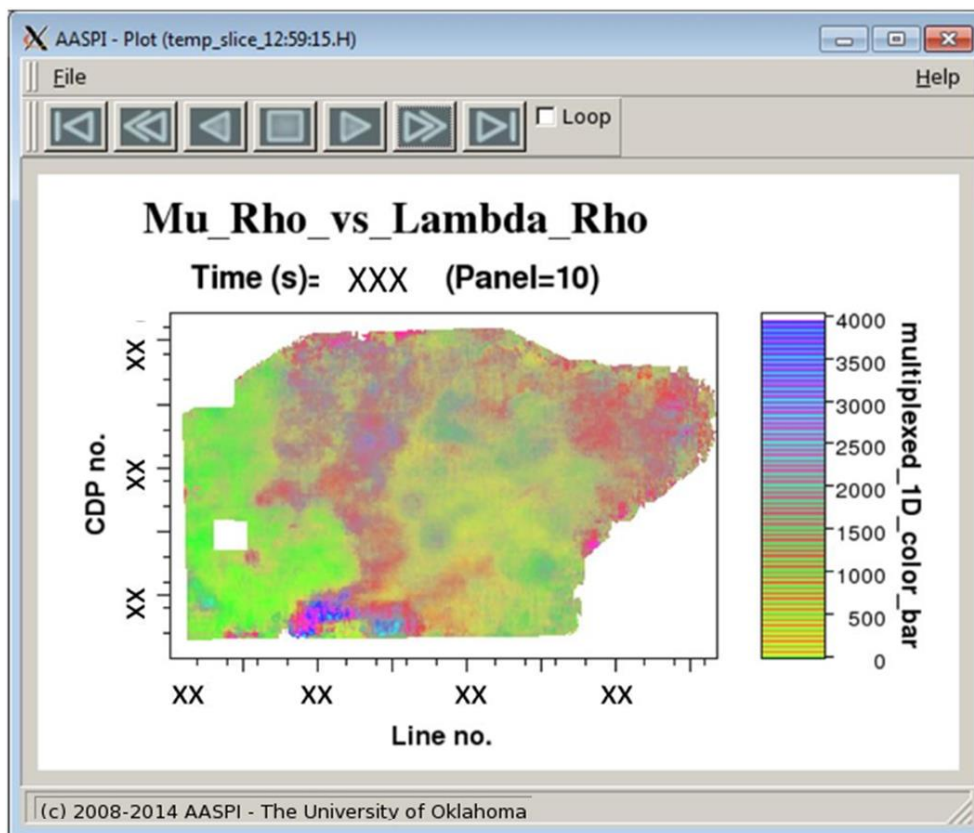


Figure 3. A stratal slice of the Lower Barnett shown as a crossplotted volume of Lambda -Rho vs. Mu-Rho.

By changing the range of the 2D histogram, we can enhance different features of interest. In the example below from Perez (2013), the quartz -rich facies is located towards the upper left, the clay-rich towards the lower left, and the calcite-rich facies towards the upper right. Figure 4 shows the same data as shown in Figures 2 and Figure 3 after modifying the ranges to more accurately represent the data. Quartz-rich facies appear as yellow and red, clay-rich as green, and calcite-rich as magenta, blue, and purple, providing an estimate of the lithological and geomechanical behavior.



## Display Tools: Program–crossplot

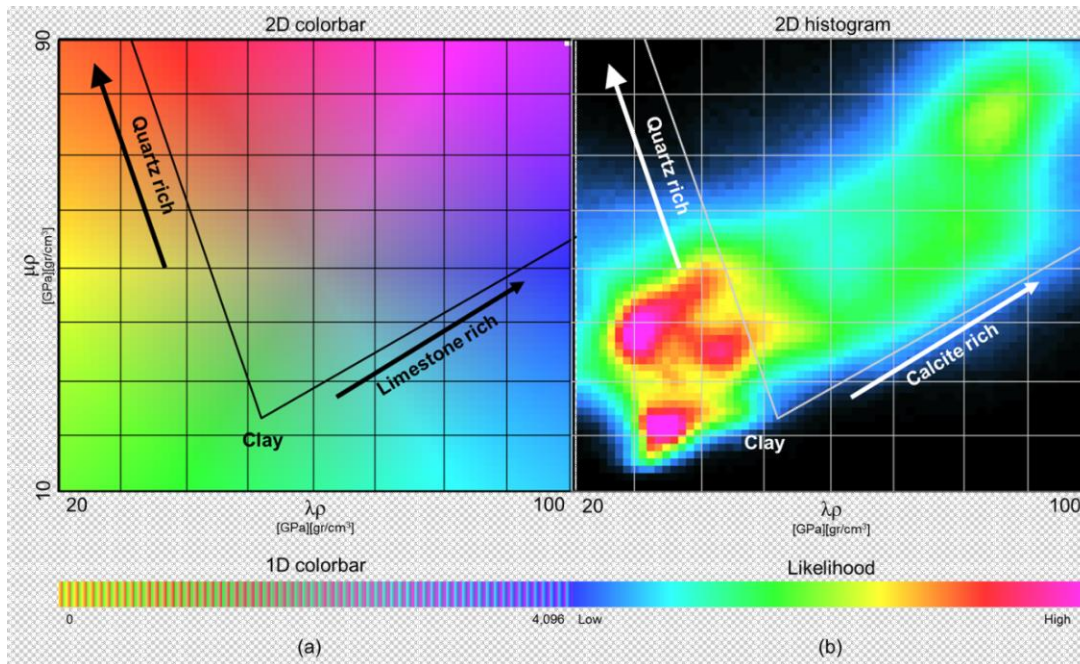


Figure 4. The same data as shown in Figures 2 and 3, but now adjusted to provide better dynamic range of the data.

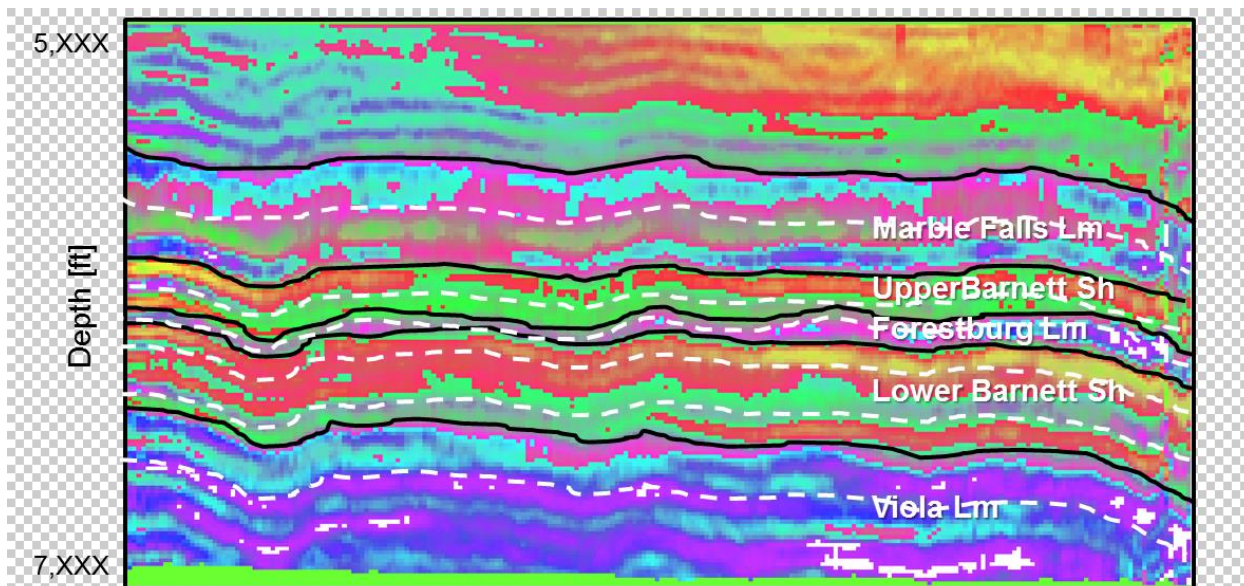


Figure 5. A vertical slice through the crossplotted volume. Quartz-rich facies appear as red and orange, clay -rich as green, and calcite-rich as cyan, blue, and purple. (After Perez, 2013).

## References

Perez, R., 2013, Brittleness estimation from seismic measurements in unconventional reservoirs : Application to the Barnett, Ph.D. dissertation, The University of Oklahoma.