



# Histograms in GEOCODER™

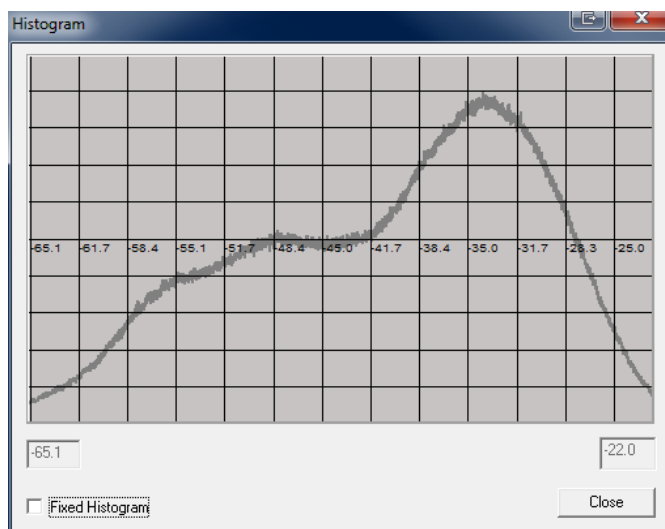
By David Maddock

I am adding to my prodigious collection of *Sounding Better* articles on GEOCODER™ this time around with a digression about histograms--what they are, how they are calculated, and what GEOCODER™ uses them for. I am told they are confusing, but their use is actually pretty straight-forward as you will see.

## WHAT'S A HISTOGRAM?

A histogram is simply a graph of some data where the X axis is the range of possible values and the Y axis is the count of the number of data points at that value. Figure 1 is an example from a typical sidescan mosaic in GEOCODER™. We can see that backscatter samples between -32dB and -35dB are the most frequent because this is the highest peak in the graph. GEOCODER™ doesn't label the Y axis so I don't know what the count of samples there is, but that's not really that important. What we care about is the shape of the curve and the minimum and maximum points on the X axis. These are going to determine how GEOCODER™ colors the display.

**FIGURE 1.** Sample Histogram

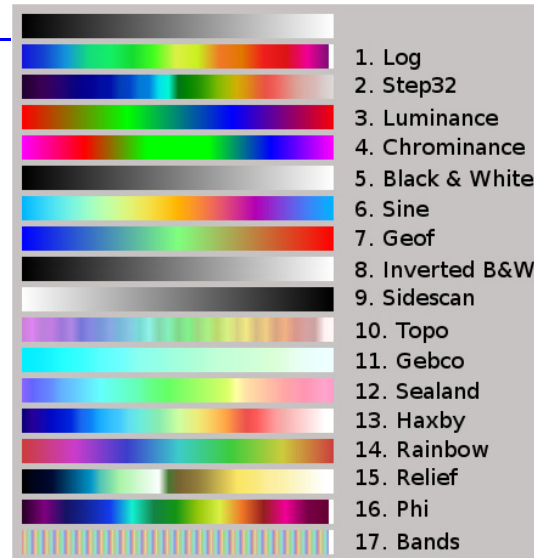


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## COLOR PALETTES

FIGURE 2. Available color palettes

GEOCODER™ offers 17 color palettes to color your mosaics and the various overlays, such as bathymetry, statistics, and ARA information. GEOCODER™ uses the minimum and maximum information from the histograms to map the color palettes to the data by "stretching" the palette from the minimum to the maximum value. When you change what data you want to view (mosaic only, bathy, statistics, ARA, etc.) GEOCODER™ looks up the histogram for that option and updates the display using the minimum and maximum for the new option. In addition, with some options it switches the color palette to something more interesting for the choice you made. For instance, using a color palette for the ARA overlay so you can see it against the black & white mosaic.



(As a sidenote, if anyone has more detail about the more "esoteric" choices, like when to use them for beyond looking pretty, e-mail me at [dave@hypack.com](mailto:dave@hypack.com).)

That's all you need to know about histograms. Really, you can stop reading this. Go on, there's plenty of better uses for your time...What are you, a masochist?! Ok, fine. You asked for it.

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## CALCULATING AND RECALCULATING HISTOGRAMS

GEOCODER™ calculates the histogram for the imagery when you first load your files. The histograms for the overlay data (statistics, ARA) are made during the "calculate" step for each mode (which may be during the full "Make Mosaic" process if you've selected that option from the menu). Because this process can be quite time-consuming with even medium-sized datasets, GEOCODER™ tries to avoid doing this step if it has already done so.

Recall that the histogram is a graph of the backscatter imagery (or data derived from it). Therefore, any action you take in GEOCODER™ which changes that imagery invalidates the histograms which you've made earlier. For example, changing imagery source from beam average to snippets and vice versa, applying a beam pattern, or toggling the apply gain/power option have this effect. When it can, GEOCODER™ detects that you've done something to invalidate the histogram and will force a recalculation when you "Make Mosaic" again. If for some reason it does not (or you've inadvertently unchecked the menu option), we provide two menu items--'Histogram > Calculate Now' and 'ARA > Recalculate ARA Histograms'--which allow you a shortcut to recalculate only those histograms without having to redo your entire mosaic.