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SHADED RELIEF

Shaded Relief and Elevation Data

This map of elevation and shaded relief was created from a digital file of elevation values for North America. This file comes from a global elevation dataset created by the U.S. Geological Survey. The elevation values for North America are arranged in a large grid with 8,295 rows and 10,295 columns. There are over 85 million grid cells in all. Each grid cell represents one square kilometer (about .39 square miles) on the ground and has a value that represents the average height above sea level within that cell.

The grid of elevation values was processed in two steps to produce this map. First, the elevation values were grouped into ranges and assigned colors (figure 1). You can use the colors to determine the elevation range for a point on the map or to find areas that are in a particular elevation range.

Second, the elevation values were digitally processed into relief shading (figure 2). The shading simulates illumination of the landscape from the northwest (azimuth 315 degrees) by a 'sun' that is 45 degrees above the horizon. The dark shadowing on the map represents the shadows cast by terrain features illuminated by this simulated 'sun.' We also exaggerated our depiction of the terrain ten times to make surface features easier to see and interpret.

The elevation colors from the first step were combined with the relief shading from the second step into a map of North America that shows both broad elevation bands and detailed surface features (figure 3). Within each elevation range, the lightest color tones represent fully-illuminated steep slopes and the darkest tones represent steep areas in shadow. Intermediate color tones show areas of relatively gentle topography.

Figure 1. Elevation values grouped into ranges and assigned colors.

Figure 2. Relief shading digitally processed from elevation values.

Figure 3. Elevation colors and relief shading combined for map of North America.

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