The New Shaded Relief Representation by Combining Multiple Light Sources with Clustering Aspect

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It is known that shaded relief representation using a Digital Elevation Model (DEM) shows fine terrain representation of a map with high-visibility.However, standard shaded relief with a single light source has difficulty to describe terrain in detail because of its dependency on an illumination and values for the z-factor emphasis.
This study attempts to establish the new method of shaded relief representation which depicts both large and small terrain features in addition to produce a trial image as a valid background map. The method devises observation for illumination and shadow density.
The first step of the study focuses the illumination effects with multiple light sources on a shaded relief. A few illuminations set each lights and shadows to whole area. Although this method defuses to be direction-dependence to some extent, it is a very limited success to describe small terrain features.
The second step is an extraction of shadow deficiency followed by an examination of shading interpolation. The shaded relief combines some illuminations from every horizontal positions with their perpendicular shadow. The shadow changes dynamically by the aspect clustering in the third and fourth quadrant.
As a result, the new relief shading representation implements to improve a previous standard. The method depict detail terrain features with fine vertical exaggeration. It also creates a natural color-shaded relief, applicable as a background image of any maps.

Keywords: DEM, Shaded Relief, Light Sources, Shade Density, Clustering Aspect

