Automating the Creation of Pseudo-Natural Maps for the Web

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Natural-color maps are useful for reference maps and maps where a realistic representation of the Earth surface matters. They are less likely to be misinterpreted, as opposed to maps that use arbitrary color schemes (e.g. hypsometric tinting). Natural-color maps were once limited to manual cartographic techniques, but they can now be created digitally with the aid of graphics editing software (*Patterson, T., & Kelso, N. V., 2013. Hal Shelton revisited: Designing and producing natural-color maps with satellite land cover data. Cartographic Perspectives, (47), 28–55)*. However, this still requires many steps and a significant time investment. This study aims to take the first step in automating the process in order to facilitate the creation of large-scale pseudo-natural maps (digitally created natural-color maps) for the web. As no baseline exists, a list of required computer graphics components must be assembled in order to begin designing software for the purpose of automating pseudo-natural mapping. A particular challenge for pseudo-natural map automation is adjusting effects, colors, and textures with location to create smoothly blending transitions. Adjustments with location are required to show land cover transitions with a natural appearance. We have composed a list of the necessary software components, which include graphic effects (such as drop shadows and embossing), color gradients, color variation across surfaces, various types of texture effects, terrain shading, obliqueness (i.e. plan-oblique relief), and animated effects. Algorithms available for creating each component are compared to assess efficiency and visual output, and prototype software for creating large-scale web maps is presented. Various pseudo-natural web maps created with these algorithms are provided.

Keywords: natural-color maps, pseudo-natural maps, spatially variable map symbolization, web mapping, cartographic automation