
TERRAIN
ATLAS
Kevin Philipow

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This atlas is produced as a portion of the requirements of the GIS: Cartography and Geovisualization program of the Centre of Geographic Sciences, NSCC, Lawrencetown, Nova Scotia. The product is unedited, unverified and intended for educational purposes only.

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Preface

This series of five assignments involved the application of multiple methods of relief representation using various software and file formats. Each one presented its own set of requirements and challenges. The first technique was a false colour image enhancement, which was applied to an antique map of France from 1636. The next four all used the same segment of the Pyrenees Mountains along the border of Spain and France to compare techniques. There were two enhanced hill shades, one of them with filters applied, an Imhof inspired relief, and another relief using the Blender software. For the last technique, LiDAR was used to create a large-scale relief map of New River Beach Provincial Park in New Brunswick. Finally, it was crucial that each of the relief representations be formatted at a high enough resolution to be resized to 300 pixels per square inch and still be an appropriate print size for this book.

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False Colour Image Enhancement

Carte Générale de France, 1636

This antique map of France was created by Christophe Nicolas Tassin in 1636 and is part of the David Rumsey Historical Map Collection. The original version (displayed as an inset) was monochrome. The object was to restore the map by adding subtle touches of colour using Adobe Photoshop. It was a good introduction to the software as it required the creation of separate layers and polygons for land, water, and other features. Then, various filters, techniques, opacity settings, and blending modes were applied to attain the desired effects. The final product adds life to the map while preserving the artistic integrity of the original version.

Enhanced Hill Shade

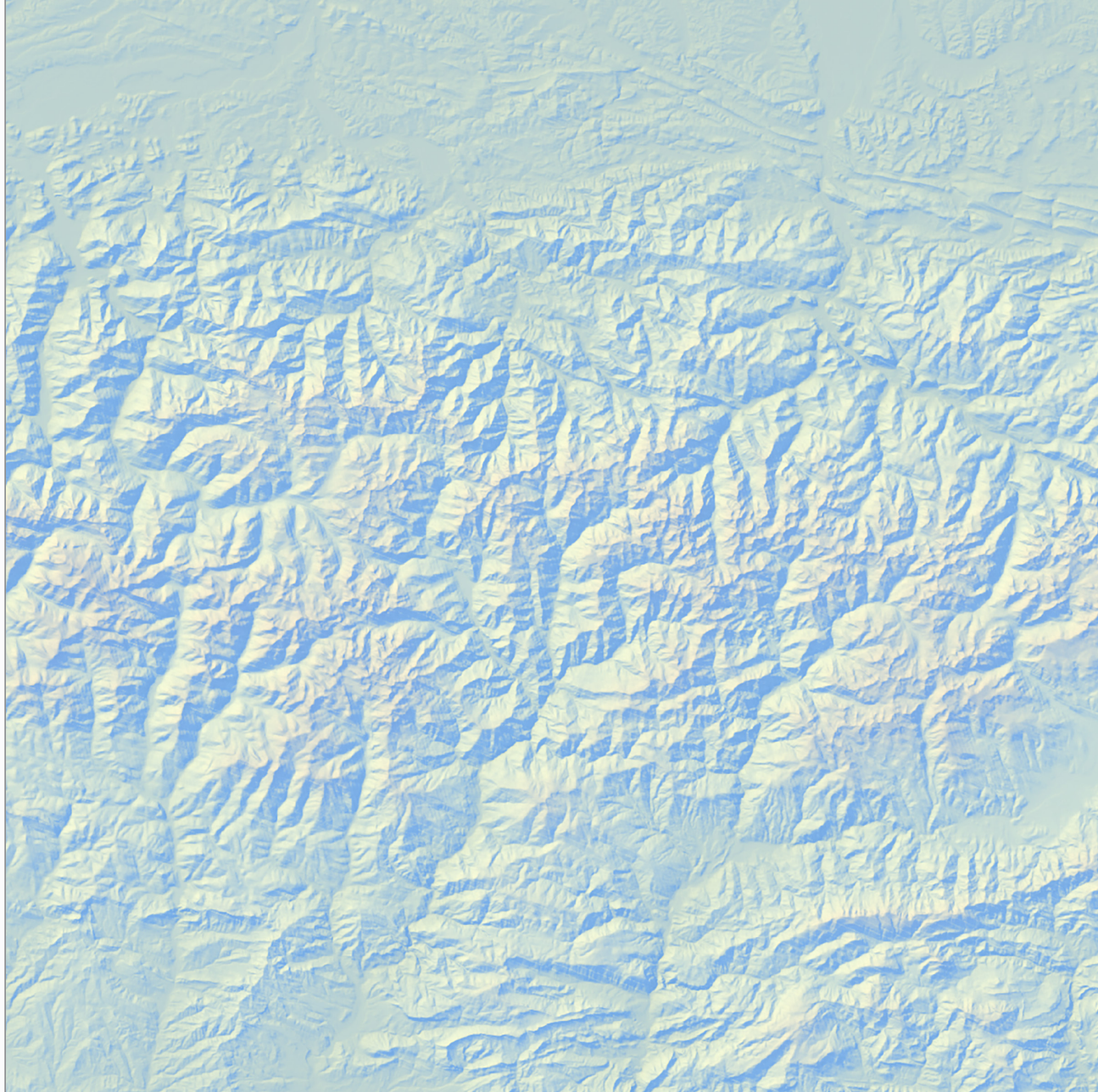
Pyrenees Mountains

A digital elevation model was used to create layers of hill shades, shaded reliefs, and hypsometric tints in ArcGIS Pro. In the process, lighting and shadow effects were applied, and the concepts of altitude and azimuth were introduced. The layers were then exported and brought into Adobe Photoshop to build composite images. Once again, various techniques were applied to achieve the desired effects, such as extracting ridgelines and shadows. The result was a 2D image with a 3D appearance. Finally, a second version of the image (displayed on the right-hand side of the adjoining page) was created with filters added for a unique effect, while maintaining a realistic appearance.

Imhof Inspired Relief

Pyrenees Mountains

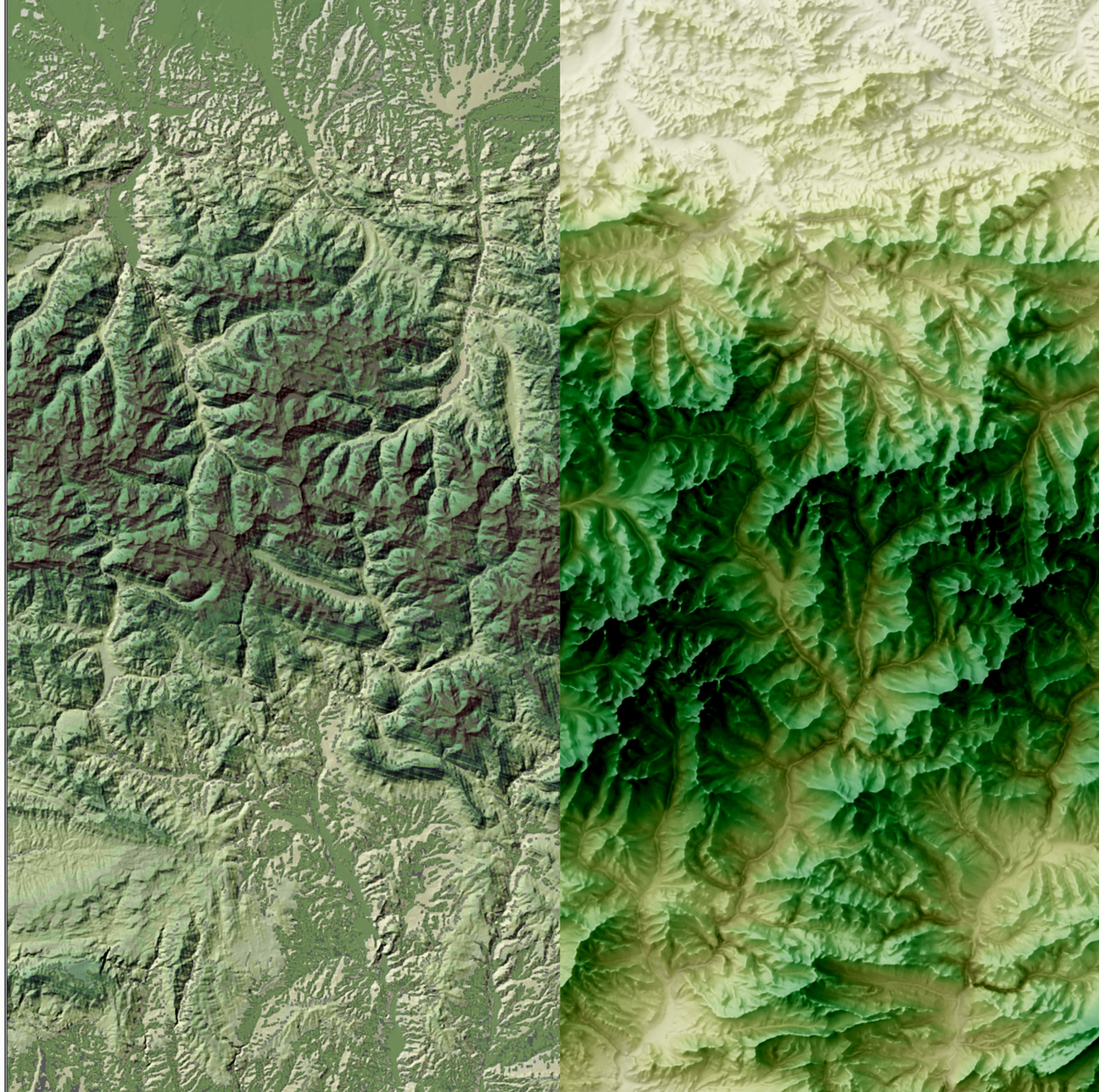
This Swiss-style shaded relief was inspired by the techniques of the famous Eduard Imhof, professor of cartography at the Swiss Federal Institute of Technology. It was completed entirely in ArcGIS Pro without any alterations in Adobe Photoshop or other software. The effect is created by displaying two modified hill shades along with a tinted DEM. The focal statistics tool is used to soften the image by giving it a slight blur. Then, the slice tool is used to re-assign the values for each hill shade. The raster calculator is used to assemble the final image with weights applied to each hill shade. Finally, the trademark yellow and blue tones are applied to the layers, and it becomes a matter of experimenting with opacities and blending modes until the desired outcome is attained.



Blender Relief

Pyrenees Mountains

This relief representation was created based on a tutorial written by Daniel Huffman for the Blender software designed specifically for 3D modeling. It offers an arguably better alternative to ArcGIS Pro for creating relief, generating a more realistic look mostly thanks to improved lighting simulation. To start, a digital elevation model is converted to a heightmap in ArcGIS Pro and exported as a TIFF file to be brought into Blender. From here, a plane is created and deformed according to the heightmap. Then, the virtual camera and light source positions are adjusted, as well as some other settings before being exported as a PNG file and brought into Adobe Photoshop for coloring and styling. In comparison to the original enhanced hill shade, the landscape in this version is much more apparent and realistic.



LiDAR Relief

New River Beach Provincial Park, New Brunswick

Light Detection and Ranging (LiDAR) was used to create a large-scale relief representation of New River Beach Provincial Park in New Brunswick, located on the north shore of the Bay of Fundy. The first step was to convert a compressed LAZ file to an LAS dataset, which was then converted to several output DEM raster layers, one for each of the classification codes to be used in the map. In addition, a hill shade was generated, and vector layers were imported, labeled and symbolized. To complete the map, a north arrow and scale bar were added. Part of what makes LiDAR impressive is its high resolution. Even in flat areas, the smallest elevation changes and vegetation details become quite apparent.

References

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About the Author

Kevin Philipow is a student of GIS: Cartography and Geovisualization at the Centre of Geographic Sciences, NSCC in Lawrencetown, Nova Scotia. Prior to that, he graduated with academic honours from the GIS Certificate Program at Canadore College in North Bay, Ontario. He also holds a Bachelor of Arts in Economics from Franklin and Marshall College in Lancaster, Pennsylvania. Some of his hobbies include golf, squash, and hiking with his dog, Evie. He lives in North Bay, Ontario.