

User-driven Manipulation of Geospatial Data

Masterstudium:
Medieninformatik

Florian Stabel

Technische Universität Wien
Institut für Computergraphik und Algorithmen
Arbeitsbereich: Computer Graphics Group
Betreuer: Ao.Univ.Prof. Dipl.-Ing. Dr.techn. Eduard Gröller

Problem Statement

This work proposes an approach for manipulating the visualization of geospatial data in real-time. As a part of the ESA DUE Permafrost project this work introduces methods to change the visualization of the raster data within a Web Geographic Information System (WebGIS) by assigning different style profiles. Based on the Styled Layer Descriptor specification and the parameters of the permafrost data, control elements are unified in one user interface. These elements allow the users of the WebGIS to explore and analyze the underlying data.

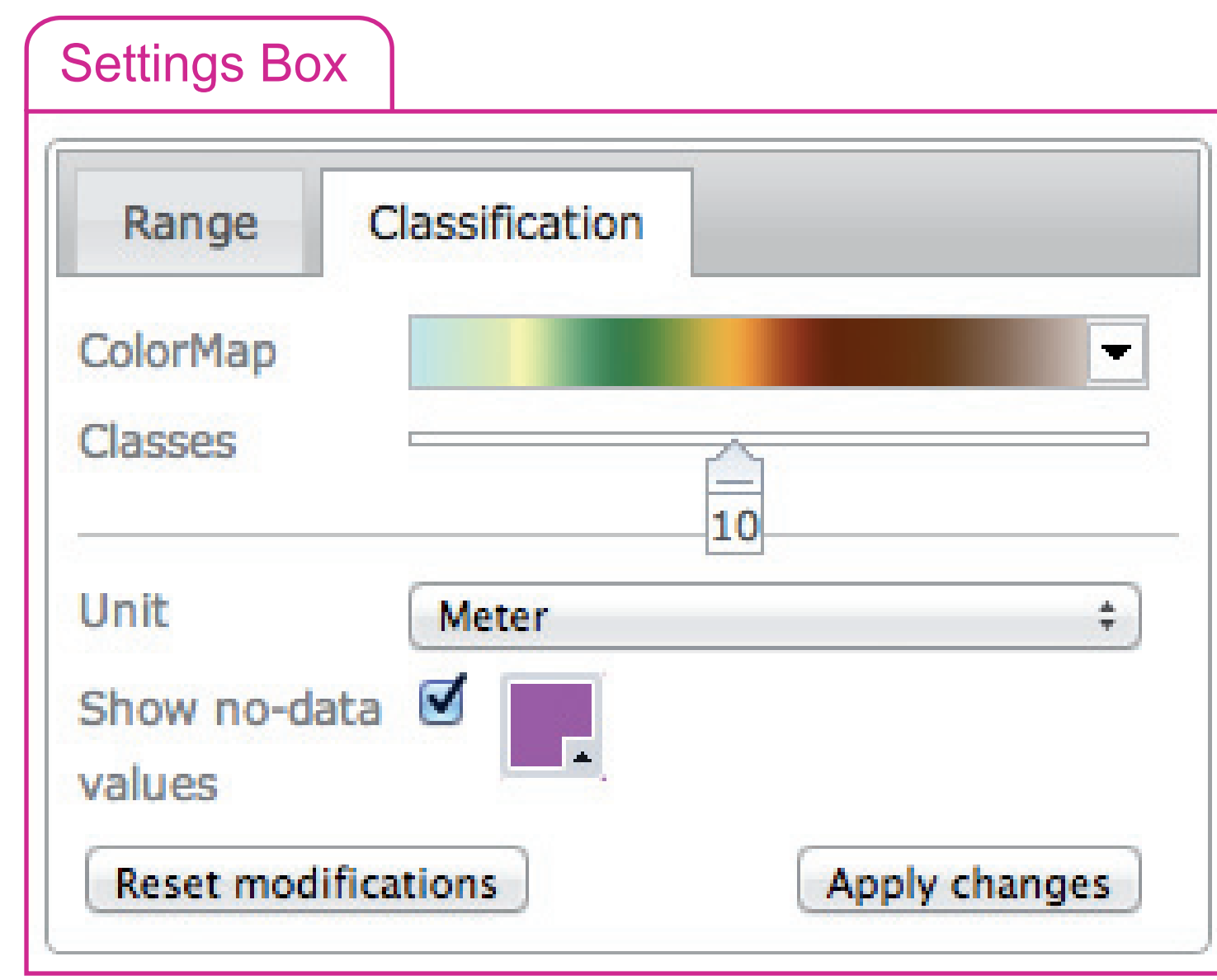
Contribution

The implementation of this work extends the WebGIS of the ESA DUE Permafrost project by the following functions:

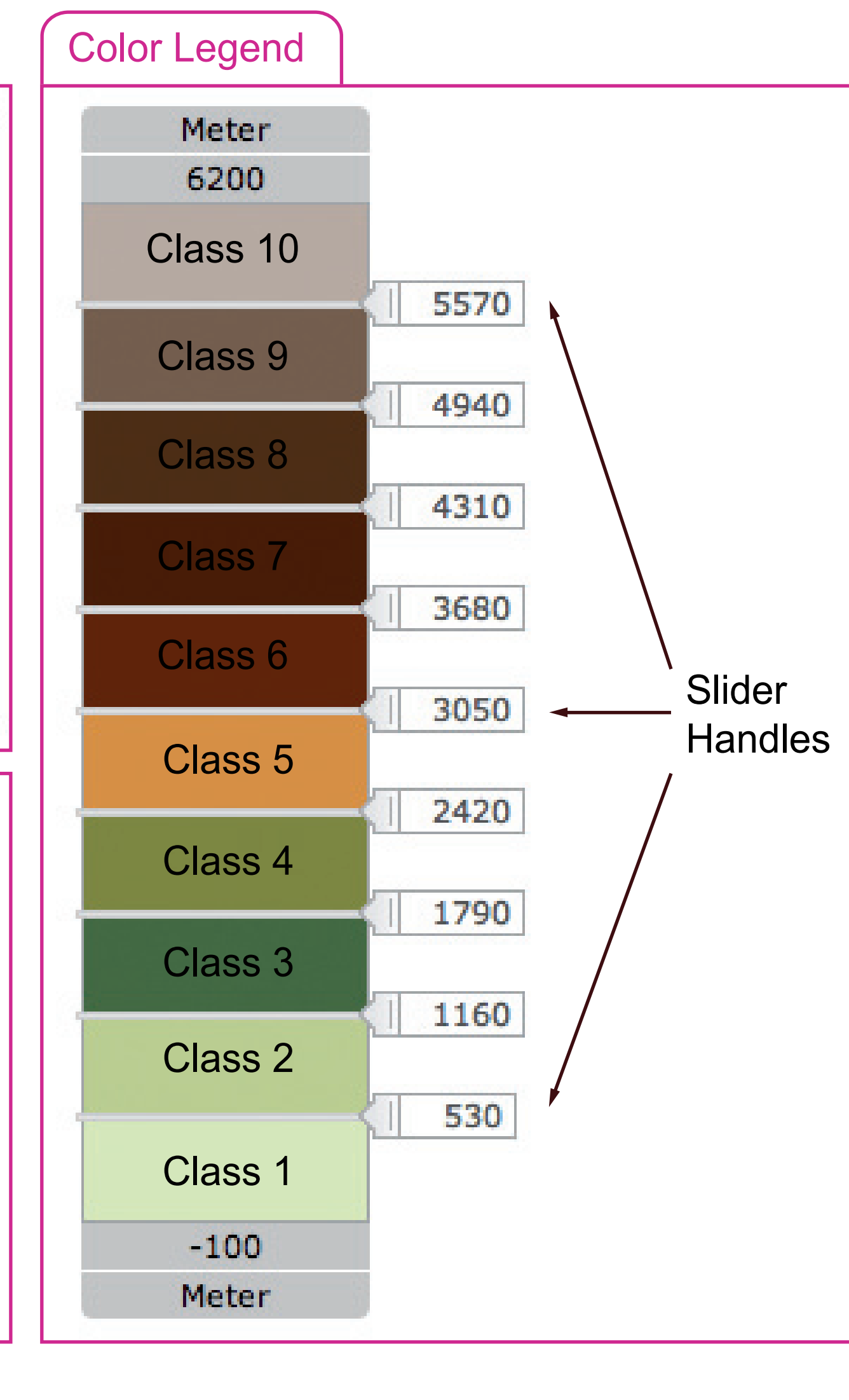
- The visualization can be adapted per layer and user without affecting the visualization of other users.
- Control elements for manipulating the layer visualization are introduced which are unified in one user interface.
- An interactive color legend is introduced which controls the values to be displayed in the layer visualization.

User Interface


Settings Box



Color Legend



Colorpicker



Settings Box

- The user can choose whether to display a specific value *range* or *classified* values of the dataset.
- The number of classes can be determined.
- Values can be converted to other measurement units.
- Areas without data can be highlighted in the visualization.
- User modifications can be reset to the default settings.

Color Legend

- Values of interest can be specified to be displayed.
- Slider handles determine the border of the adjacent classes.
- By moving the slider handles, the value range of the adjacent classes will be adapted.
- Custom colors for a certain class can be set by clicking onto a class.

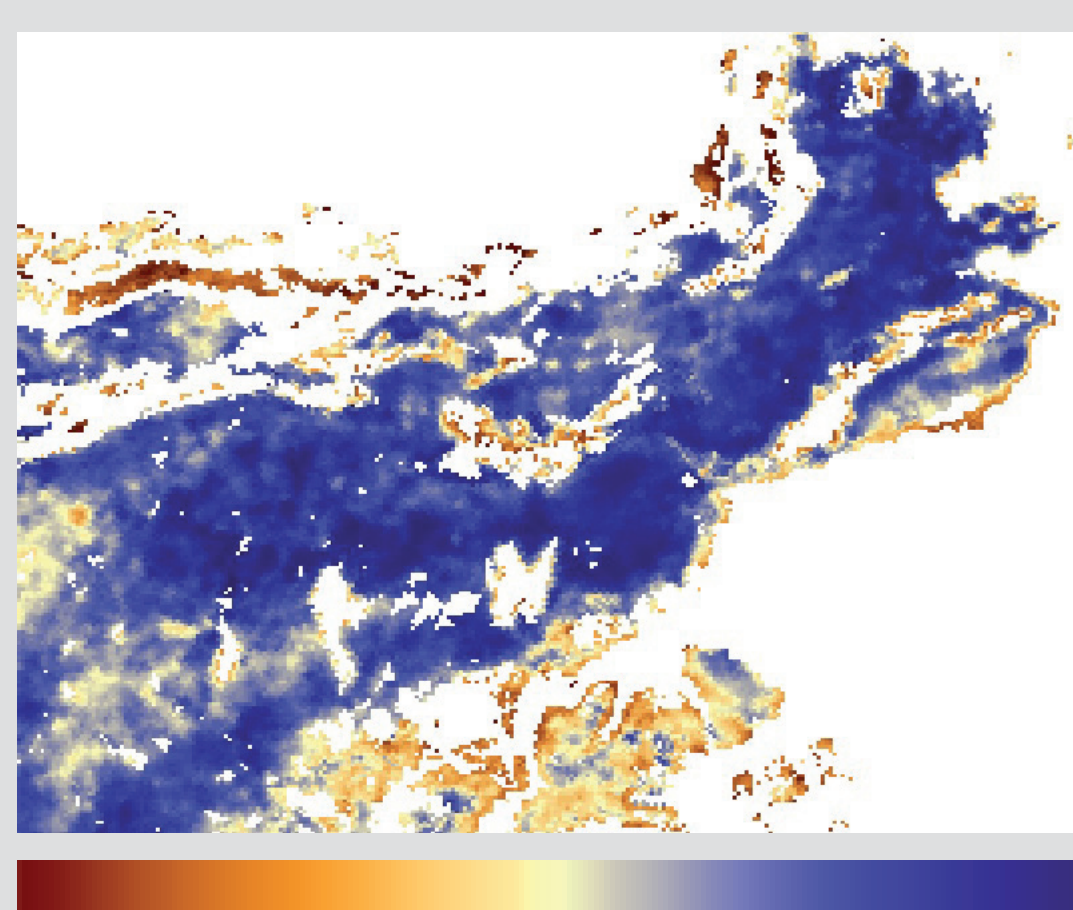
Colorpicker

- Custom colors can be set for classes and no-data areas.

Settings of the user interface are transformed into a layer style according to the *Styled Layer Descriptor* specification. Every time a layer is requested, the corresponding layer style is applied and the visualization is rendered.

Results

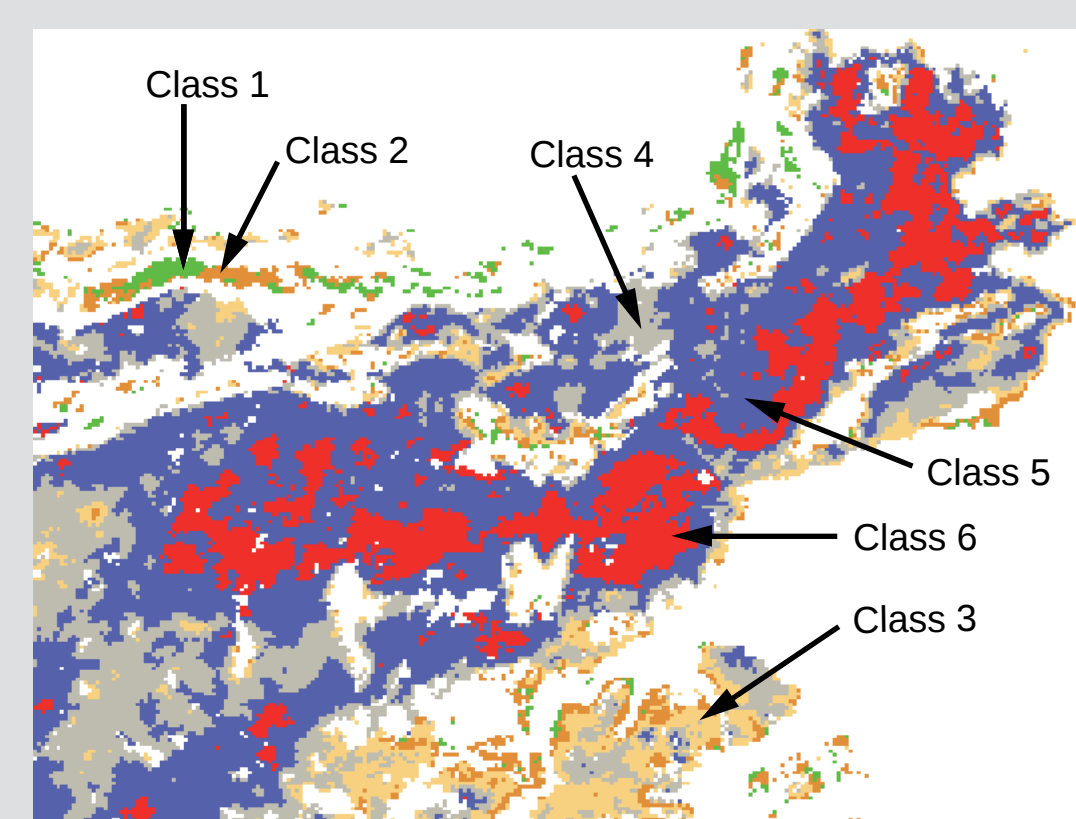
Different Colormaps



According to the permafrost data, a set of colormaps was specified. Using the colormap of the *Remote Sensing Product Surface Soil Moisture*, soil of high moisture is colored in blue while soil with low moisture is colored in red.

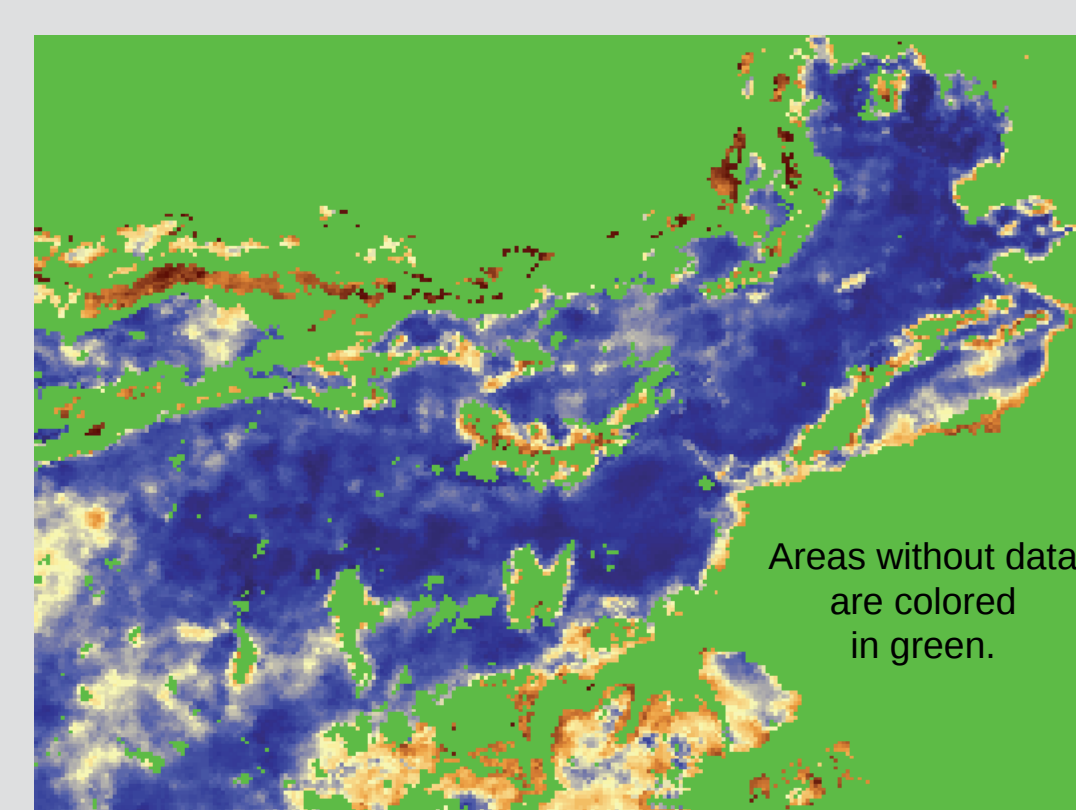
Applying a different colormap to the same data can help to highlight interesting characteristics of the data.

Classification



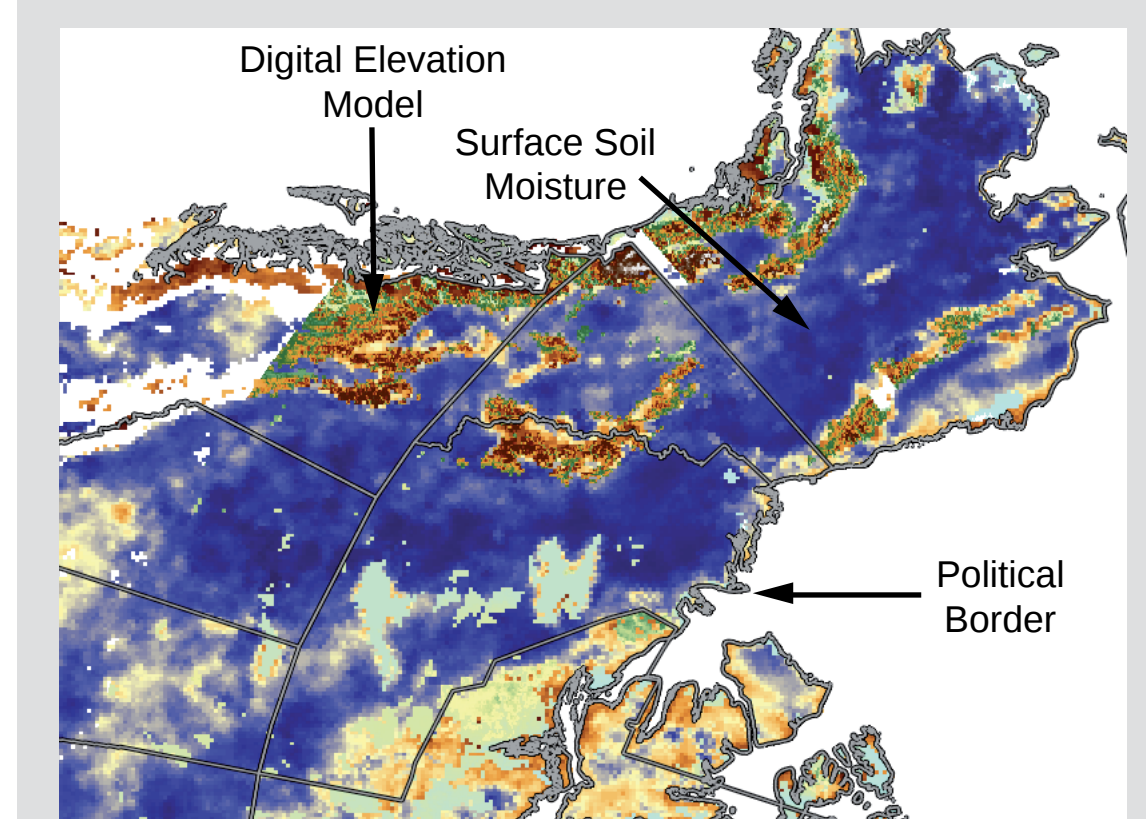
Values of the permafrost data can be classified and colored in a specific color. Areas of interest can easily be determined in the layer visualization.

Areas without data



Data is not provided for all areas since errors occurred in the remote-sensing process. These areas can be colored and highlighted from the actual data.

Overlapping Layers



Layers of different *Remote Sensing Products* like the *Digital Elevation Model* or the *Surface Soil Moisture* can be overlapped. This enables to compare characteristics of these *Remote Sensing Products*. The appearance of each layer can be adapted to emphasize interesting values.