Contents

Module 5.2 - Developing and Hosting OGC Services - OGC Services and Styling in GeoServer - Part II

Overview

- Review of Raster Styling in GeoServer
- Raster Styling Demonstration

Raster Symbolizer - Review

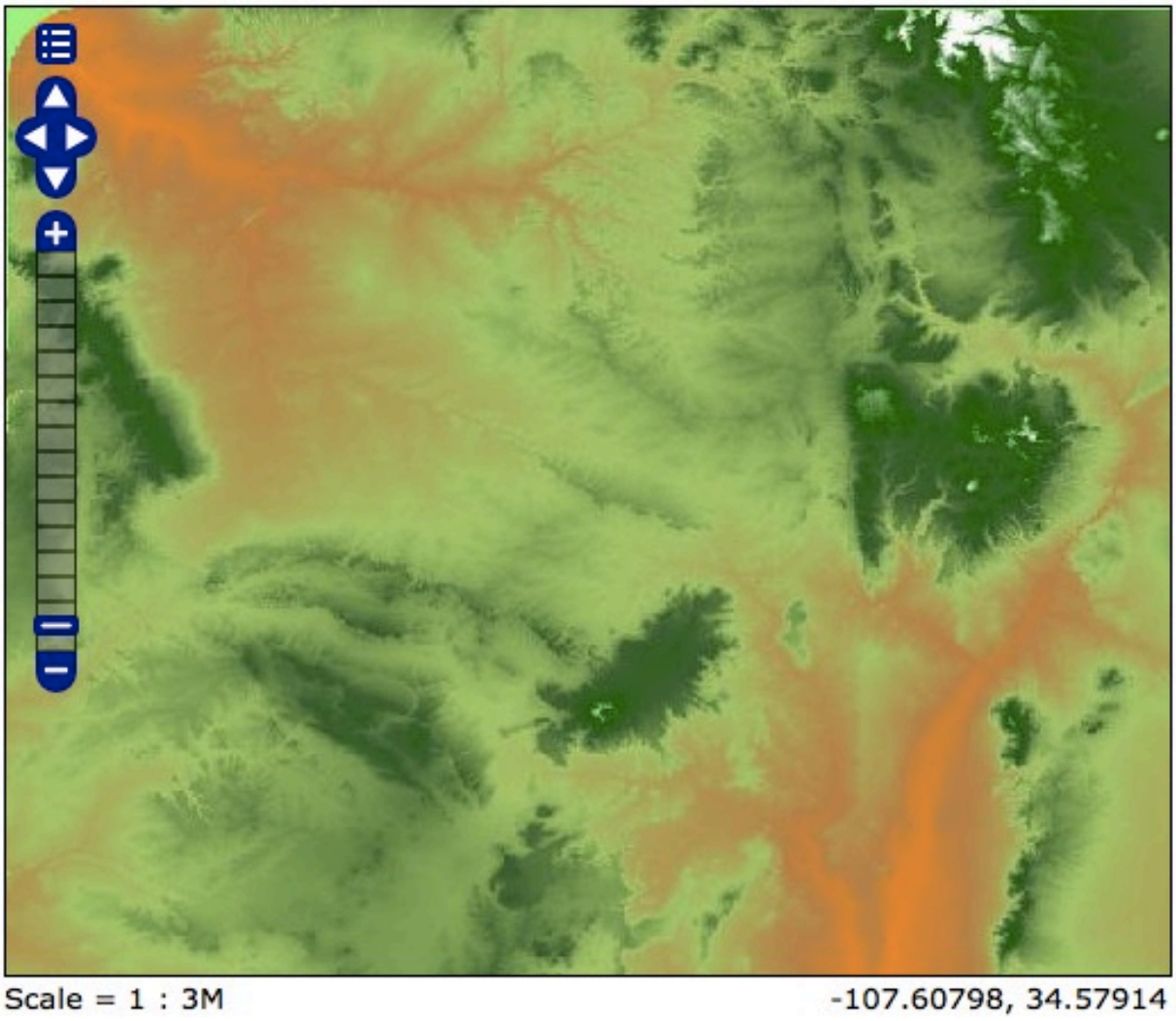
```
<Opacity>
<ColorMap type=ramp|values|intervals extended=true|false>
  <ColorMapEntry color="" quantity="" label="" opacity=""/>
<ChannelSelection>
  <RedChannel> <GreenChannel> <BlueChannel>
    <SourceChannelName>
  <GrayChannel>
    <SourceChannelName>
<ContrastEnhancement>
<ShadedRelief> (not implemented in ver 2.0)
<OverlapBehavior> (not implemented in ver 2.0)
<ImageOutline> (not implemented in ver 2.0)
```

Sample Raster SLD for Color Map Examples

```
<NamedLayer>
  <Name>gtopo</Name>
  <UserStyle>
    <Name>dem</Name>
    <Title>Simple DEM style</Title>
    <Abstract>Classic elevation color progression</Abstract>
    <FeatureTypeStyle>
      <Rule>
        <RasterSymbolizer>
          <Opacity>1.0</Opacity>
          <ColorMap>
            <ColorMapEntry color="#000000" quantity="-500" label="nodata" opacity="0.0" />
            <ColorMapEntry color="#AAFFAA" quantity="0" label="0" />
            <ColorMapEntry color="#00FF00" quantity="1000" label="1000"/>
            <ColorMapEntry color="#FFFF00" quantity="1200" label="1200" />
            <ColorMapEntry color="#FF7F00" quantity="1400" label="1400" />
            <ColorMapEntry color="#BF7F3F" quantity="1600" label="1600" />
            <ColorMapEntry color="#99CC66" quantity="2000" label="2000" />
            <ColorMapEntry color="#336633" quantity="2500" label="2500" />
            <ColorMapEntry color="#006600" quantity="3000" label="3000" />
            <ColorMapEntry color="#FFFFFF" quantity="3500" label="3500" />
          </ColorMap>
        </RasterSymbolizer>
      </Rule>
    </FeatureTypeStyle>
  </UserStyle>
</NamedLayer>
```

Default “Ramp” Raster Color Map

```
<ColorMap> or <ColorMap type="ramp">
```



“intervals” Raster Color Map

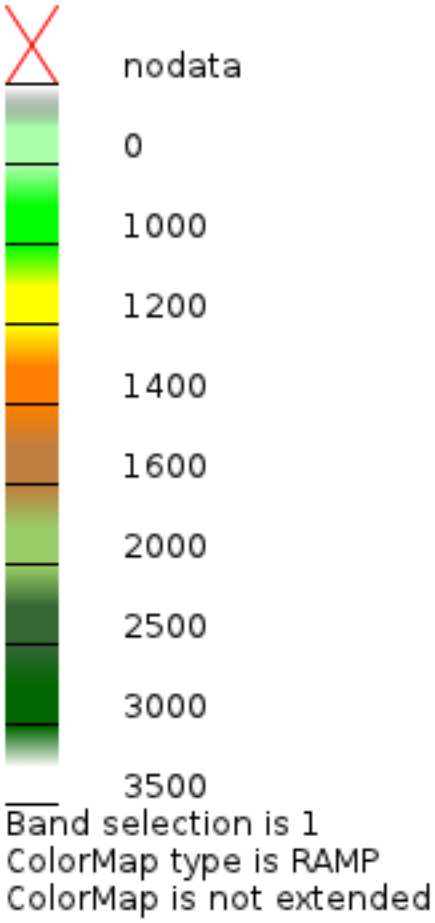
```
<ColorMap type="intervals">
```

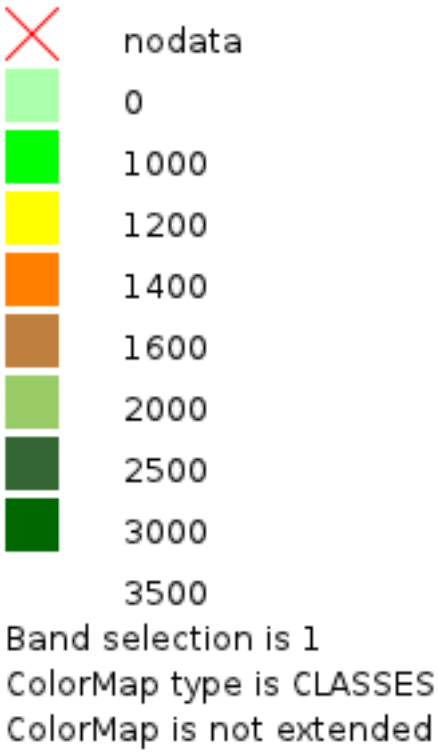
“values” Raster Color Map

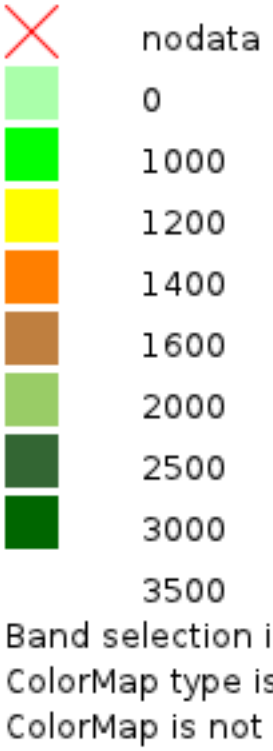
```
<ColorMap type="values">
```

Legend Graphics for the Three Styes

```
http://geog485.unm.edu:8080/geoserver/wms?
  service=WMS&
  version=1.1.0&
  request=GetLegendGraphic&
  layer=Karl:kb_nm_ned09_30m_nw_qtr2&
  style=dem-value&
  format=image/png
```



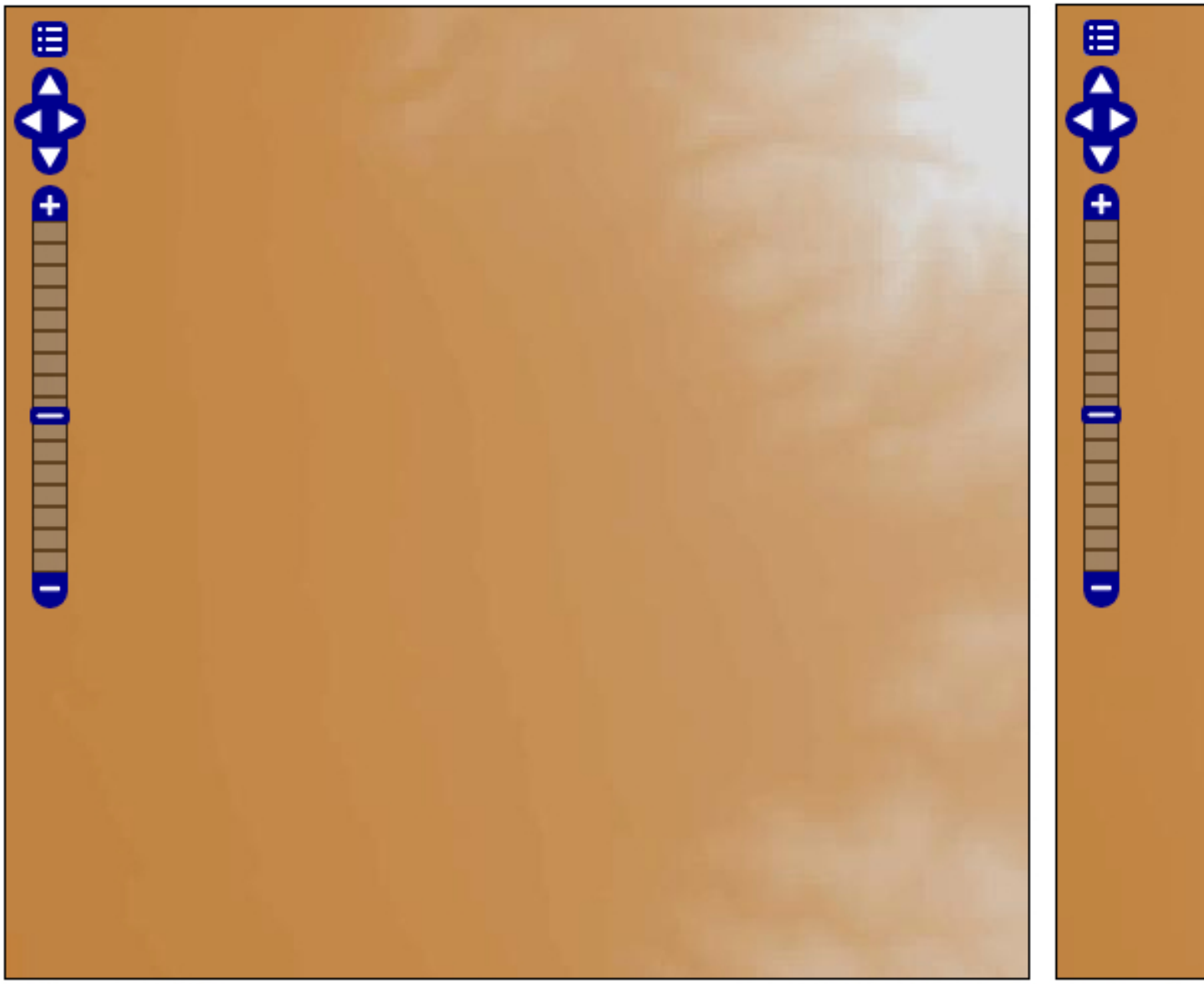




GeoServer GetLegendGraphic Documentation

Extend or Not To Extend?

```
<ColorMap type="ramp" extended="false">  = 256 colors in ramp
<ColorMap type="ramp" extended="true"> = 65536 colors in ramp
```



Opacity

Options for defining `opacity` appear in two places in the *raster symbolizer*.

At the level of the entire raster dataset

```
<Opacity>0.5</Opacity>
```

Within a `ColorMapEntry` for a specific color definition within a `ColorMap`

```
<ColorMap>
   <ColorMapEntry color="#000000" quantity="-500" label="nodata" opacity="0.0" />
   <ColorMapEntry color="#AAFFAA" quantity="0" label="0" />
   <ColorMapEntry color="#00FF00" quantity="1000" label="1000"/>
```

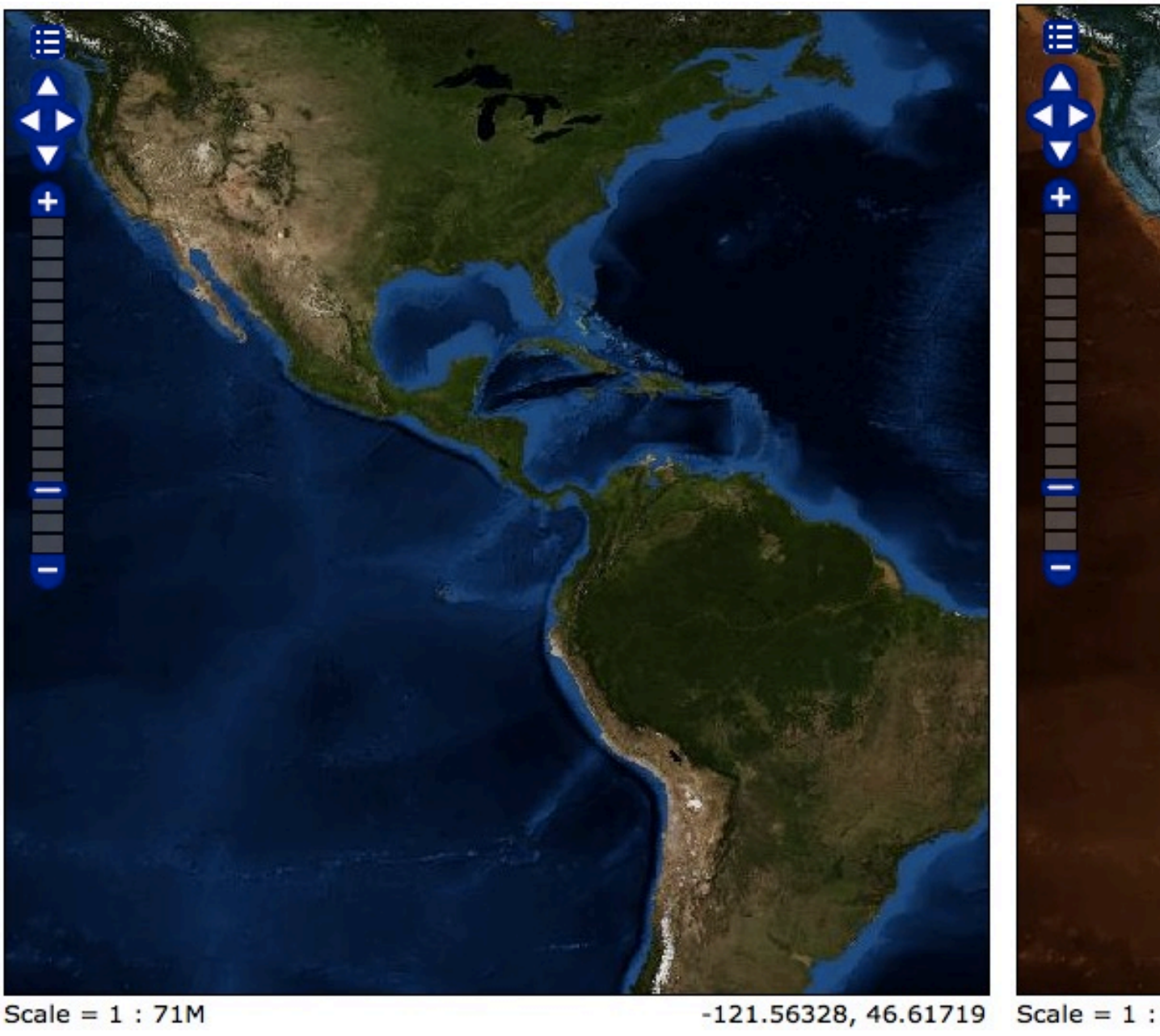
```
   ...
   <ColorMapEntry color="#FFFFFF" quantity="3500" label="3500" />
</ColorMap>
```

Channel Selection

Many raster datasets contain multiple *bands* of values which may be viewed individually or assigned to the colors *red*, *green*, and *blue* to generate a color image representing a combination of band values. GeoServer allows for the specification of a single band for display as a `GrayChannel` or three bands as `RedChannel`, `GreenChannel`, and `BlueChannel`.

```
<RasterSymbolizer>
 <Opacity>1.0</Opacity>
 <ChannelSelection>
  <RedChannel>
    <SourceChannelName>3</SourceChannelName>
  </RedChannel>
  <GreenChannel>
    <SourceChannelName>2</SourceChannelName>
  </GreenChannel>
  <BlueChannel>
    <SourceChannelName>1</SourceChannelName>
  </BlueChannel>
 </ChannelSelection>
</RasterSymbolizer>
```

Channel Selection - illustration



Contrast Enhancement

Some raster data may need adjustment to increase the contrast (the range between the darkest and lightest values) displayed. GeoServer provides three options for contrast enhancement, each of which have a different effect on the resulting image.

Histogram The values are stretched so that an equal number of pixels fall into each color in the range

Normalize The minimum and maximum brightness values are mapped to the minimum and maximum raster values

Gamma The image is brightened or darkened by a specified factor (negative numbers darken, positive numbers brighten)

Sample Contrast Enhancement SLD for Examples

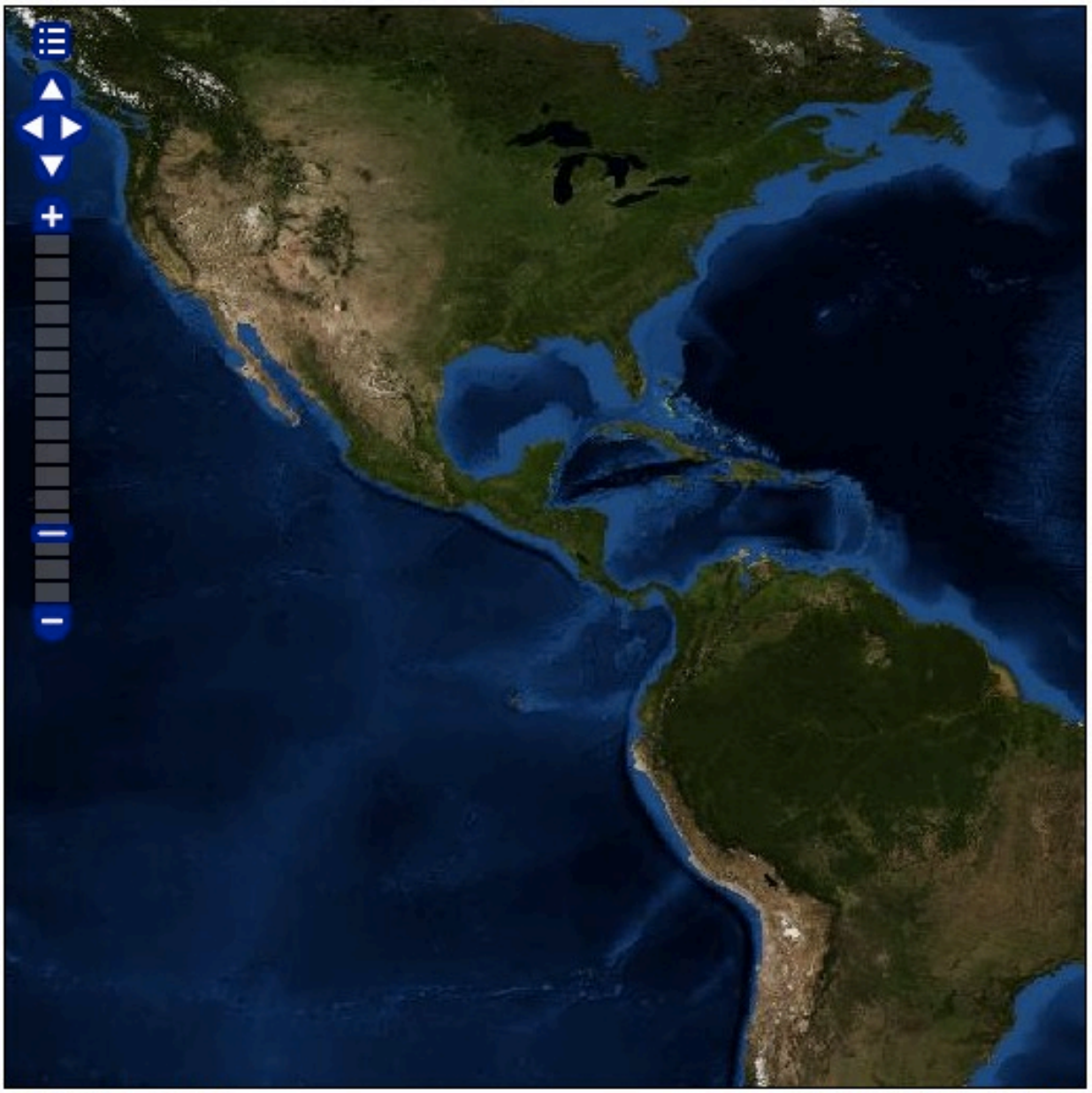
```
<RasterSymbolizer>
  <Opacity>1.0</Opacity>
  <ChannelSelection>
    <RedChannel>
      <SourceChannelName>1</SourceChannelName>
      <ContrastEnhancement>
      <Histogram/>
      </ContrastEnhancement>
    </RedChannel>
    <GreenChannel>
      <SourceChannelName>2</SourceChannelName>
      <ContrastEnhancement>
      <Histogram/>
      </ContrastEnhancement>
    </GreenChannel>
    <BlueChannel>
      <SourceChannelName>3</SourceChannelName>
      <ContrastEnhancement>
      <Histogram/>
      </ContrastEnhancement>
    </BlueChannel>
  </ChannelSelection>
</RasterSymbolizer>
```

Default - Normalize

```
<ContrastEnhancement>
  <Normalize/>
</ContrastEnhancement>
```

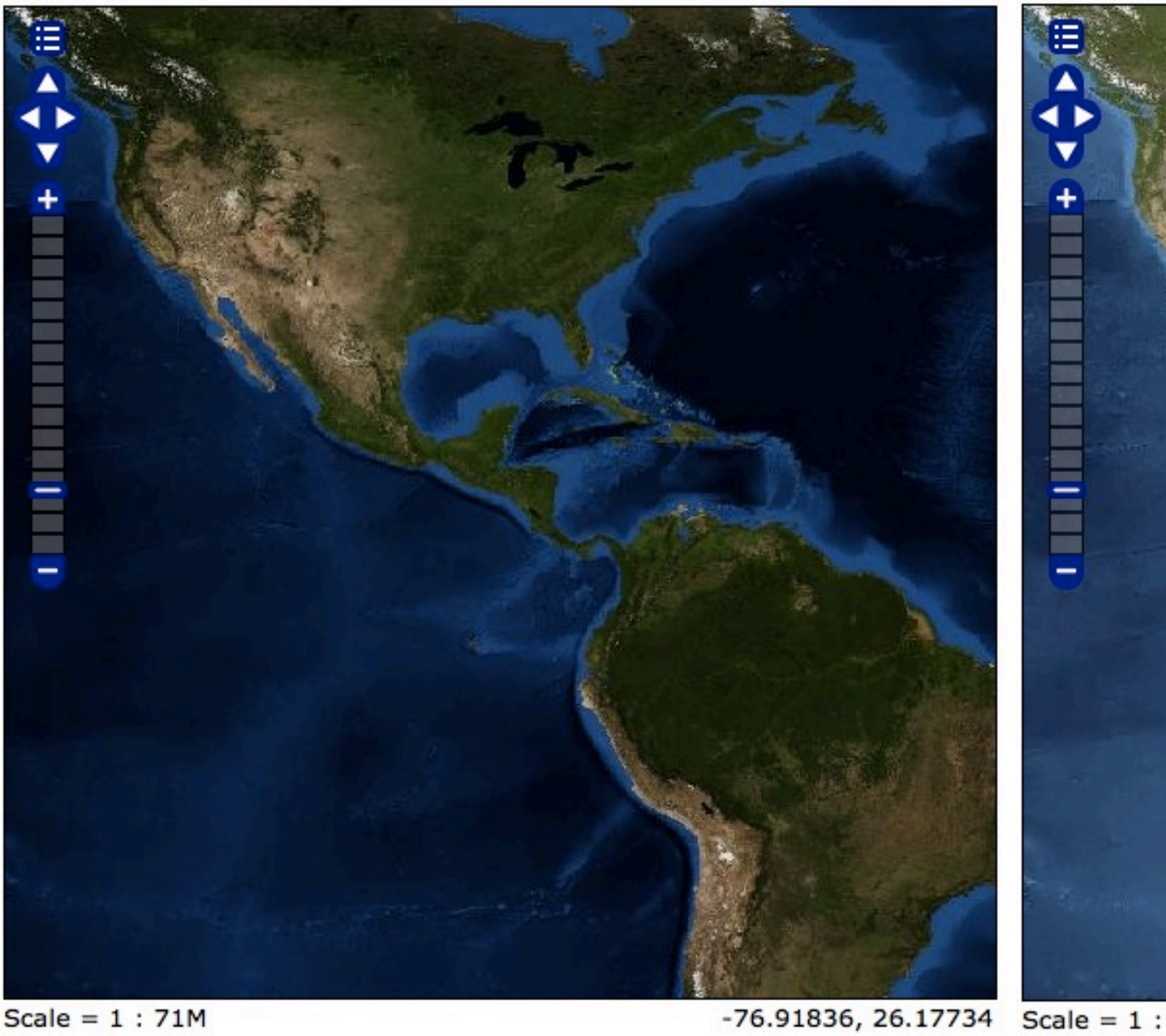
Default - Histogram

```
<ContrastEnhancement>
  <Histogram/>
</ContrastEnhancement>
```



Default - Gamma

```
<ContrastEnhancement>
  <GammaValue>.5</GammaValue>
</ContrastEnhancement>
```



GeoServer Demo/Q&A

Class GeoServer Instance: http://geog485.unm.edu:8080/geoserver/web/