

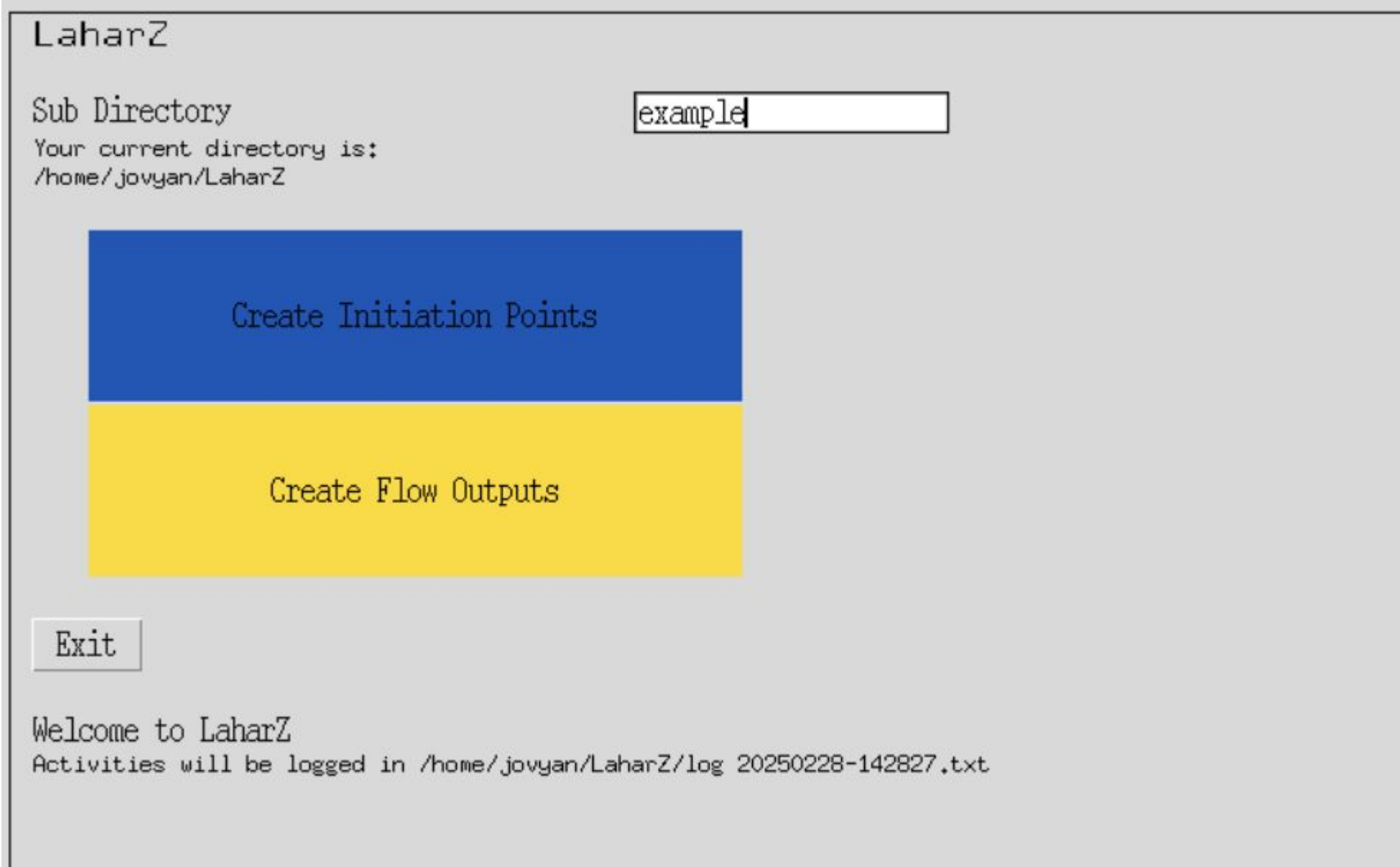


LaharZ Example

A) Model setup

1. Login to VICTOR through `hub.victorproject.org` in your browser
2. Choose a small machine
3. Once logged in, open a Terminal window, type `victor setup` and choose LaharZ
4. Copy the DEM of Mt Rainier named `Rainier.tif` from `~/shared/DEMs/NorthAmerica/` into the new folder `LaharZ/example`
5. Launch the Desktop using the  icon
6. Open a Terminal window on the desktop by clicking the  icon
7. Change directory into the folder `LaharZ` by typing `cd ~/LaharZ` in the terminal window and pressing enter.
8. Run the program by typing `python laharz.py` and pressing enter. A new window will appear.

In the GUI, type “example” for the folder name, and click **Create Initiation Points**



A) Creating initiation points:

1. Enter the input parameters for the initiation points
2. Click the “Initiation points” button
3. If asked, click “overwrite” button

Generate Initiation Points

DEM File	<input type="text" value="Rainier.tif"/>	Name of your DEM file in example
Stream and Flow Direction Files		
<input checked="" type="radio"/> Generate files		
<input type="radio"/> Use your own files		
<input checked="" type="checkbox"/> Fill DEM file		Check to fill the DEM file (recommended)
	Uncheck box to disable overwrite check	
Streams file	<input checked="" type="checkbox"/> <input type="text" value="MR-streams.tif"/>	Name of your streams file to be created in example
Stream Threshold	<input type="text" value="1000.0"/>	Threshold value for accumulation to form stream
Flow direction file	<input checked="" type="checkbox"/> <input type="text" value="MR-flowdir.tif"/>	Name of your flow direction file to be created in example
Determine Energy Cone Apex		
<input type="radio"/> Use Search File		
<input checked="" type="radio"/> Use Longitude/Latitude		
Apex	<input type="text" value="-121.75, 46.85"/>	Longitude, Latitude
Incremental Height	<input type="text" value="50.0"/>	Incremental height in metres
H/L Ratio	<input type="text" value="0.4"/>	H/L Ratio
Sea Level	<input type="text" value="0.0"/>	No initiation points will be created at sea level or below
<input checked="" type="checkbox"/> Plot Energy Cone Graphics		
	Uncheck box to disable overwrite check	
Energy Cone Graphics File	<input type="checkbox"/> <input type="text" value="MR_ec_cone.tif"/>	Name of the file for the energy cone graphics in example
Extent	<input type="text" value="1.5"/>	Extent to plot the energy cone/surface (1.3 = 130% of L)
Energy Cone Line File	<input type="checkbox"/> <input type="text" value="MR_ecline.tif"/>	Name of the file for the energy cone line in example
Proximal Hazard Zone File	<input type="checkbox"/> <input type="text" value="prox_hz_zn.gpkg"/>	Name of the file for the proximal hazard zone in example
Initiation Points File	<input type="checkbox"/> <input type="text" value="MR_ip1.gpkg"/>	Name of the file for the initiations points in example
<input type="button" value="Back"/>	<input type="button" value="Initiation points"/>	

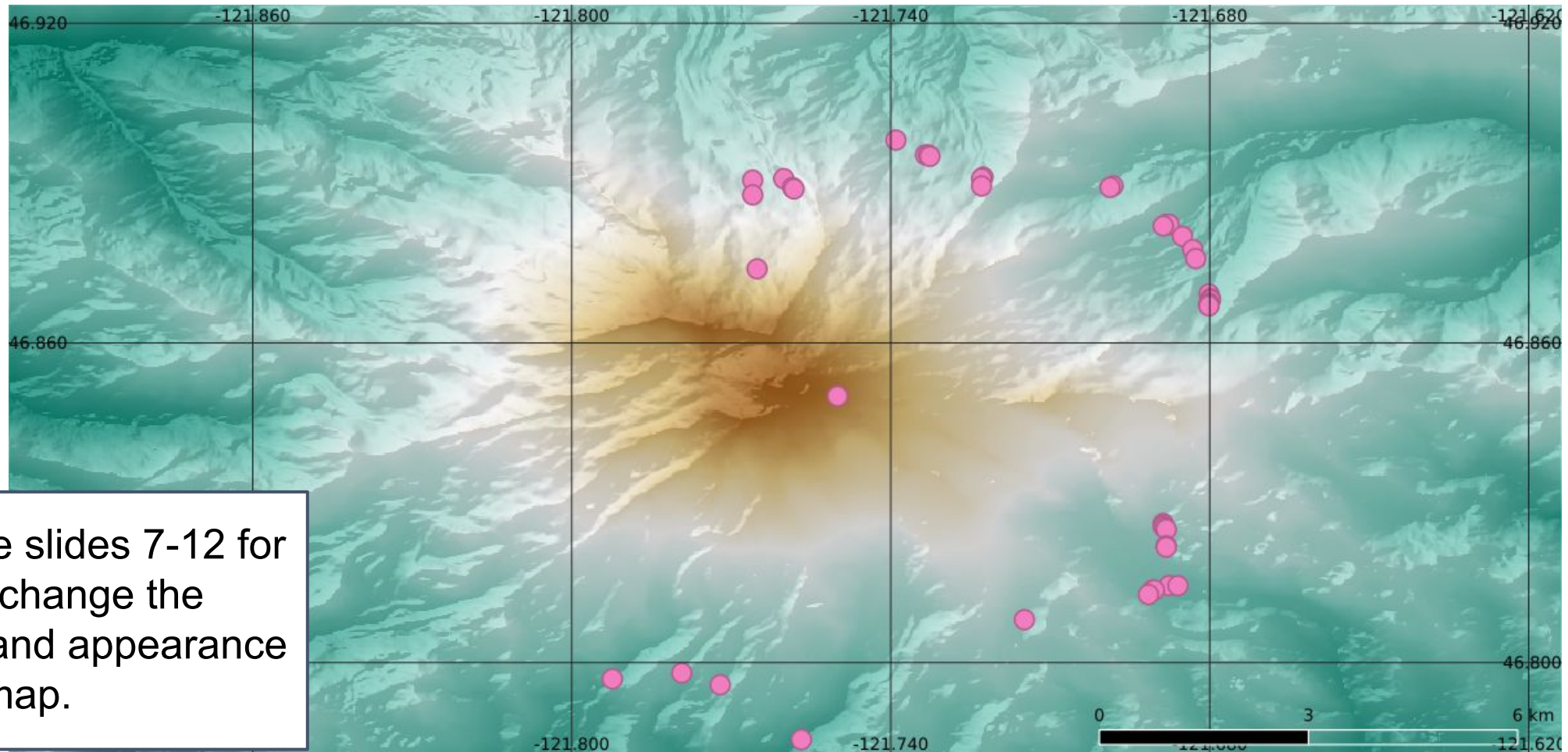
Visualization of Initiation Points

1. On the Desktop, open QGIS



2. Load the Mt Rainier DEM using “Layer->Add Layer->Add Raster Layer”

3. Add the initiation points just created using “Layer->Add Layer->Add Vector Layer” and loading the file MR_ip1.gpkg



! See slides 7-12 for how to change the colors and appearance of the map.

B) Run the flow model

- 1. In the GUI, click and run **Create flow outputs**
- 2. Enter the file names to use the results of the first step
- 3. Update flow parameters:
 - Change the Scenario to “Custom” and the Planar Area to 200.0 (note the .0)

Generate Flows

DEM File	<input type="text" value="Rainier.tif"/>	Name of your DEM file in example
Streams File	<input type="text" value="MR-streams.tif"/>	Name of your streams file in example (not used to generate flows)
Flow Direction File	<input type="text" value="MR-flowdir.tif"/>	Name of your flow direction file in example
Initiation Points File	<input type="text" value="MR_ip1.gpkg"/>	Name of the file with the initiations points in example
Volume(s)	<input type="text" value="1e4, 1e5, 5e5"/>	Volumes (m ³) in a list separated by commas
Scenario	<input type="text" value="Custom"/>	Name of the scenario to use
Cross sectional area: c 1	<input type="text" value="0.05"/>	Value of the c1 parameter
Planar Area c 2	<input type="text" value="200.0"/>	Value of the c2 parameter
Cross Sectional Area =	$c_1 V^{2/3}$	
Planar Area =	$c_2 V^{2/3}$	
Sea Level	<input type="text" value="0.0"/>	Flow will stop at sea level
Flow Output Directory	<input type="checkbox"/> <input type="text" value="MR_Lahars"/>	Directory for flow output raster files
Flow output vector file	<input checked="" type="checkbox"/> <input type="text"/>	File name for flow vector file

Volume(s)

Scenario

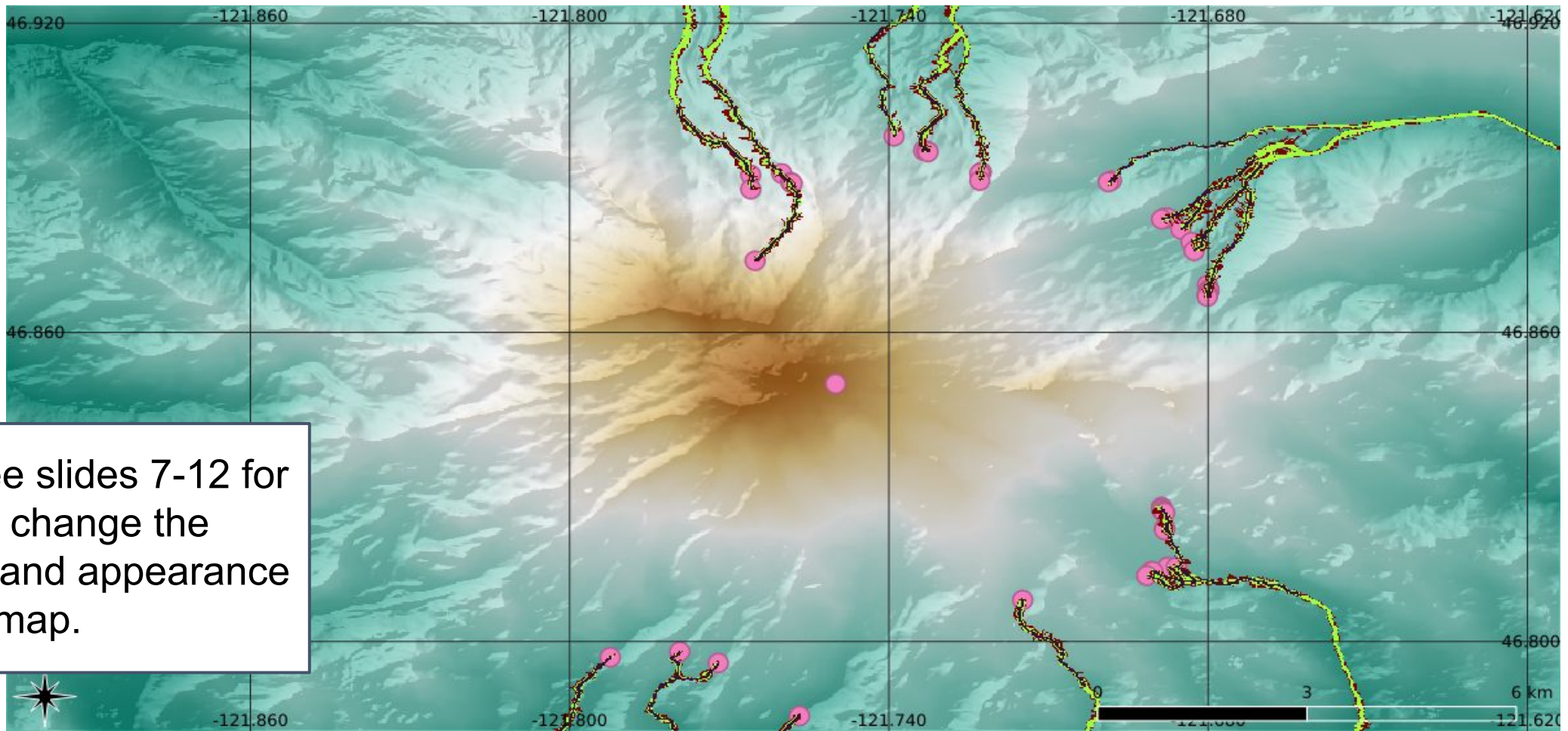
Cross sectional area: c 1

Planar Area c 2

- Lahar
- Debris
- Pyroclastic
- Custom

Visualization of flow outputs

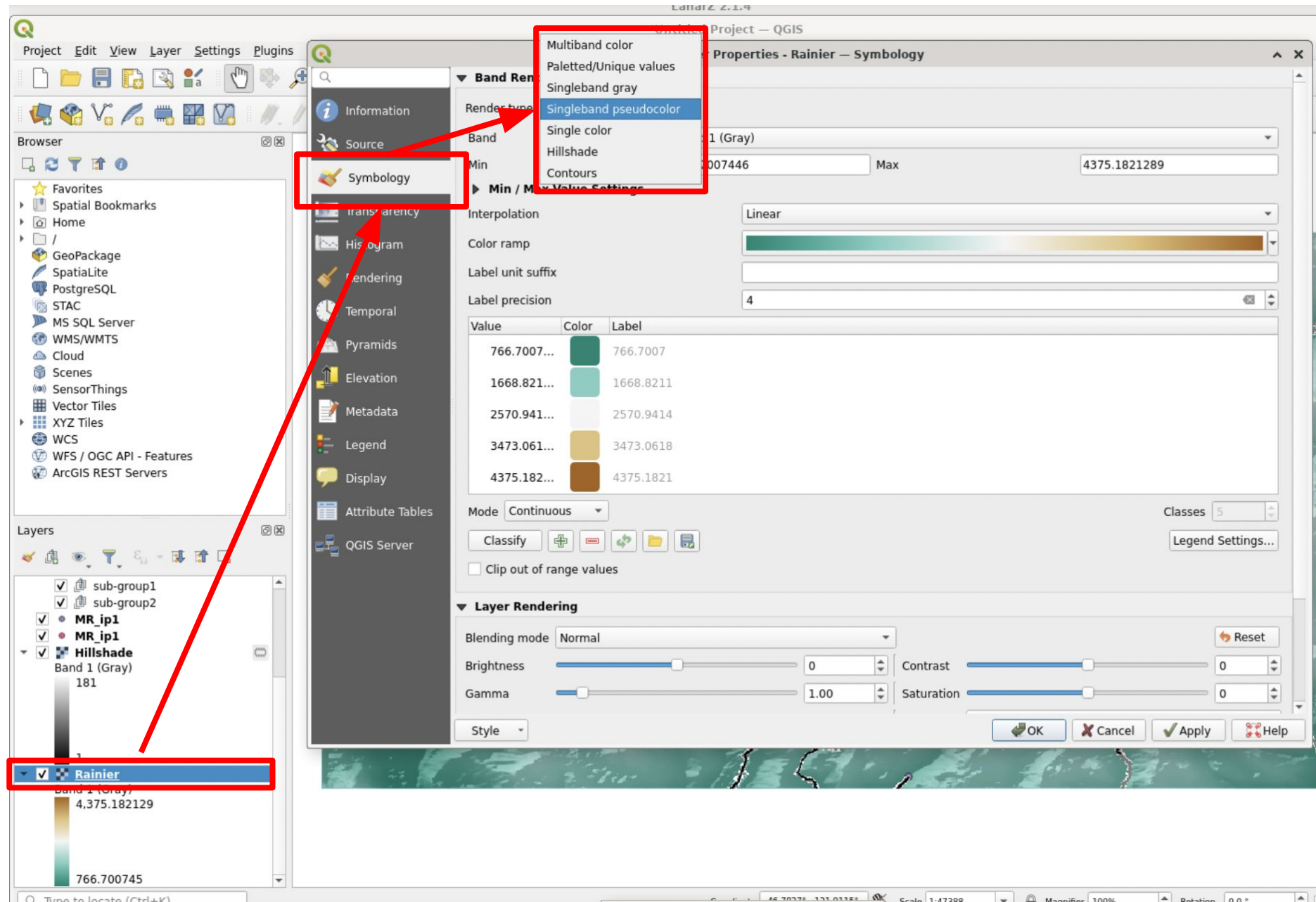
1. Return to your QGIS project
2. Add flow output tiff files from the results folder using Layer→Add Layer →Add Raster Layer and choosing the file total.tif from the MR_Lahars folder



! See slides 7-12 for how to change the colors and appearance of the map.

C) Adjust the visualization of the flow outputs: color

1. In the 'layers' panel at the bottom left of your QGIS screen, double click the Rainier layer.
2. A window will appear. From here, ensure you are in the 'symbology' tab from the list on the left of the window.
3. Change the drop down menu labeled "Render Type" at the top of the window to "Singleband Pseudocolor"



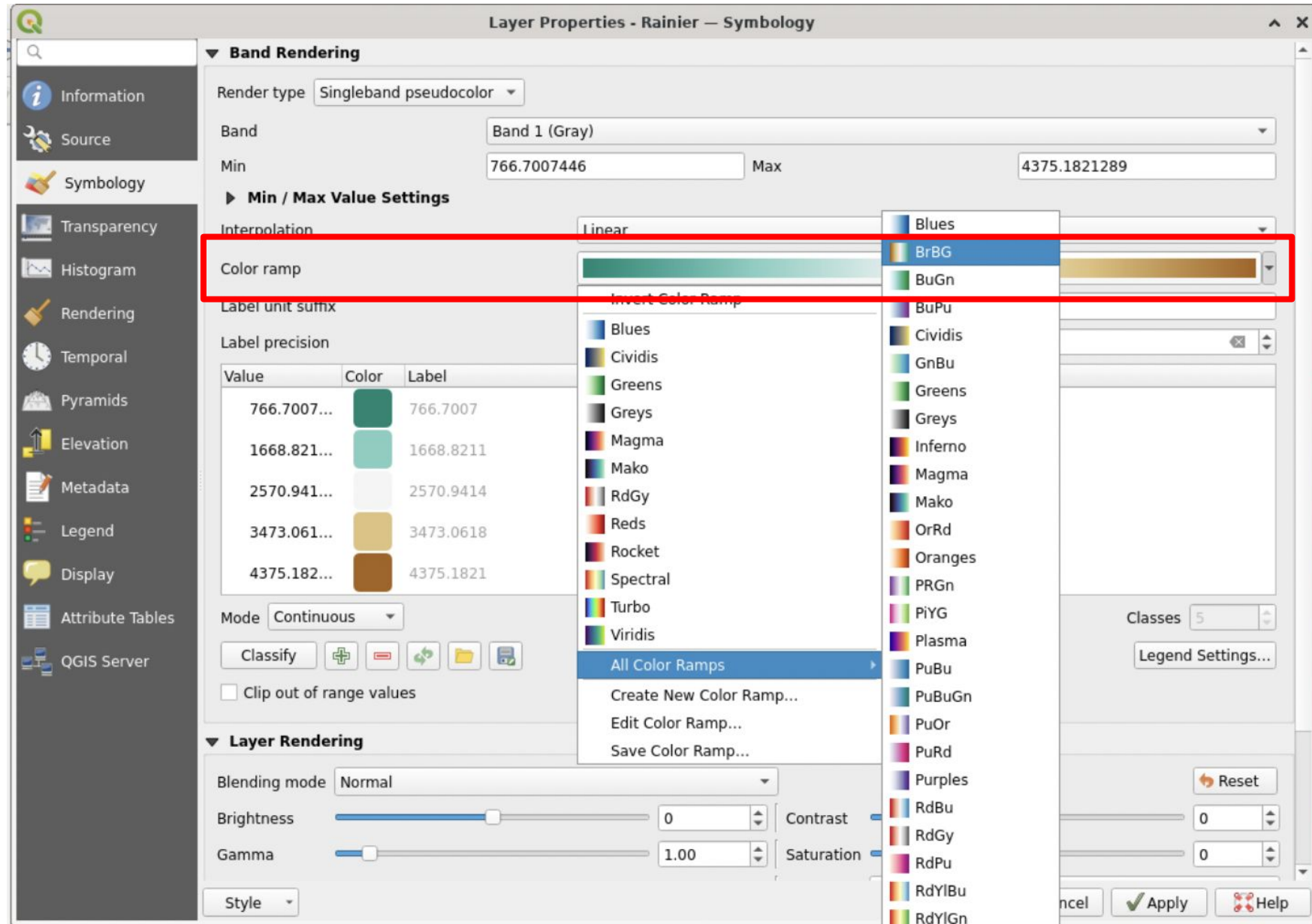
c) Adjust the visualization of the flow outputs: color

4. In order to match the example, click the arrow to the right of the 'color ramp' option.

5. Hover over 'All color ramps' from the list that appears and choose "BrBG."

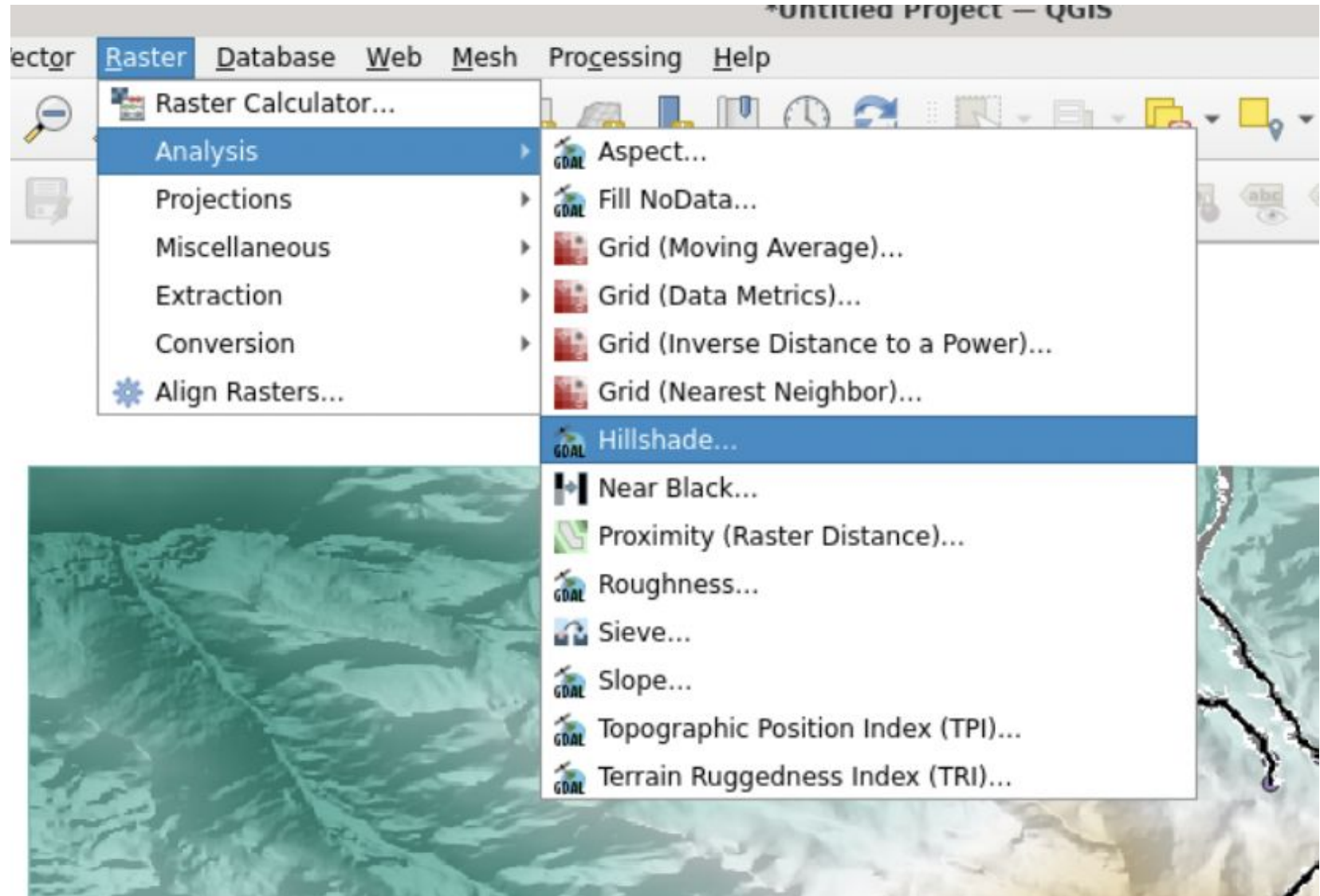
6. Click the arrow to the right of color ramp again and click 'Invert Color Ramp' at the top of the list that appears.

7. Click apply before closing the window.



d) Adjust the visualization of the flow outputs: topography

1. Navigate to the Raster menu item at the top of the window.
2. Hover over 'Analysis' and select 'Hillshade' from the list that appears.
3. After ensuring the DEM being used is `Rainier.tif`, select 'run' at the bottom of the window that appears.

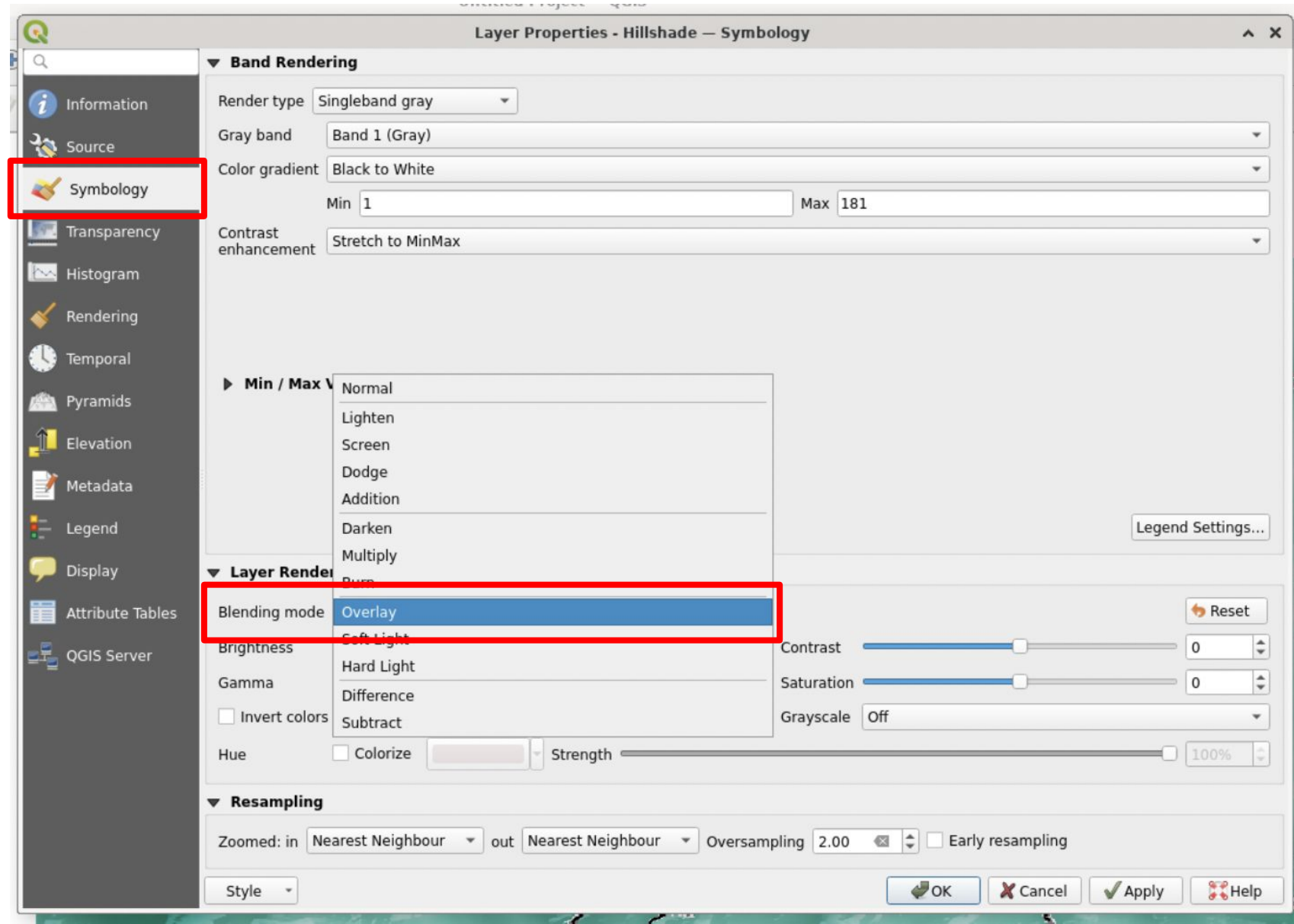


d) Adjust the visualization of the flow outputs: topography

4. Close the window and double click the new 'Hillshade' layer in the layers panel.

5. Ensure you are in the symbology tab. Open the dropdown menu under the "Blending Mode" option and select overlay.

6. Click apply at the bottom of the window



d) Adjust the visualization of the flow outputs: topography

7. Open the 'Transparency' tab in the same window.

8. Adjust the 'global opacity' slider to around 25%.

9. Click apply at the bottom of the window.

