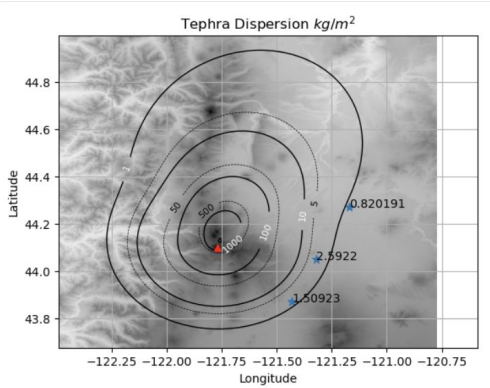
Running Tephra2 on VICTOR

1. Log into victor at `victor.2i2c.cloud`. We suggest using the smallest machine for this workflow.
2. Open a Terminal window, enter '`victor setup`' and then enter the number associated with Tephra2.
3. Open `tephra2.ipynb` inside the new folder that has been created within your home directory.
4. Run the installation cell to ensure you have the necessary tools to run the model.
5. Enter the coordinates of your volcano (with as much precision as possible):
   a. `vent_latitude, vent_longitude` = latitude and longitude values separated by a comma (ex: 44.1, -121.77)
6. Run cells to create the eruption parameter file. A DEM file for your specified volcano will appear in your home directory.
7. Provide some information about the eruption by specifying input parameters:
   a. `plume_height` = height in meters above sea level of the top of the plume (ex: 12000)
   b. `eruption_mass` = total mass of tephra produced in eruption (ex: 1e12 or 10000000)
   c. `median_grain` = median of the total grain size distribution for the eruption (ex: 1)
   d. `std_grain` = standard deviation of the total grain size distribution (ex: 1)

8. Optionally, update the additional parameters to make further specifications to the model. Running this cell as is will set these parameters to their default values.

9. Input parameters for your grid file (leaving these blank will set them to default values):
   a. `grid_radius` = distance around the volcano in meters (ex: [50,000])
   b. `grid_spacing` = spacing of grid file in meters (ex: [1,000])
   c. `elevation` = elevation in meters of grid, one constant value (ex: [1,500])
   d. `locations` = Provide coordinates (with as much precision as possible) of the locations you'd like to analyze tephra deposit at. Enclose each set of coordinates in brackets and separate them using commas. (ex: [[44.05,-121.32],[44.27,-121.17],[43.87,-121.43]])
10. Give date and time information to pull data for the creation of your wind file. Enter values as strings (wrapped in quotation marks), and then run the following cells to create your file.
11. Run the tephra2 model. This might take a few minutes. The model should say "completed" when finished running, with a return code of 0 showing a successful run.
12. Run the final cells to plot an isomass map using the model's assessment of tephra accumulation. Your locations of interest should be overlaid on the plot.



Visualize Tephra2 Output as a Raster Layer in QGIS

1. Open the Desktop 

from the Launcher page and then start QGIS. 

Option 1: Use Code to Create Raster Layer

1. Return to your `tephra2.ipynb` jupyter notebook. Run the cell containing VICTOR's "`points_to_raster()`" function to create a raster from the isomass output.
2. In QGIS, click `Layer -> Add Layer -> Add Raster Layer`, and select the converted .tif file that was just created. The default file path will be "`/home/jovyan/tephra2/tephra_out.tif`". Click `add` to save the layer.

Option 2: Use QGIS to Create Raster Layer

1. In QGIS, click `Layer -> Add Layer -> Add Delimited Text Layer`, and select the .csv output file that was created while running Tephra2. The default file path will be "`/home/jovyan/tephra2/tephra2.csv`".
   a. Under `File Format`, select "`Custom`" and then check "`Space`"
   b. Set `x` to "`Easting`," `y` to "`Northing`," and `z` to "`Elevation`"

2. Select `Processing` -> `Toolbox` -> `Interpolation` -> `IDW` or `TIN Interpolation`.
   a. Add the tephra2 point data as the input layer and `km/m^2` as the interpolation attribute.
   b. Use the arrow to calculate extent from the points layer.
   c. Set the resolution to a reasonable value (ex: 1,000m in each direction).
   d. Provide a filename for the output. Without a filename, the function will fail.

3. Once the function is finished running, which might take a few minutes, load the new layer.
   a. Click `Layer -> Add Layer -> Add Raster Layer`, and select the new file that was just created.