Exercise 4A Point to nearest point:

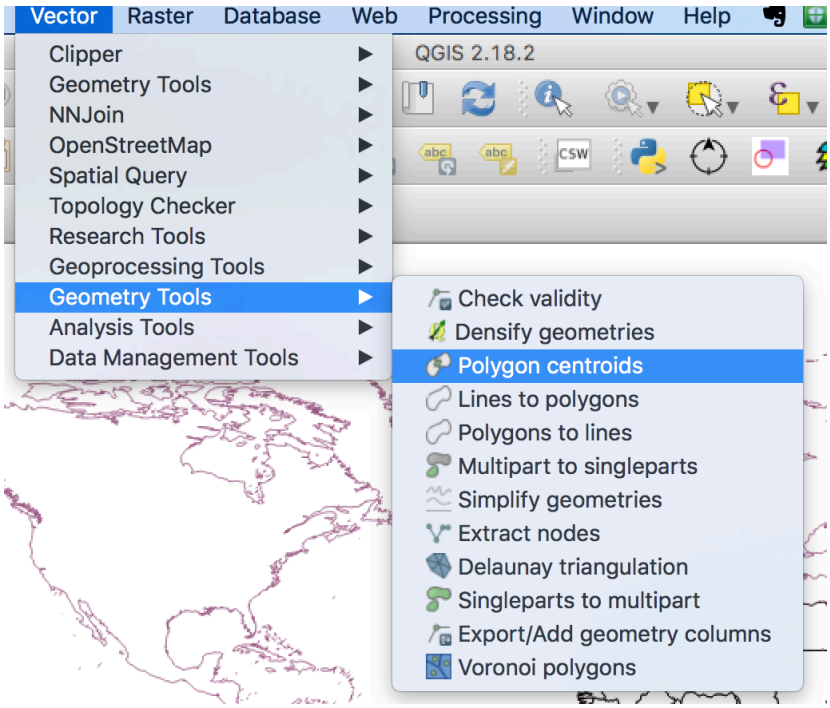
1. From folder Exercise 4 load

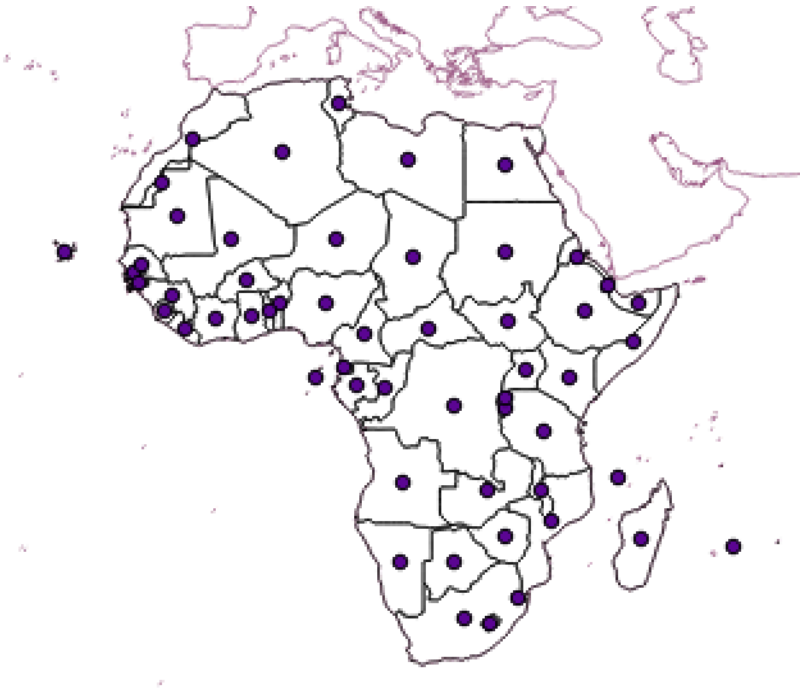
   - African Countries
   - Landing_Stations
   - Cables

2. Check CRS

3. Calculate Centroids

   Vector|Geometry Tools | Polygon Centroids

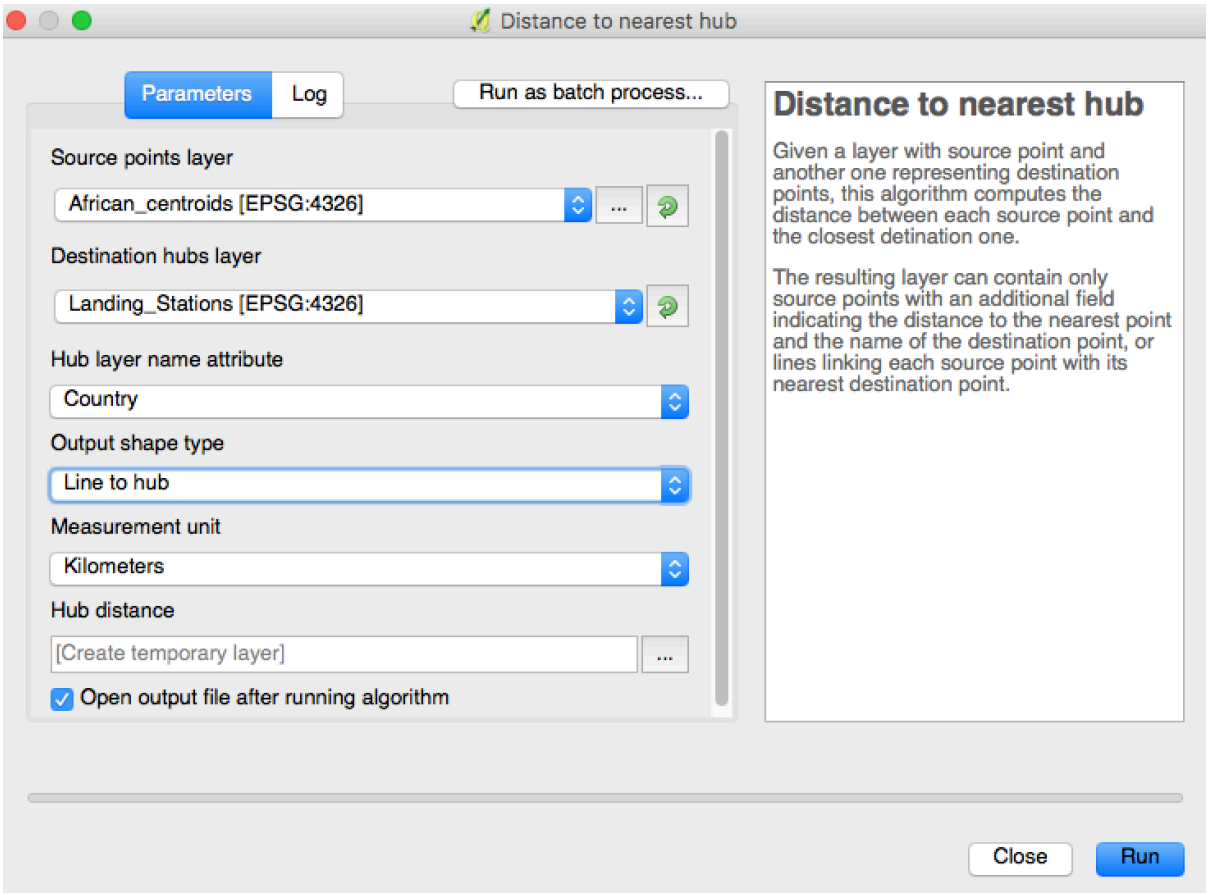




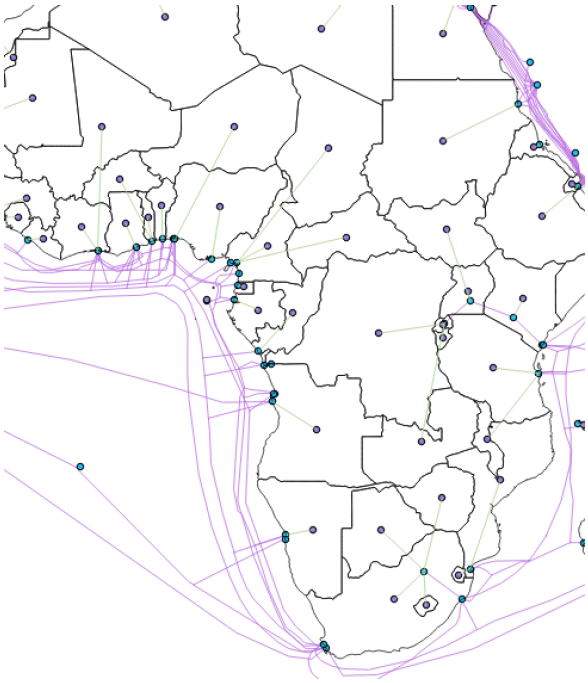
4. Save new Layer as African_centroids

5. Use the “Distance to nearest hub” tool to find the nearest point on the nearest landing station.

   Processing | Search for “Distance to nearest hub”

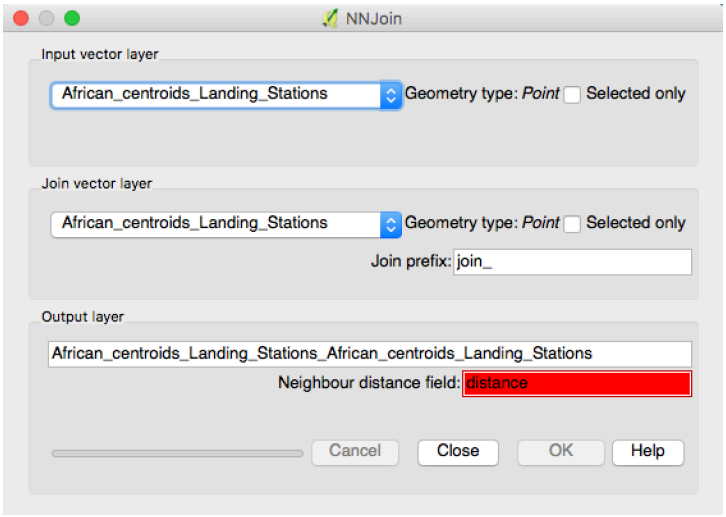


6. This creates the new layer “Hub distance”



7. Check the attribute Table of Hub Distance. Does it contain all the information we need?

8. Use the NNjoin plugin



9. Check the attribute table.

DIY Exercise 4B Distance Matrix:

1. From folder Exercise 4 load

   - KEN_adm2

2. Generate Centroids

3. Save Centroid Layer

4. Calculate Distance Matrix

   Vector | Analysis Tools | Distance Matrix

   Note (Distance is in degrees) You could multiply distance in degrees by 111. This is the conversion rate between degrees and kilometres at the equator.

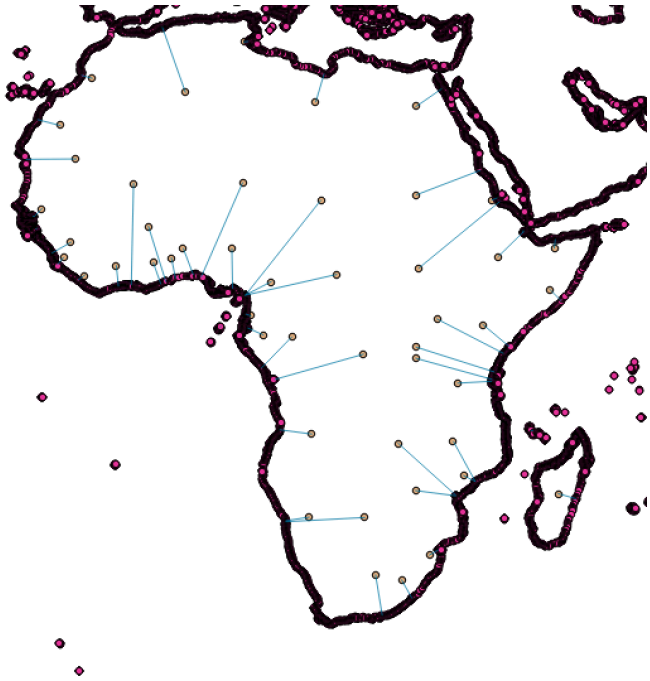
Exercise 4C Point to nearest polyline:

1. From folder Exercise 4 load

   - African Countries
   - 10m coastline

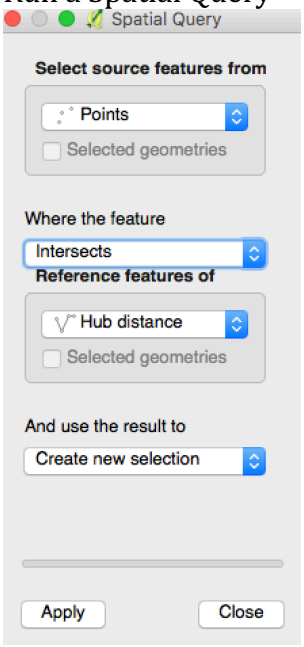
2. Convert Coastline polylines to points.
   Processing | Search for “Convert lines to points

3. Use Distance to Hub tool

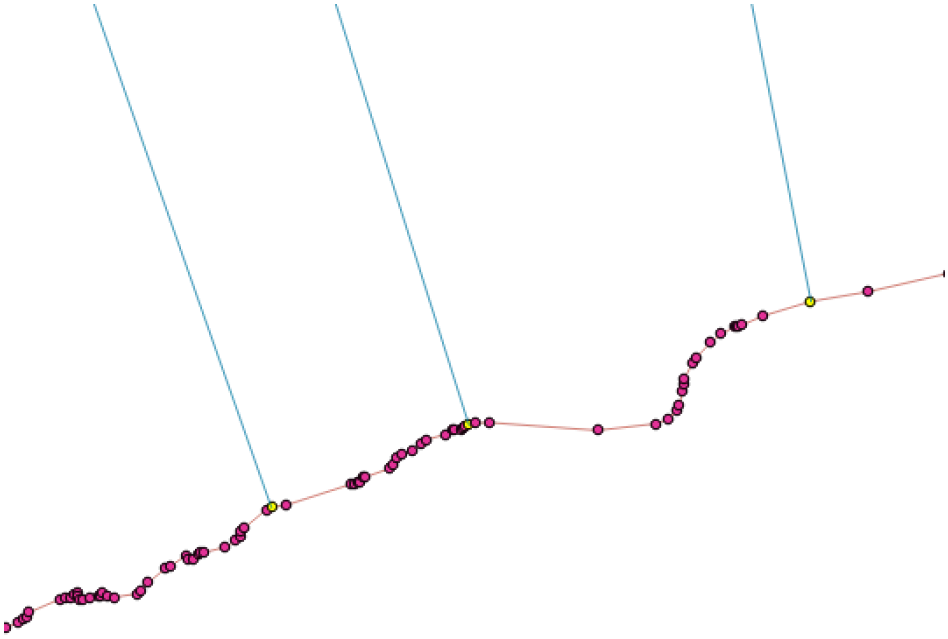


4. We only need the points on the coast that are the nearest to the respective country's capital.

Run a Spatial Query



5. Zoom in



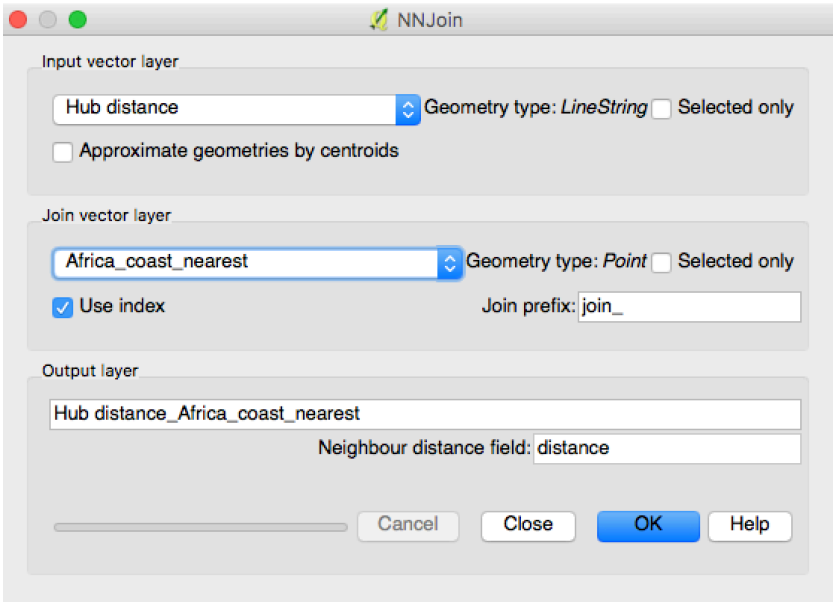
6. Save as “Africa_coast_nearest”

   Save only selected features

7. Add coordinates of each point (required if you want to calculate distance to Slave Trade centers later on, in stata?)

   Vector | Geometry Tools | Export/Add Geometry Tools

8. Use NNjoin to join information from the country_centroids


NNJoin
Input vector layer
Hub distance
Geometry type: LineString
Selected only
Approximate geometries by centroids
Join vector layer
Africa_coast_nearest
Geometry type: Point
Selected only
Use index
Join prefix: join_
Output layer
Hub distance_Africa_coast_nearest
Neighbour distance field: distance
Cancel
Close
OK
Help

9. Save layer.

Exercise 4D Buffer:

1. From folder Exercise 4 load

   - Kenya Schools

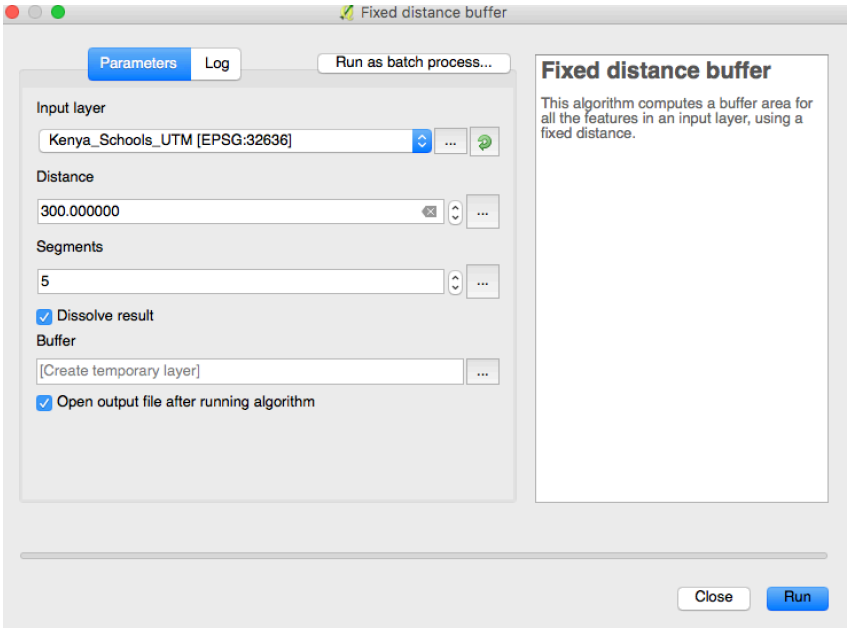
2. Change CRS to projected CRS WGS 1984 / UTM 36 N

   Find fitting UTM zone for your area here
   http://www.dmap.co.uk/utmworld.htm

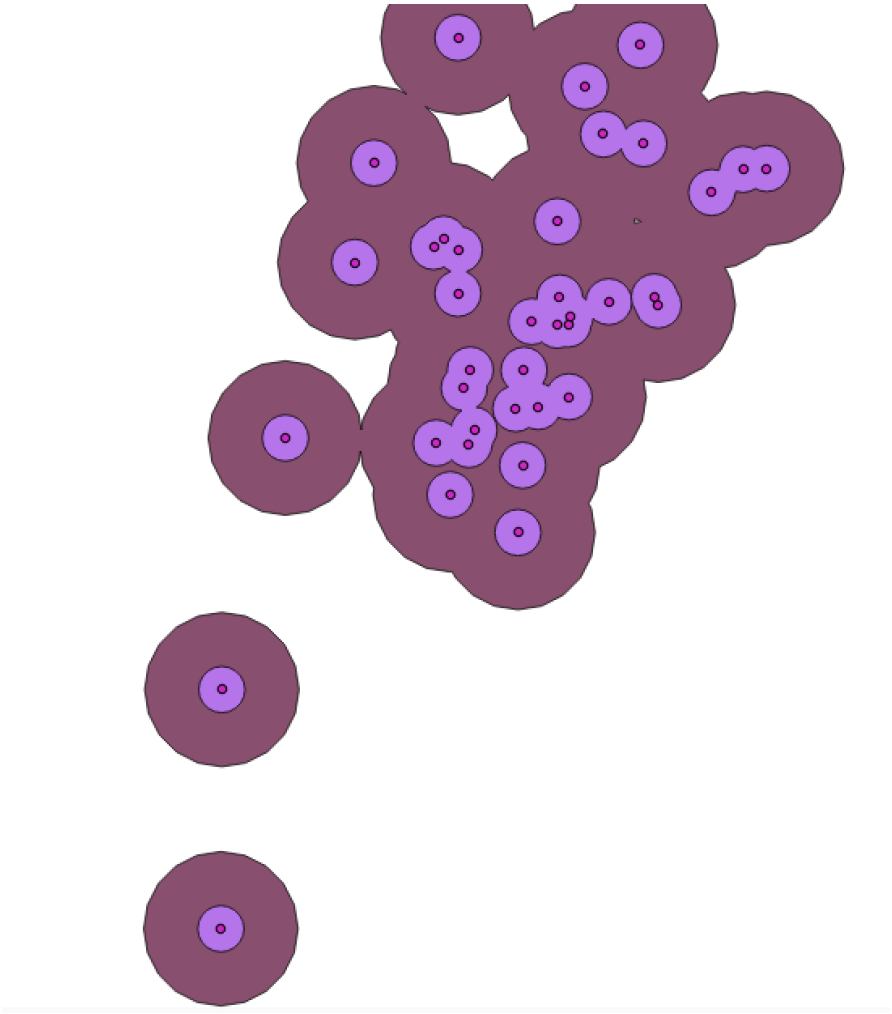
   Save Layer and Change CRS

   Change CRS of the Project as well

3. Vector | Geoprocessing Tools | Fixed Distance Buffer



   Create 1 Buffer with a radius of 300 and one with a radius of 1000 (in meters)



Exercise 4e Map Algebra – Calculating Ruggedness:

There are many differente Terrain ruggedness measures.
http://gis4geomorphology.com/roughness-topographic-position/

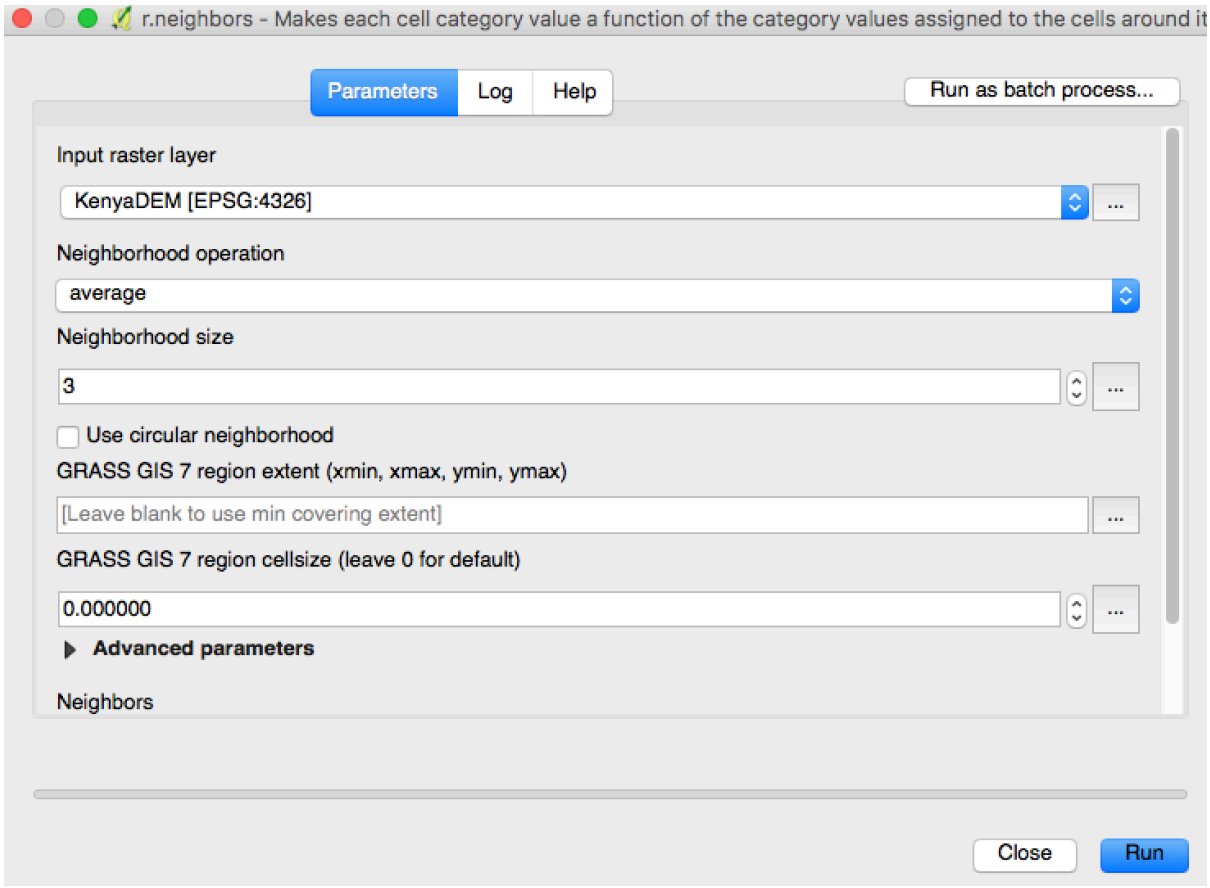
For this exercise we are gong to calculate the Relative Topographic Position

RTP = (DEMmean – DEMmin)/(DEMmax-DEMmin)

1. From folder Exercise 4 load
   - raster KenyaDEM
   - vector KEN_adm2

2. Calculate Focal statistics using the processing tool r.neighbours

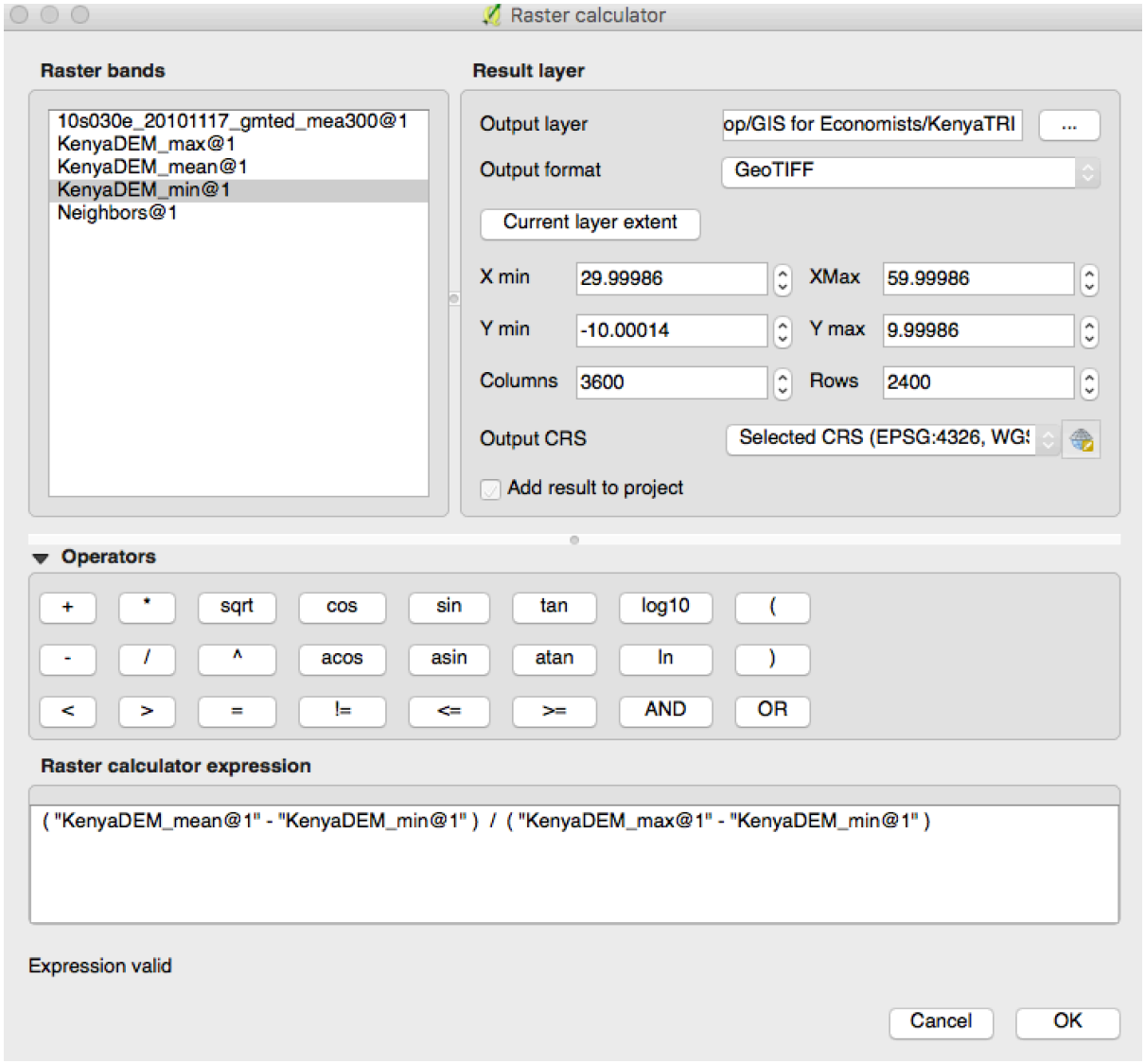
   Processing | search for "r.neighbours"



   Calculate 3 new raster

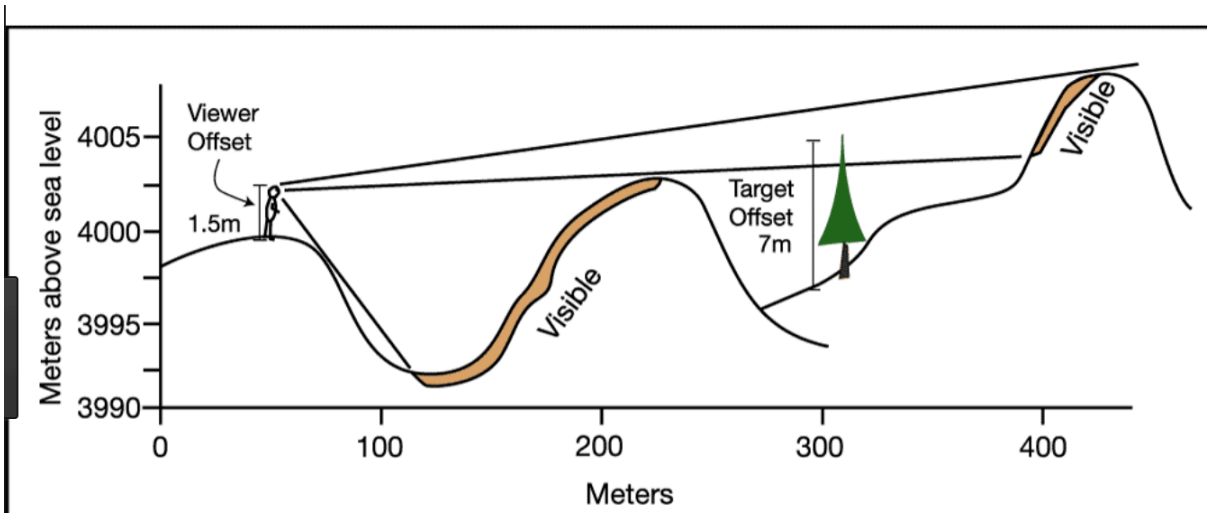
   KenyaDEM_min, KenyaDEM_max, KenyaDEM_mean

3. Use the Raster Calculator to calculate the RTP



4 F. Viewshed Analysis (Preliminary Beta version)

Goal: Identify Areas with mobile phone coverage. Combine information about the location of Telecomm towers, their range and their height with DEM in a viewshed analysis:

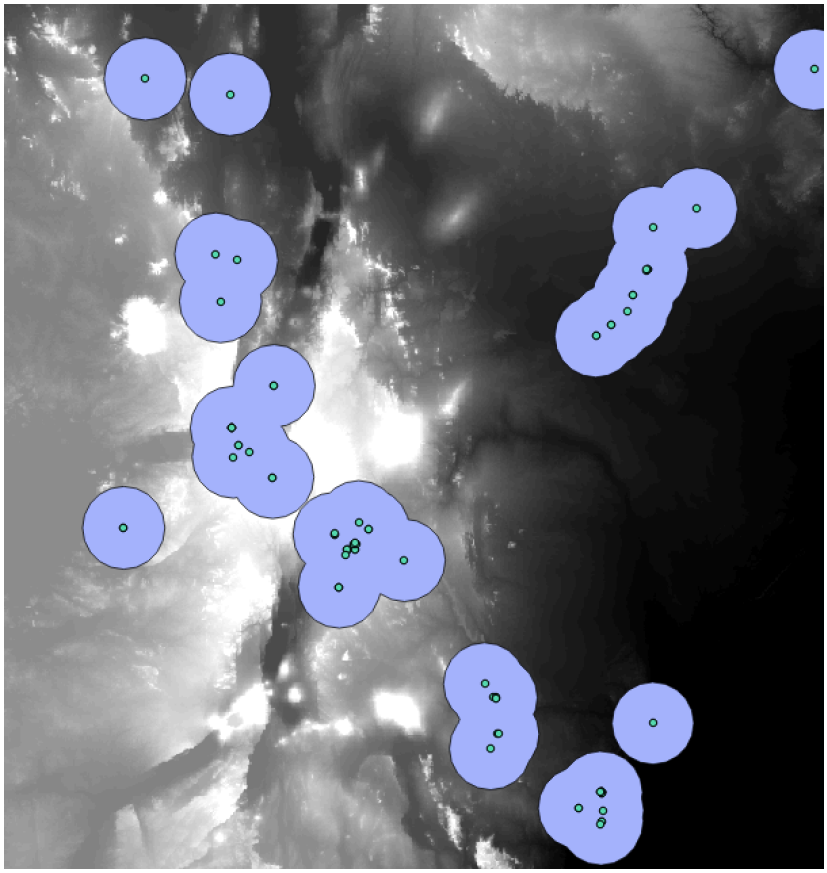


Source: http://mapaspects.org/

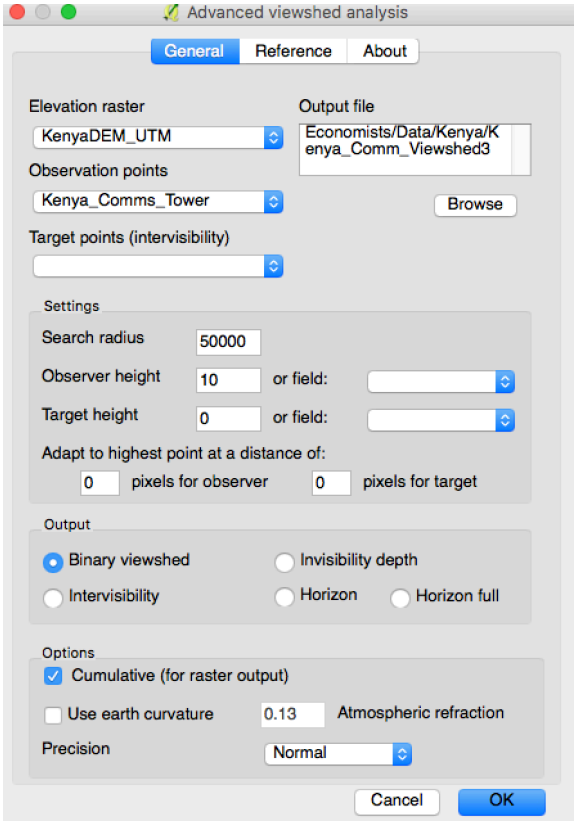
1. From folder Exercise 4 load
   - raster KenyaDEM
   - vector Kenya_Comms_Tower

2. Change Projection to WGS 84 / UTM N 36

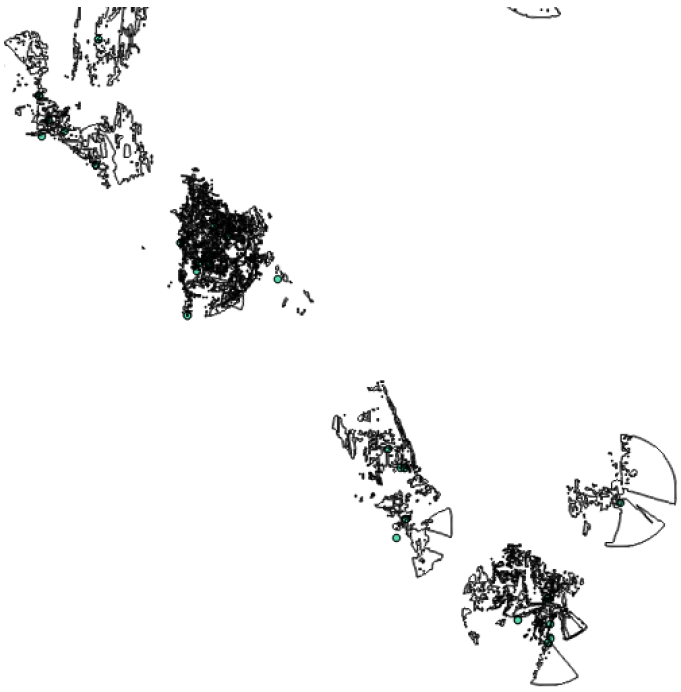
3. Create Buffer with 50km radius



4. Install Plugin “Viewshed Analysis”
5. Plugins |Viewshed Analysis |Viewshed Analysis
6. Choose observer height and search radius



7. New output is raster.

8. Convert raster to vector.

   Raster | Conversion | Polygonize