

Hands-on
Shoreline Change Mapping

Training Course on
"Geospatial Techniques for Coastal Mapping and Monitoring "
26-30 November, 2018

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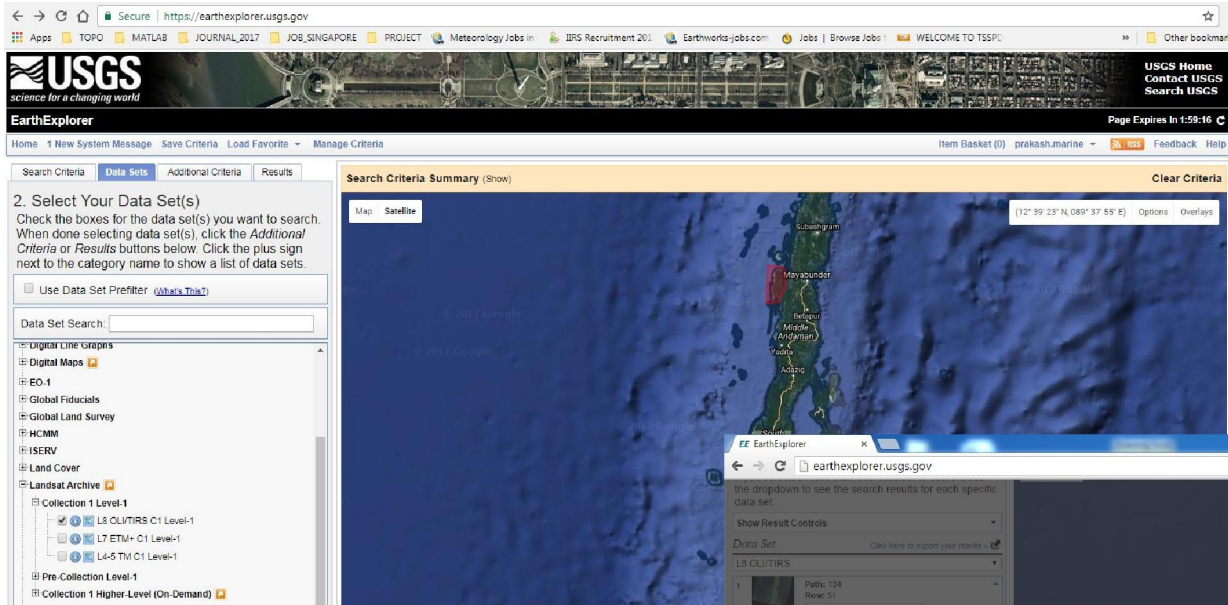


Over view of Course

- Download Two period landsat data (Landsat ETM+ (15, Nov 2000) and Landsat 8 LOI (26 Feb 2018))
- Digitize two period shoreline with suitable band combination
- Create Transect and calculate shoreline change rate along the transect line.
- Generation of Shoreline Change map and calculation of Statistics

Download Landsat data

Go to <http://earthexplorer.usgs.gov/> and create new user account (login) → Landsat Archive → set search criteria based on user place and accusation time of Landsat data → Download tar file from Archive



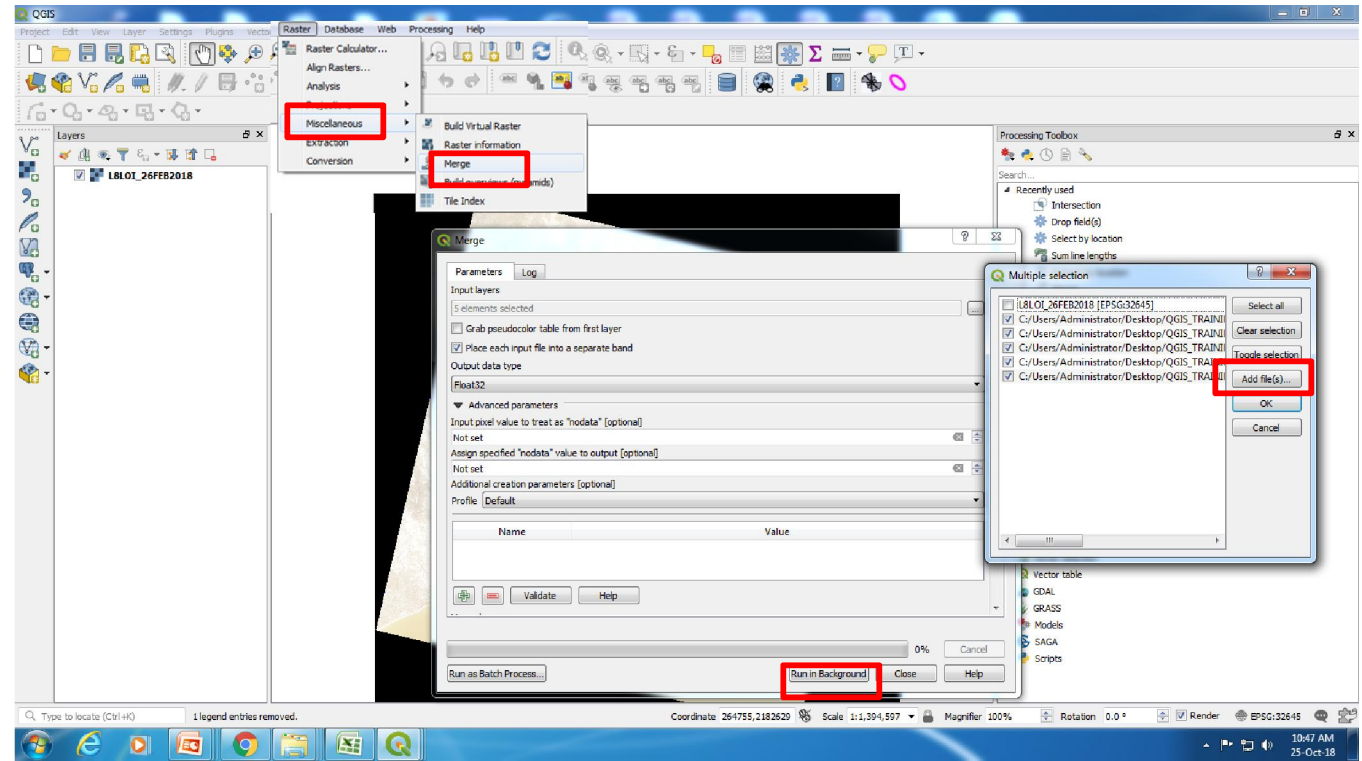
The screenshot shows the Earth Explorer website interface. The top navigation bar includes the USGS logo and the text "science for a changing world". The main content area is titled "Search Criteria Summary (Show)" and "Clear Criteria". On the left, there is a section titled "2. Select Your Data Set(s)" with instructions: "Check the boxes for the data set(s) you want to search. When done selecting data set(s), click the Additional Criteria or Results buttons below. Click the plus sign next to the category name to show a list of data sets." Below this, there is a "Data Set Search" input field and a list of data set categories. The "Landsat Archive" category is expanded, showing "Collection 1 Level-1" with sub-items: "L8 OLI/TIRS C1 Level-1", "L7 ETM+ C1 Level-1", and "L4-5 TM C1 Level-1". The "L8 OLI/TIRS C1 Level-1" item is selected. The main map area shows a satellite view of a region with labels for "Subangram", "Meyazunder", "Beligaur", "Mirgaur", "Ardipaur", "Vidhi", and "Aadha". The map coordinates are (12° 59' 23" N, 089° 47' 55" E). A "Download Options" dialog box is open on the right, showing a list of download options: "LandsatLook 'Natural Color' Image (4.8 MB)", "LandsatLook 'Thermal' Image (1.7 MB)", "LandsatLook 'Quality' Image (1.0 MB)", "LandsatLook images with Geographic Reference (7.6 MB)", and "Level 1 GeoTIFF Data Product (772.9 MB)". A "Save As" dialog box is also open, showing the file name "LC08_34051301520546400.tif" and the save type "WinRAR archive".

Download Landsat 8 LOI Label-1 product data set on dated 26-Feb-208 image > Unzip file

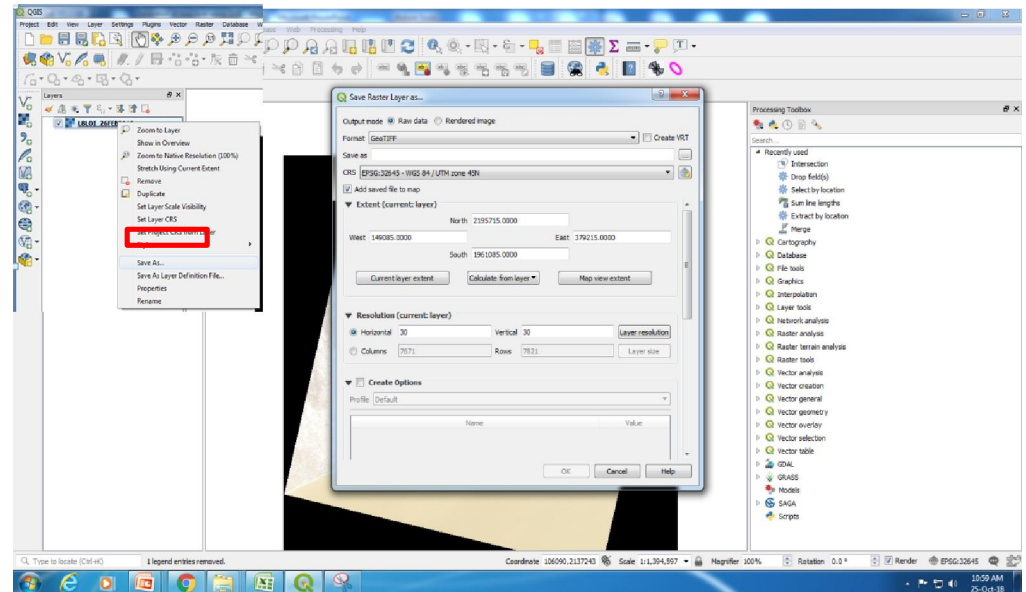
Band Configuration of Landsat 8 LOI

Bands	Wavelength (micrometers)	Resolution (meters)
Band 1 - Ultra Blue (coastal/aerosol)	0.435 - 0.451	30
Band 2 - Blue	0.452 - 0.512	30
Band 3 - Green	0.533 - 0.590	30
Band 4 - Red	0.636 - 0.673	30
Band 5 - Near Infrared (NIR)	0.851 - 0.879	30
Band 6 - Shortwave Infrared (SWIR) 1	1.566 - 1.651	30
Band 7 - Shortwave Infrared (SWIR) 2	2.107 - 2.294	30
Band 8 - Panchromatic	0.503 - 0.676	15
Band 9 - Cirrus	1.363 - 1.384	30
Band 10 - Thermal Infrared (TIRS) 1	10.60 - 11.19	100 * (30)
Band 11 - Thermal Infrared (TIRS) 2	11.50 - 12.51	100 * (30)

Band composite:

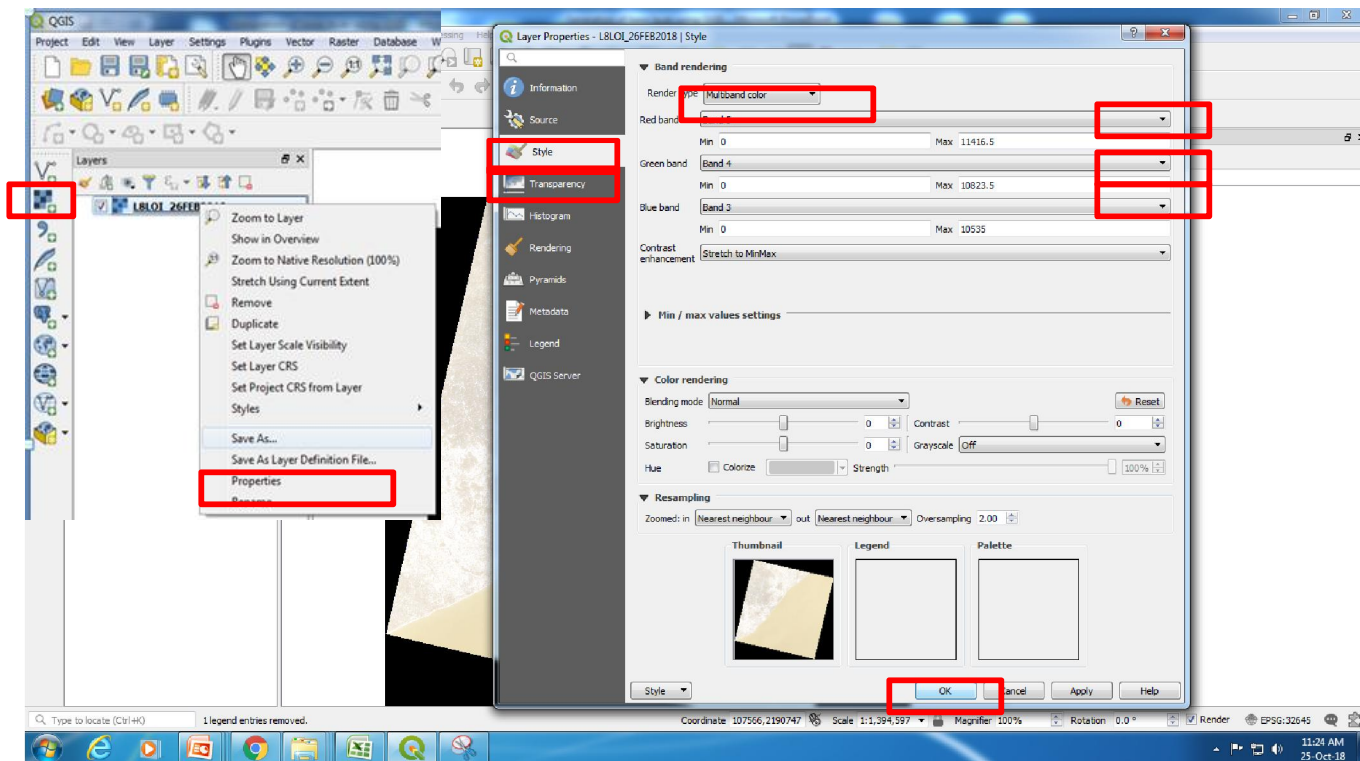


Create composite image: Go to Raster> Miscellaneous> merge> click layer input>multiple selection window will popup then add file of Band-1 to band-5 from working folder > check on input file into separate file> click on run background then it will run and layer stack file will store in temp folder.
Save file: right click and click on save as > new window will pop-up> save file.

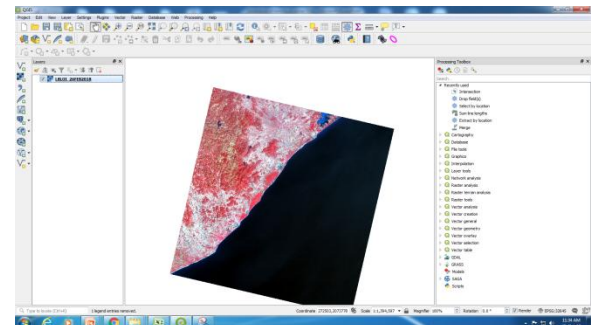


Create the FCC composite band for display

Open raster file> Right click on file> properties > Render type as multi-band color> assign Red band into B5,green into B4 and Blue into B3.> OK

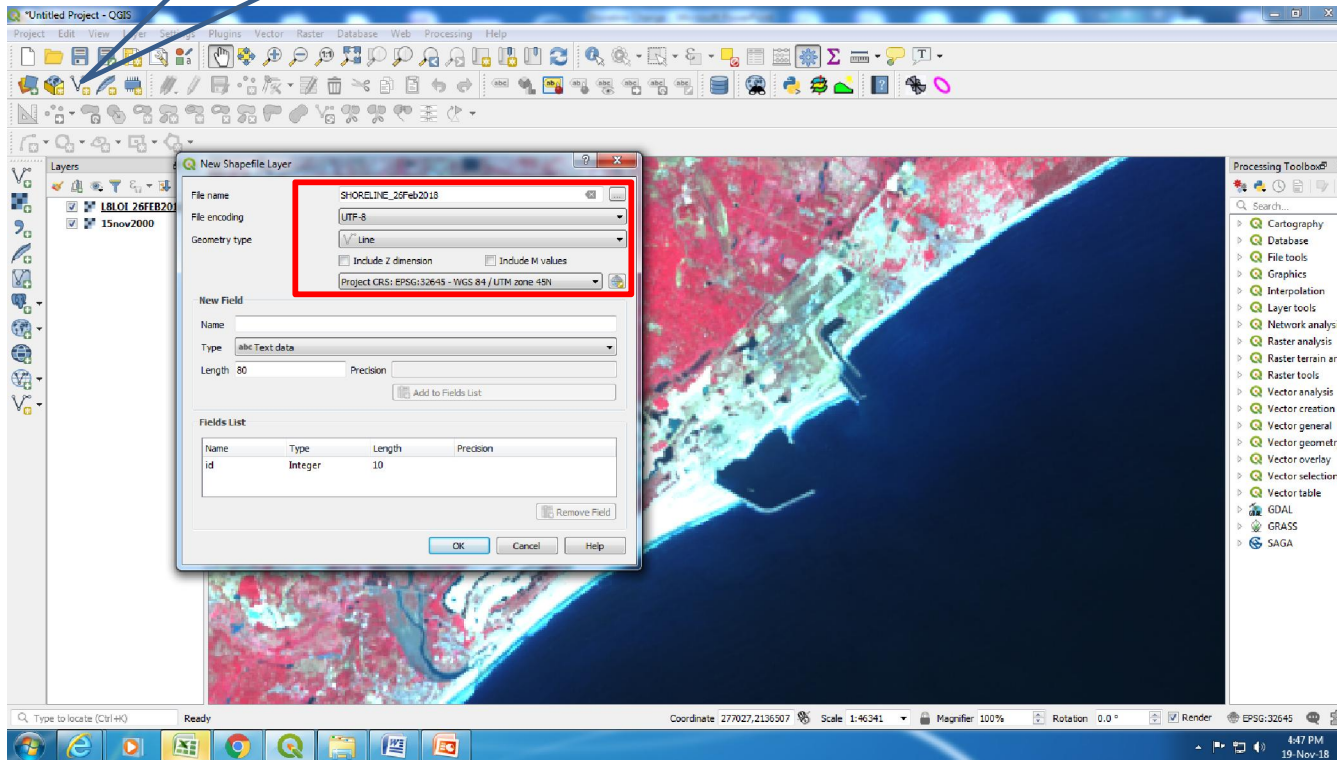


Click on transparency> additional no data value is 0
Now it will display FCC image.

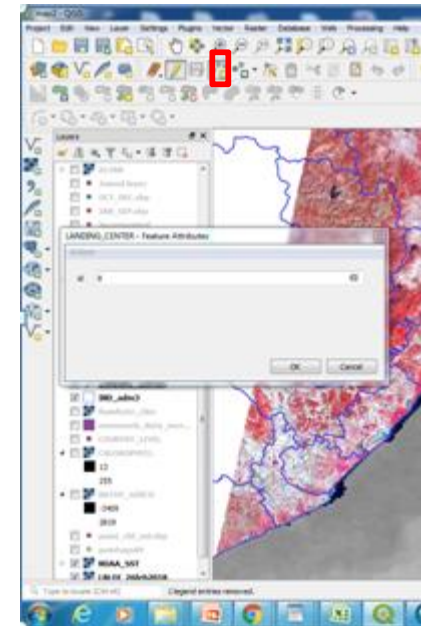


Digitize shoreline

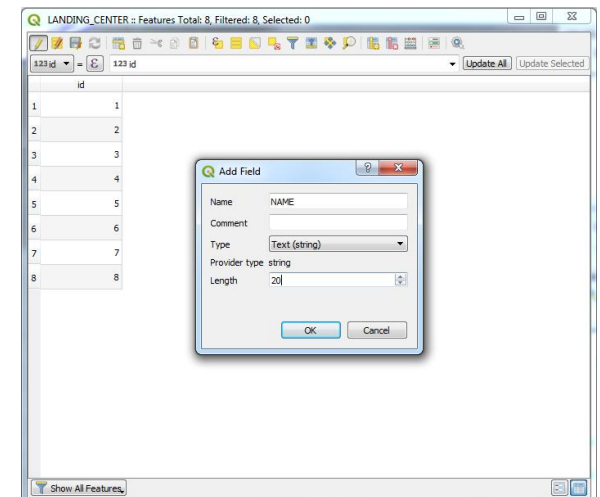
Click to create new layer



Add new line



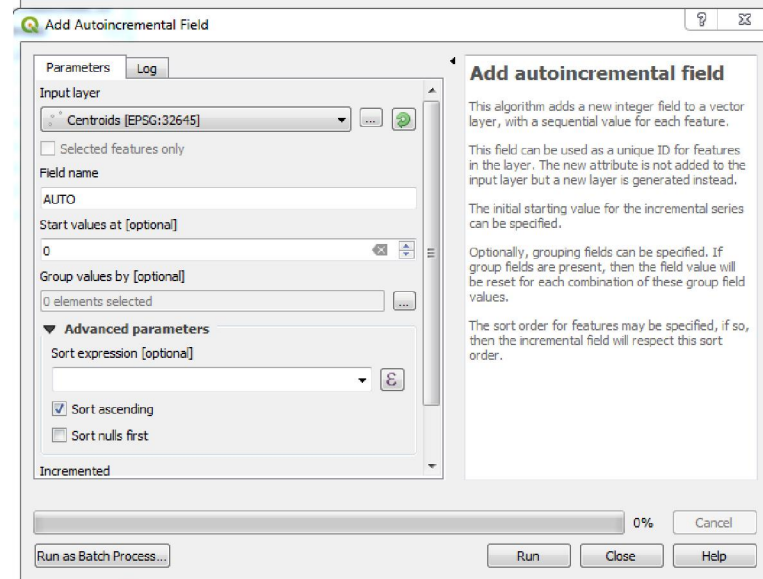
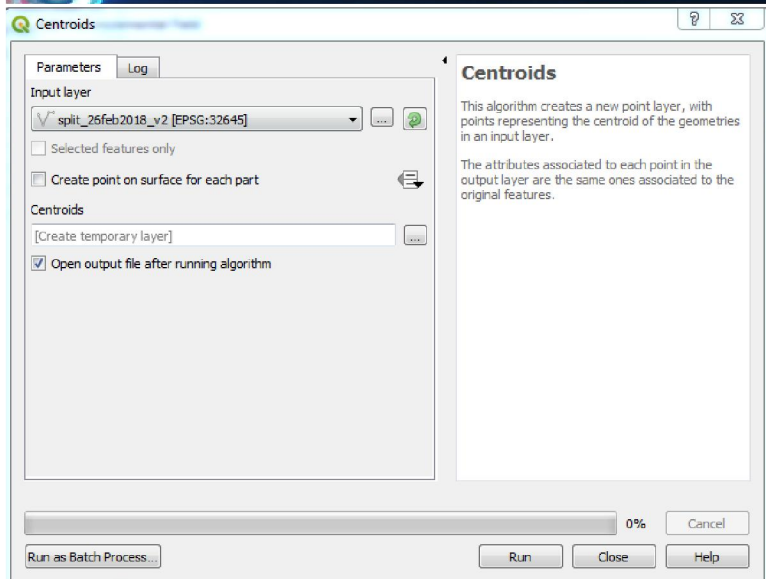
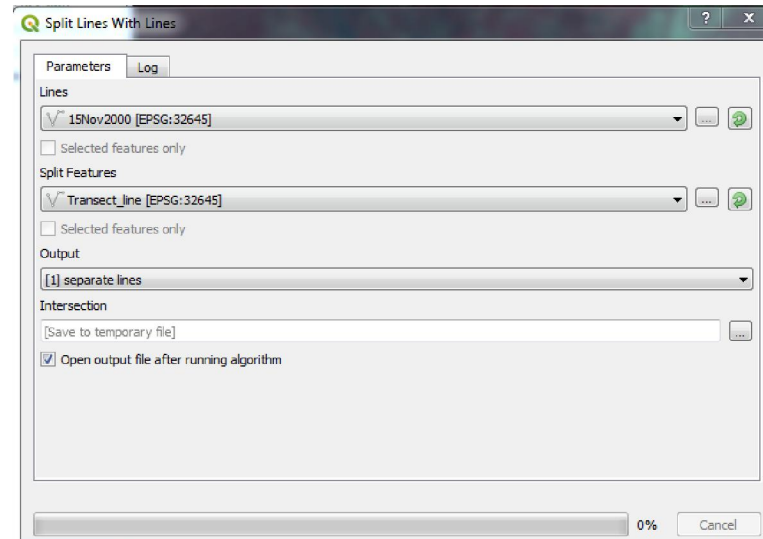
Add new field



To create New layer (vector Layer): Click on New shp file layer > insert file name > change geometry type (line) > insert field name and change data type > **digitize feature** : click on toggle editing (it will activate editing mod > click on add line > after complete save the layer

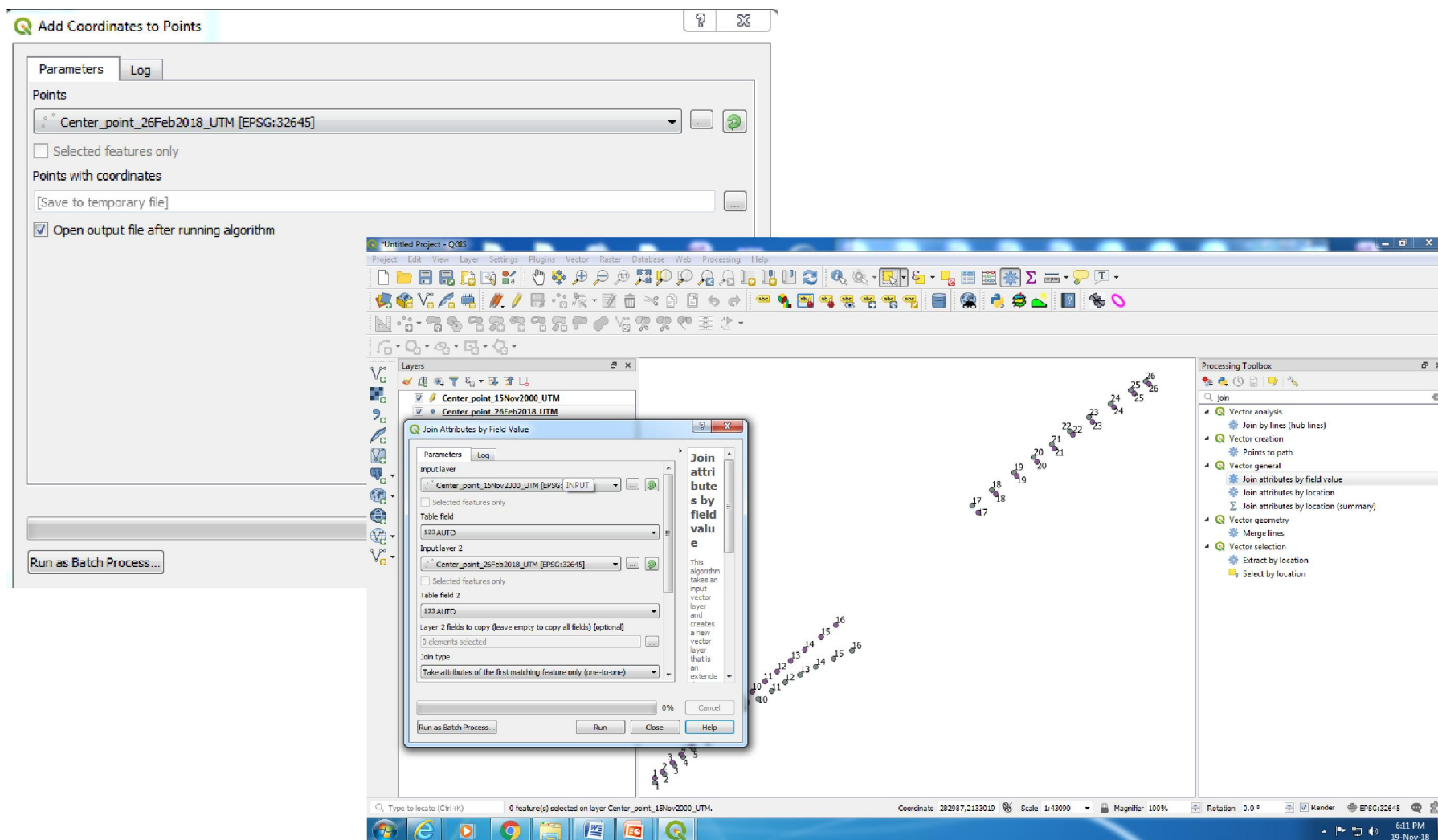
Create Individual Shoreline, Transect and Primary Key ID

Digitise two shoreline and transect line> Split Individual Shoreline with Transect line> convert line to center point using centroid tool in each split shoreline> create auto ID using add auto incremental field tool>



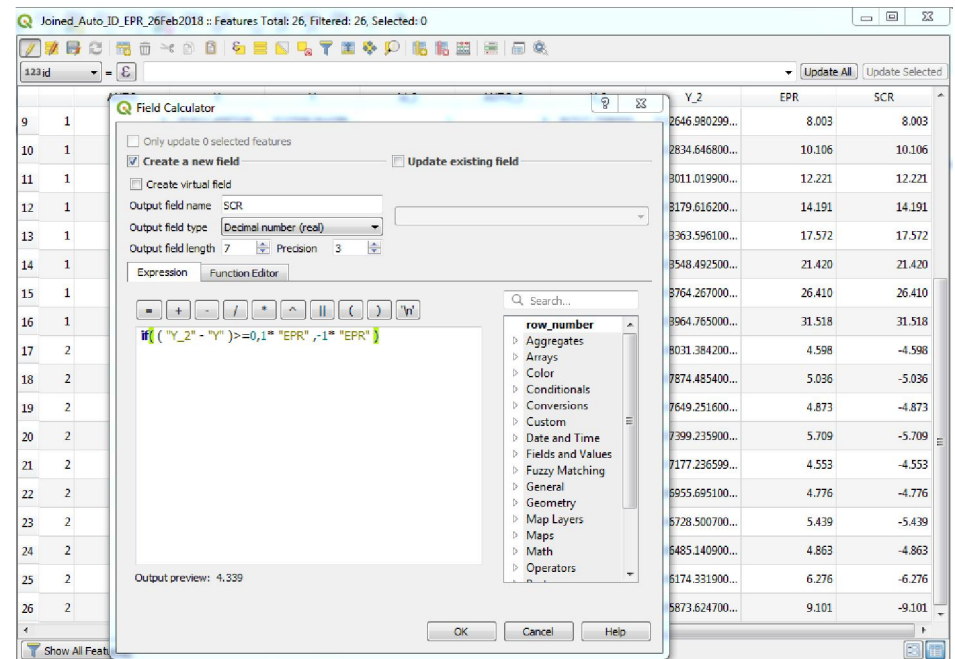
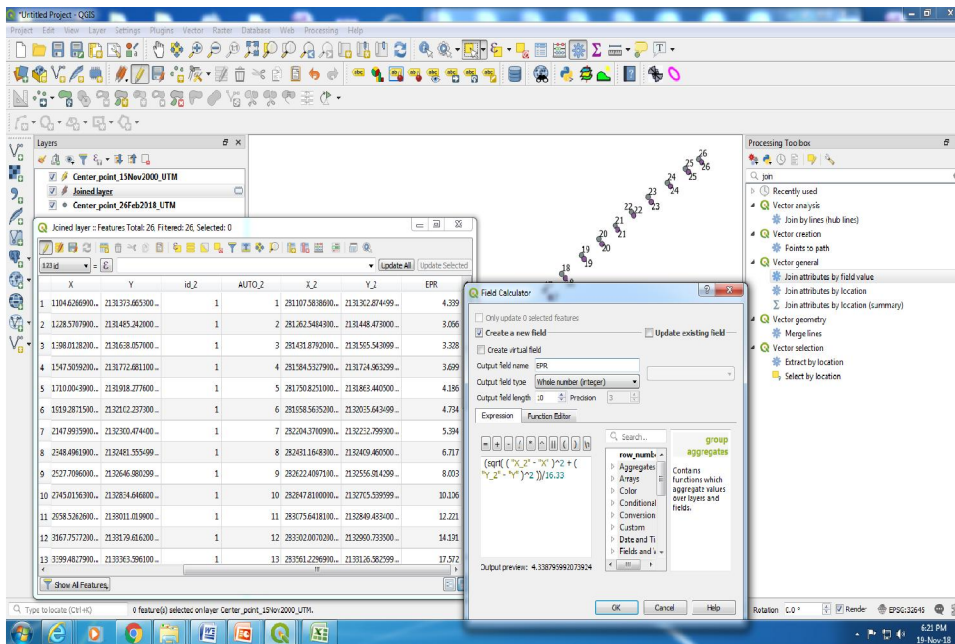
Add coordinate on centroid points

Add coordinates on each centroid points using add coordinates to points tool>join by attribute of 1st shore line with 2nd shoreline based on common ID (primary Key)



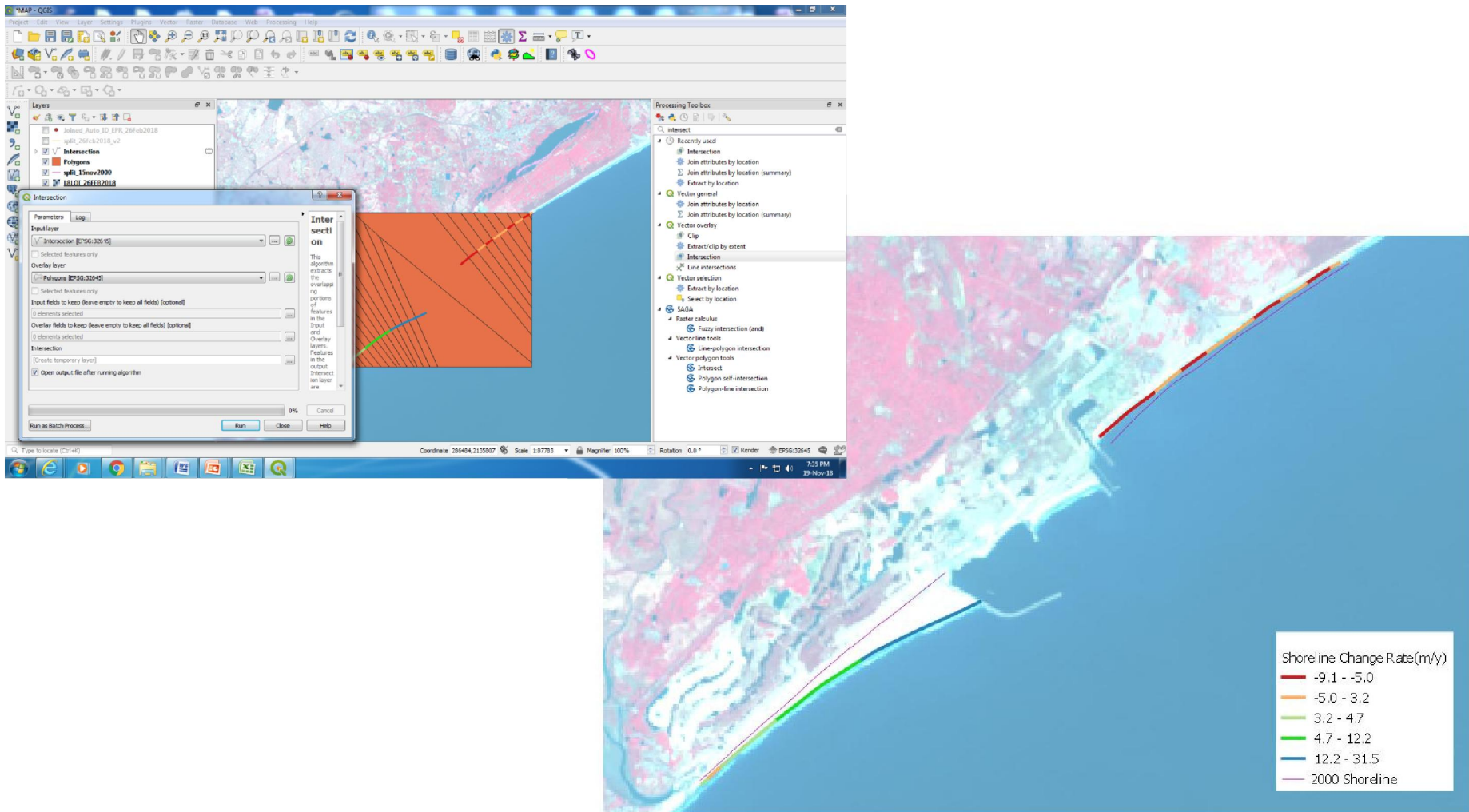
Calculation of Shoreline Change rate (m/y)

- Calculate distance formula [using $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$]:
 - add New field: go Join_LC_PFZ_SST_ChI_DEPTH.shp in editing mode > open attribute table > click on open field calculator and put the formula $(\sqrt{("X" - "X_2")^2 + ("Y" - "Y_2")^2}) / 16.33$ to calculate the distance.
- Assign sign for erosion(-ve) and accession (+ve) : give the condition if(Y2-Y1>=0 then apply erosion else accession sign



Generate Shoreline Change rate map (m/y)

Create Thiessen Poly using Shoreline change rate points and intersect with recent shoreline
Generate Shoreline change rate



Thank you