Hands-on

Shoreline Change Mapping

Training Course on

"Geospatial Techniques for Coastal Mapping and Monitoring "

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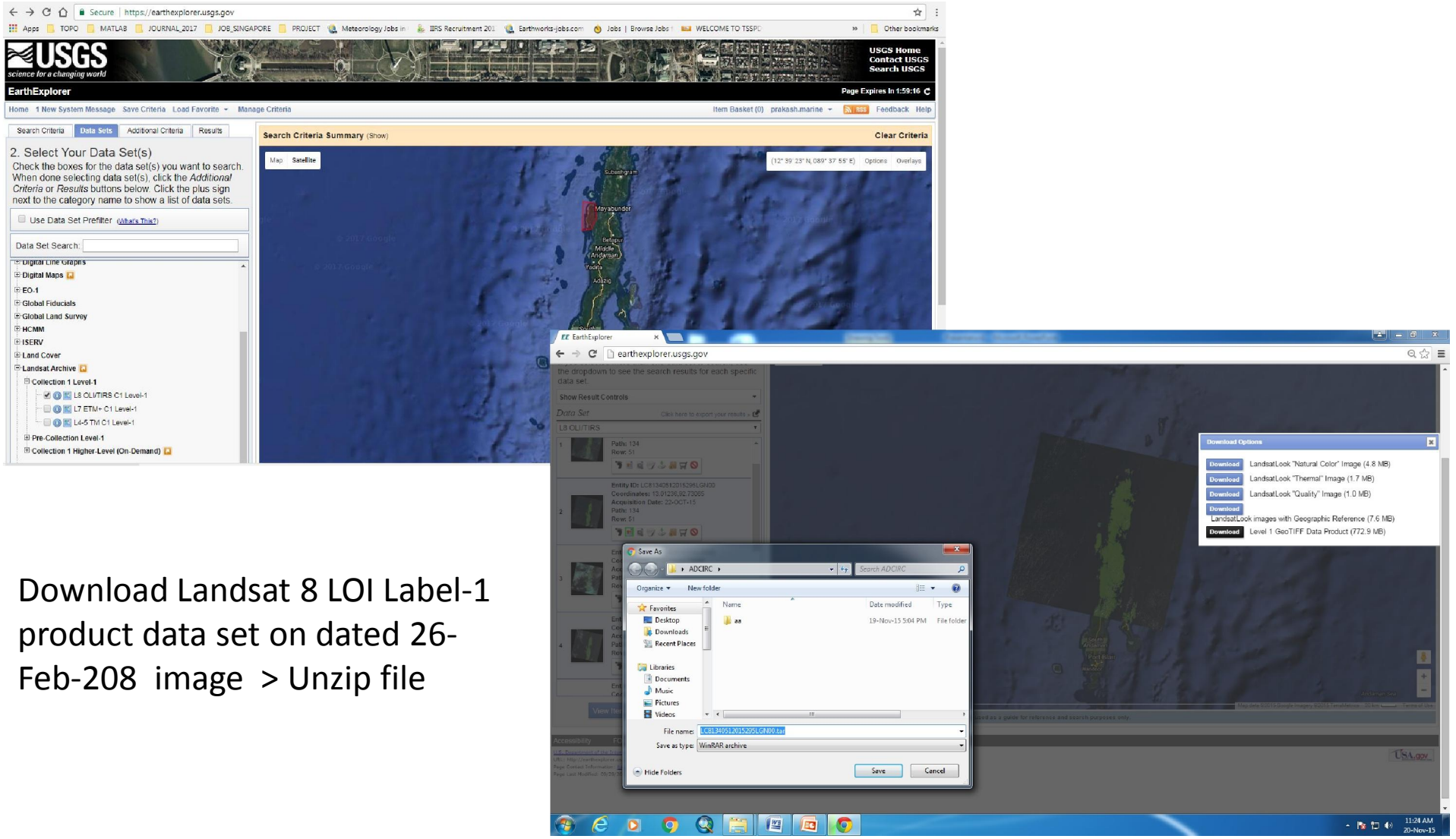
Over view of Course

- 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

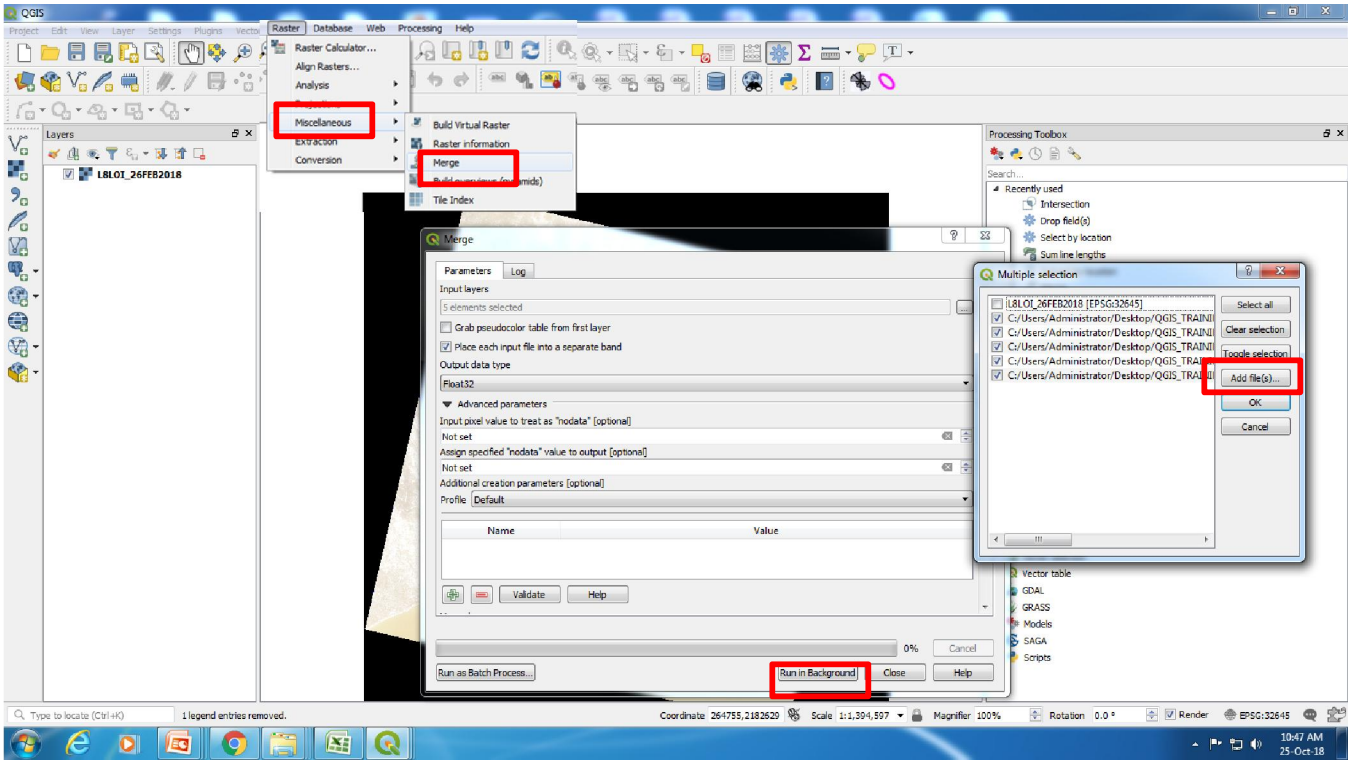


Download Landsat 8 LOI Label-1 product data set on dated 26-Feb-208 image > Unzip file

Band Configuration of Landsat 8 LOI

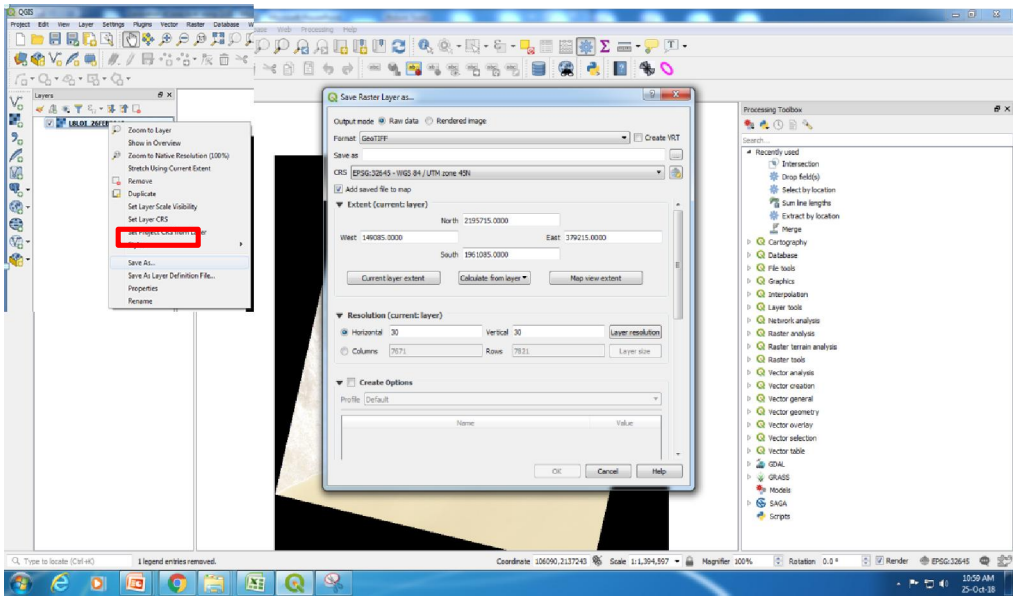
Bands	Wavelength (micrometers)	Resolution (meters)
Band 1 - Ultra Blue (coastal/aerosol)	0.435 - 0.451	30
Band 2 - Blue	0.452 - 0.512	30
Band 3 - Green	0.533 - 0.590	30
Band 4 - Red	0.636 - 0.673	30
Band 5 - Near Infrared (NIR)	0.851 - 0.879	30
Band 6 - Shortwave Infrared (SWIR) 1	1.566 - 1.651	30
Band 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:



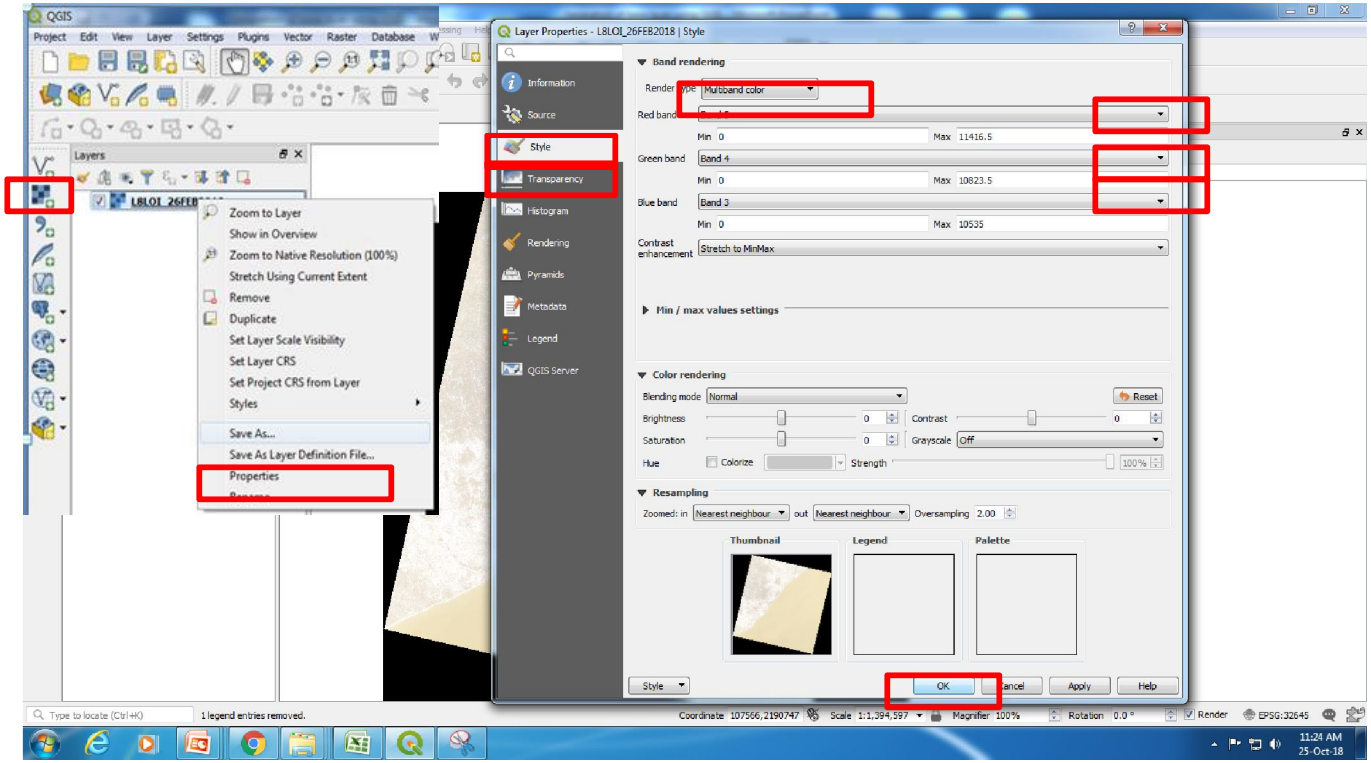
Create composite image: Go to Raster> Miscellaneous> merge> click layer input>multiple selection window will popup then add file of Band-1 to band-5 from working folder > check on input file into separate file> click on run background then it will run and layer stack file will store in temp folder.

Save file: right click and click on save as > new window will pop-up> save file.

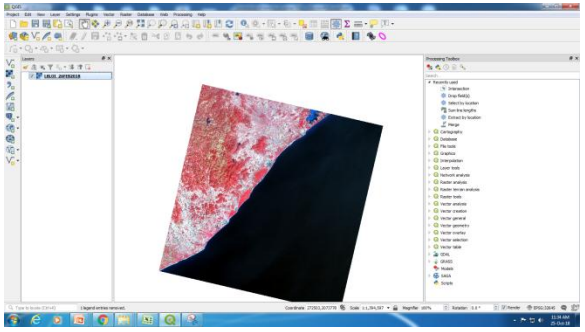


Create the FCC composite band for display

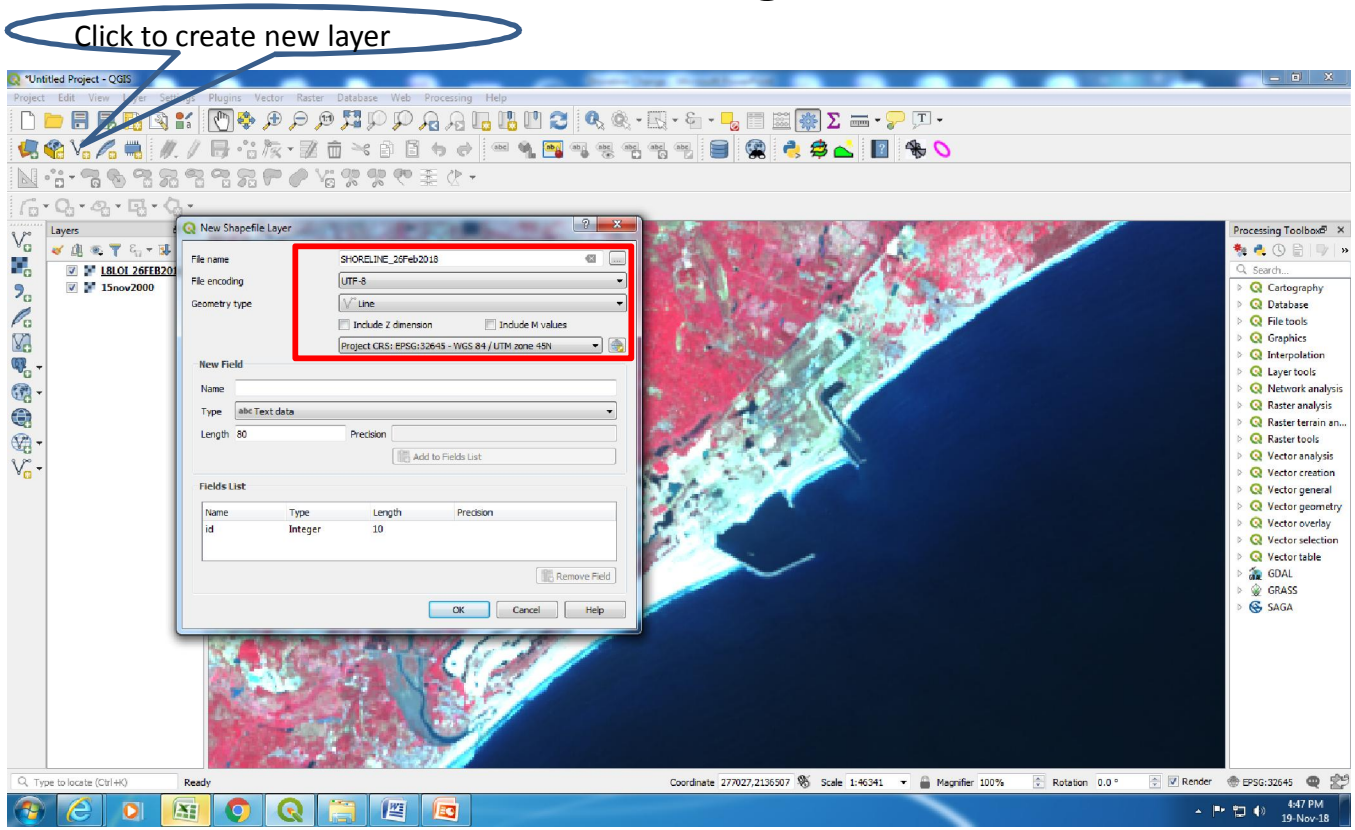
Open raster file> Right click on file> properties > Render type as multi-band color> assign Red band into B5,green into B4 and Blue into B3.> OK



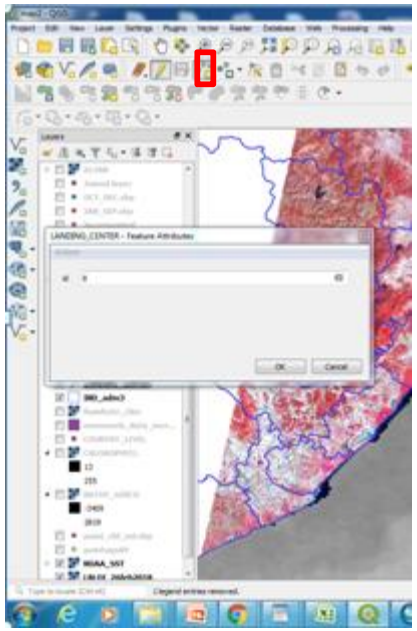
Click on transparency> additional no data value is 0
Now it will display FFC image.



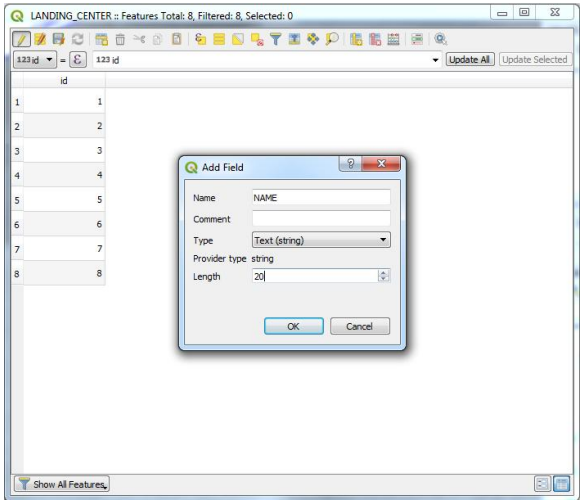
Digitize shoreline



Add new line



Add new field

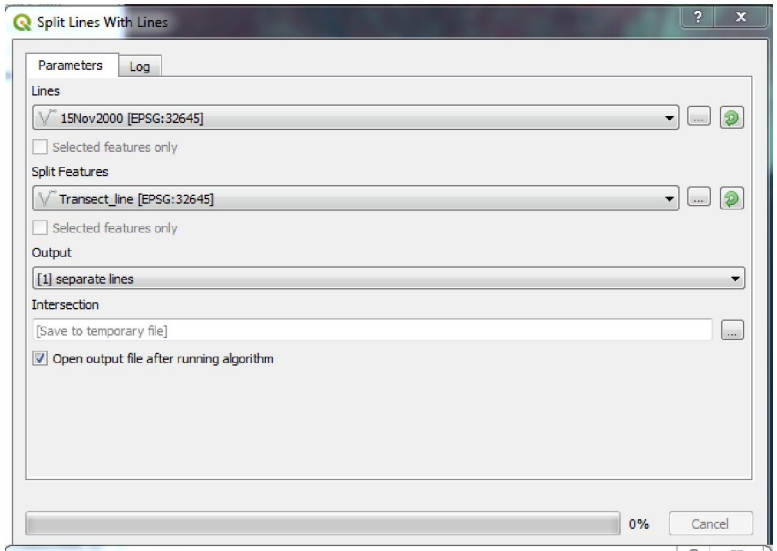


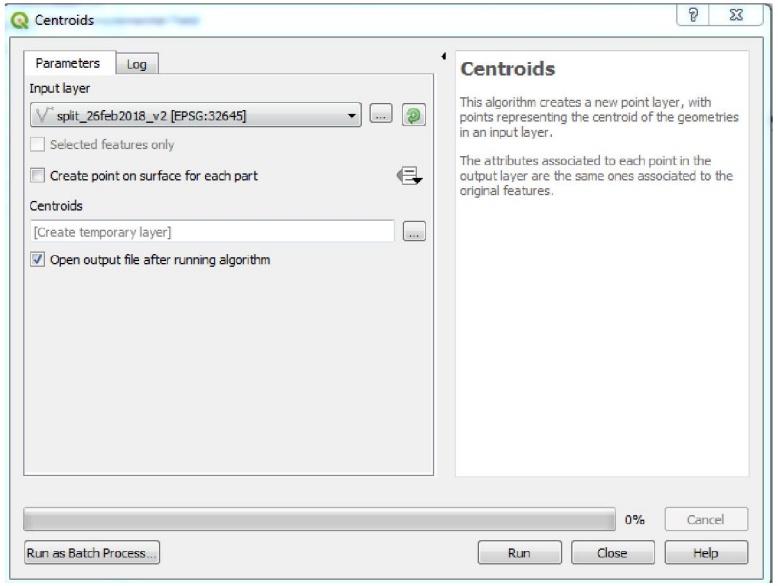
To create New layer (vector Layer): Click on New shp file layer > insert file name> change geometry type (line) > insert field name and change data type>

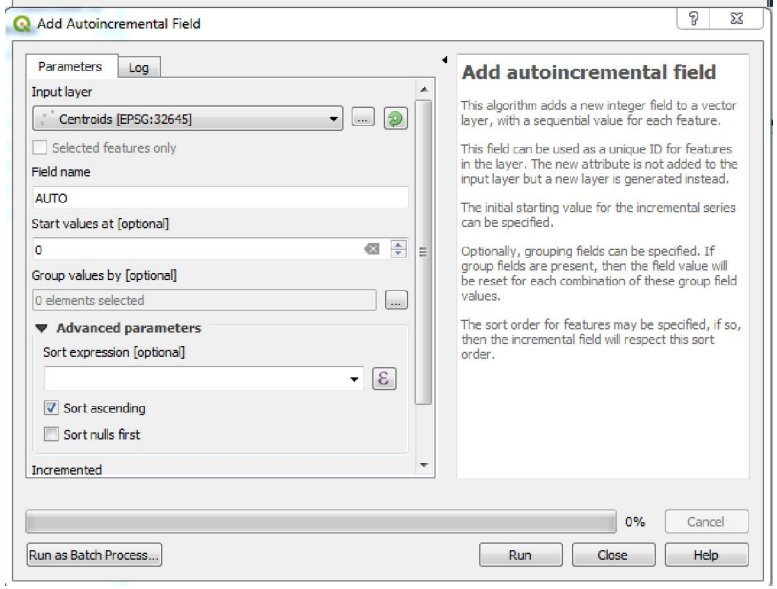
digitize feature : click on toggle editing (it will activate editing mod > click on add line> after complete save the layer

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>

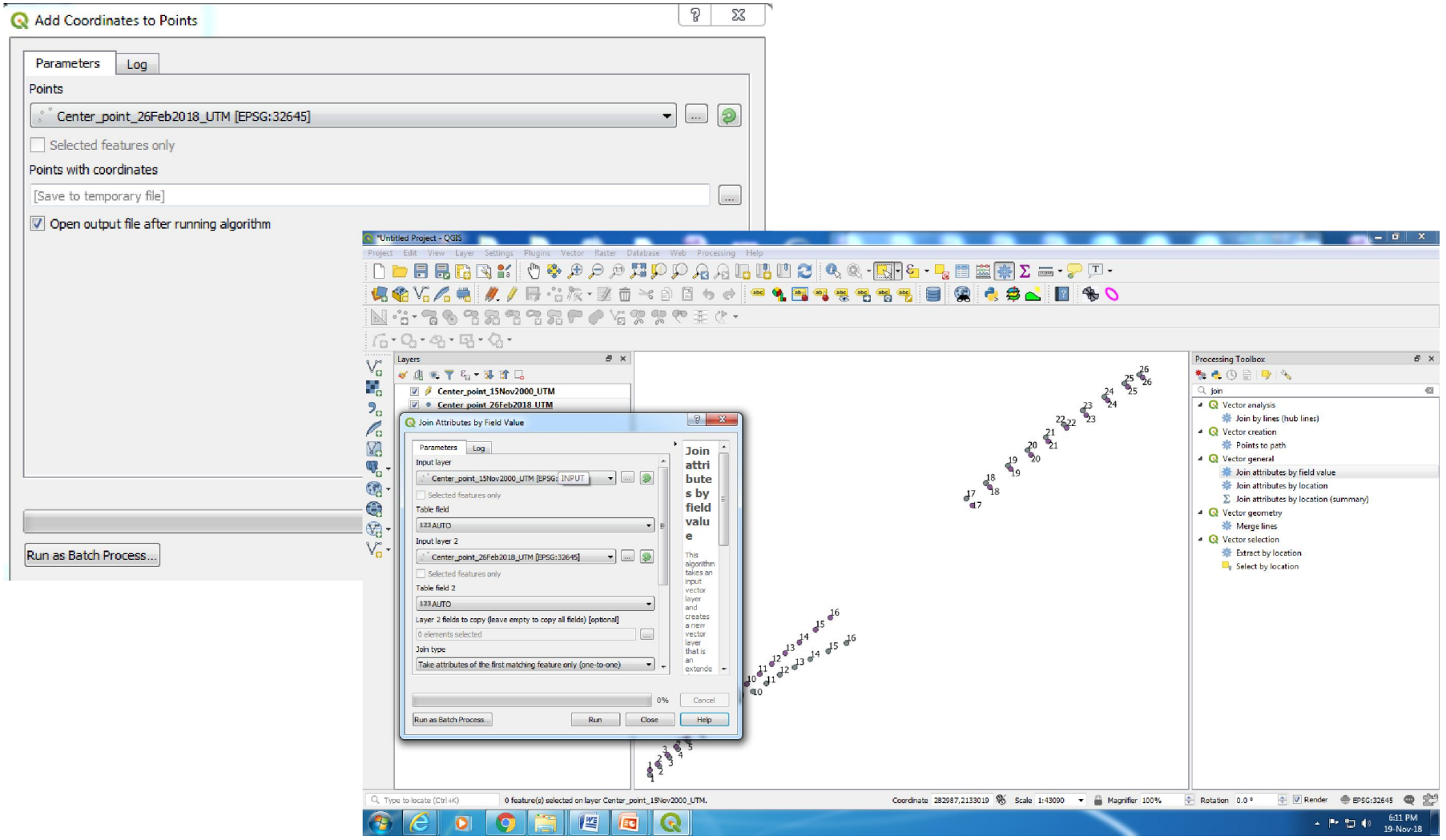






Add coordinate on centroid points

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)

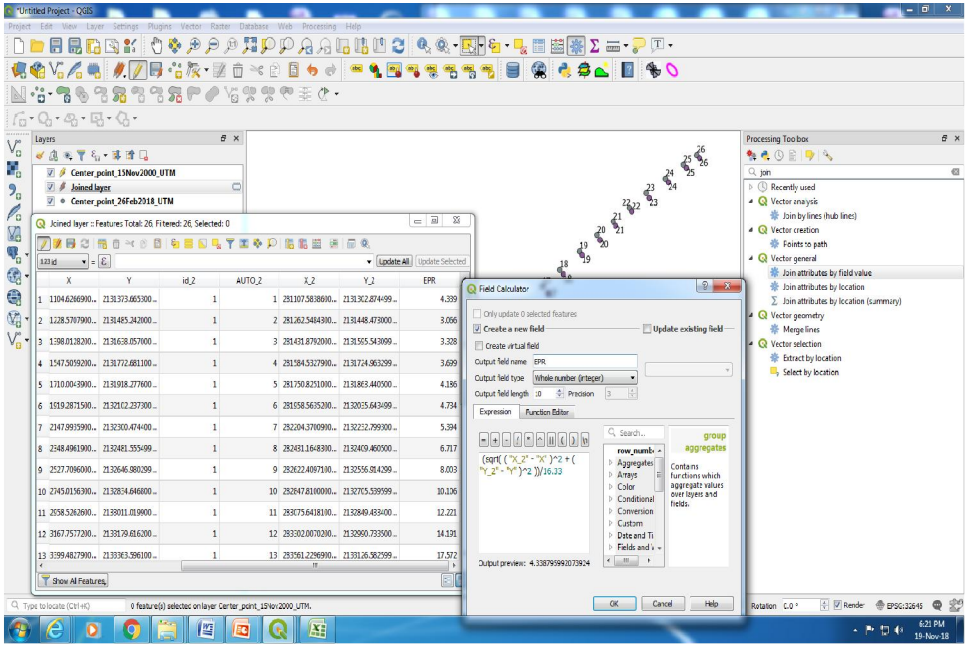


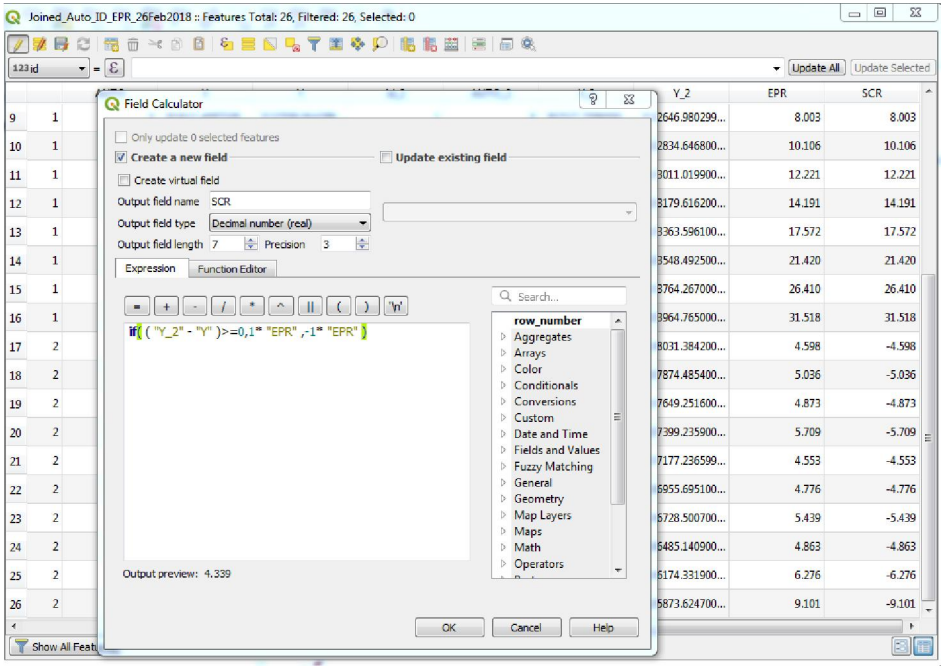
Calculation of Shoreline Change rate (m/y)

- Calculate distance formula [using sqrt($(x2 - x1)^2 + (y2 - y1)^2$)]:

  add New field: go Join_LC_PFZ_SST_Chl_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.

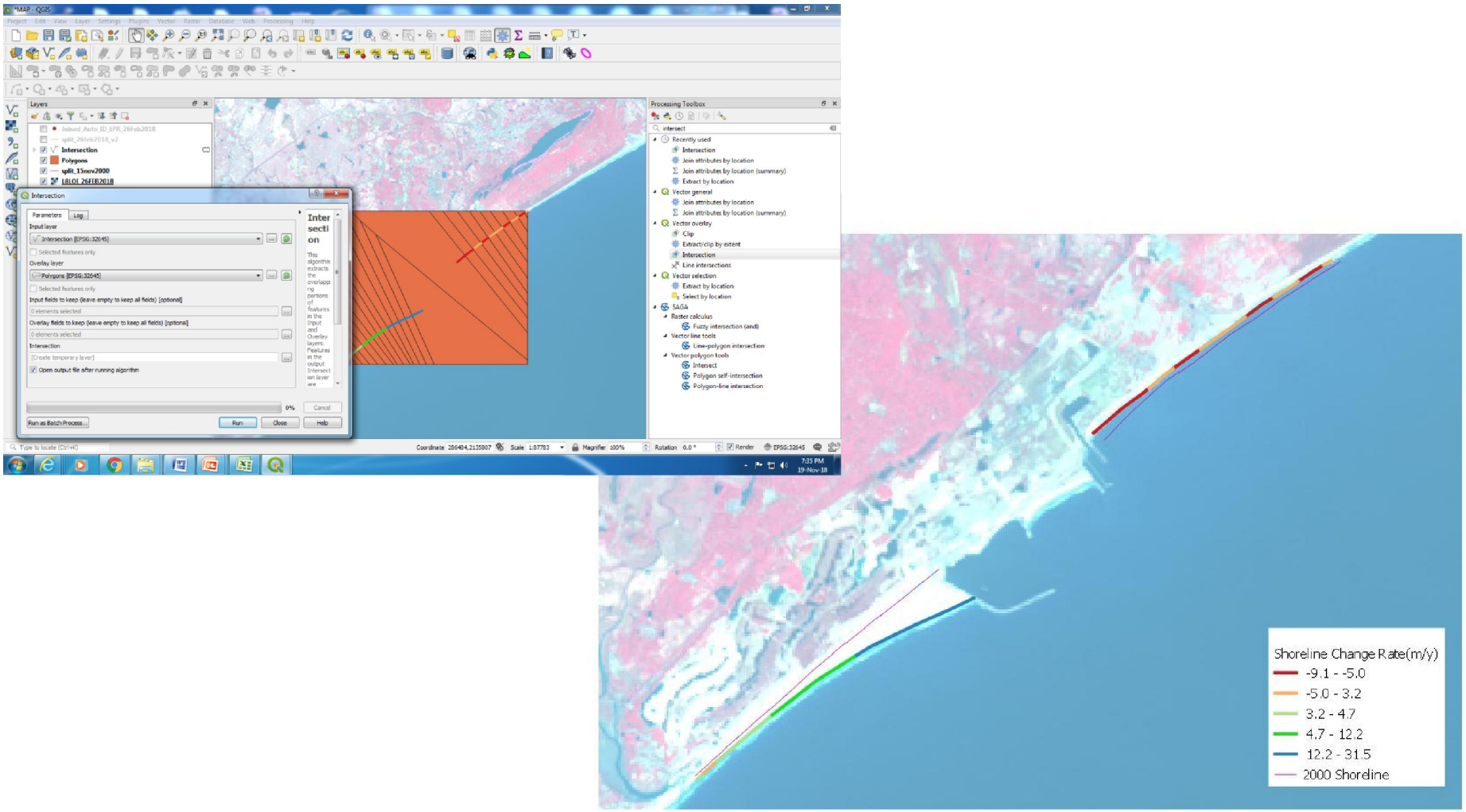
- Assign sign for erosion(-ve) and accession (+ve) : give the condition if(Y2-Y1>=0 then apply erosion else accession sign





Generate Shoreline Change rate map (m/y)

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



Thank you