Hands-on

Coastal Risk Assessment (Tsunami)

Training Course on

"Geospatial Techniques for Coastal Mapping and Monitoring "

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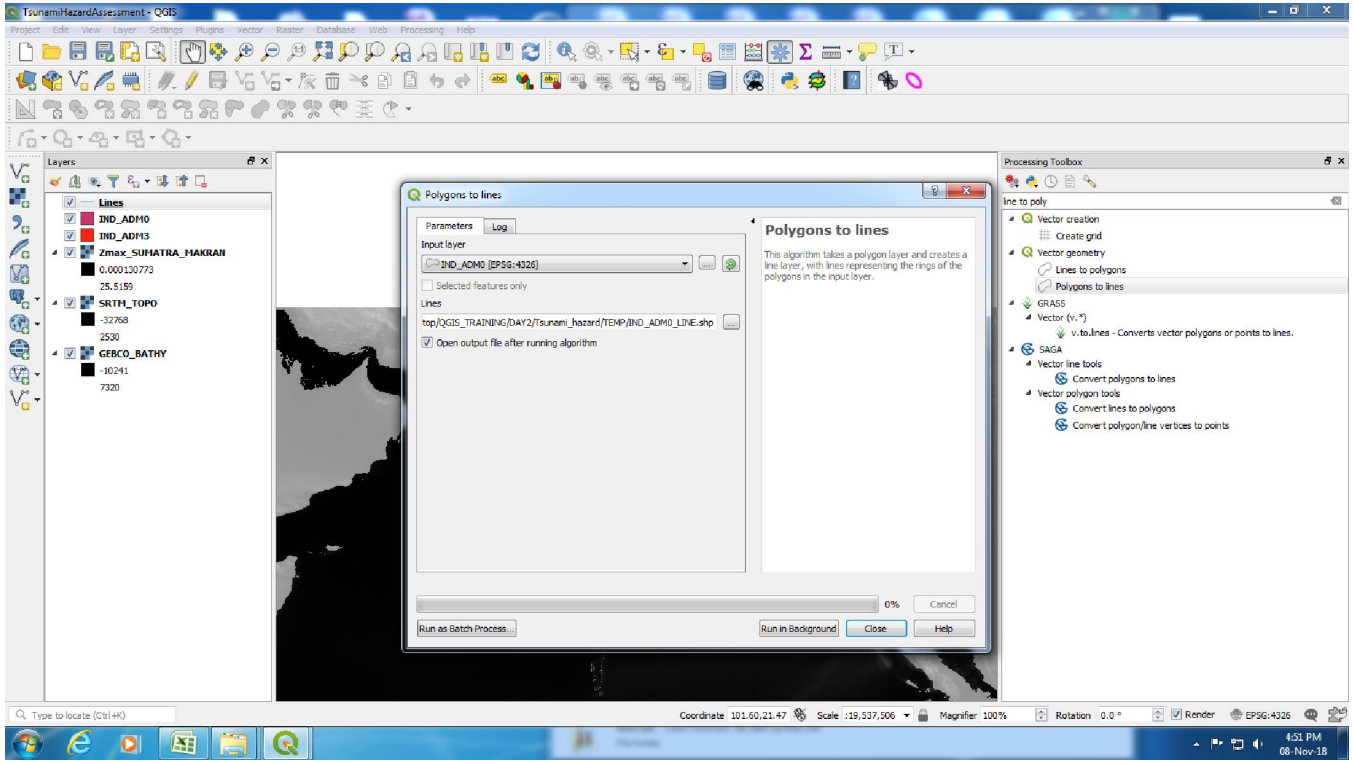
Over view Course:

- Tsunami scenario Data: Maximum wave height of historical events at the Indian ocean
  - Composite Maximum wave height of Sumatra (24 Dec,2004) and makran earthquake scenario (28 November 1945)
- Extract hazard zone at each taluk level (administrative area of sub-district)
- Calculate Taluk wise mean value of wave height
- Generation of Tsunami hazard map

Tsunami Risk Assessment (Taluk Level):

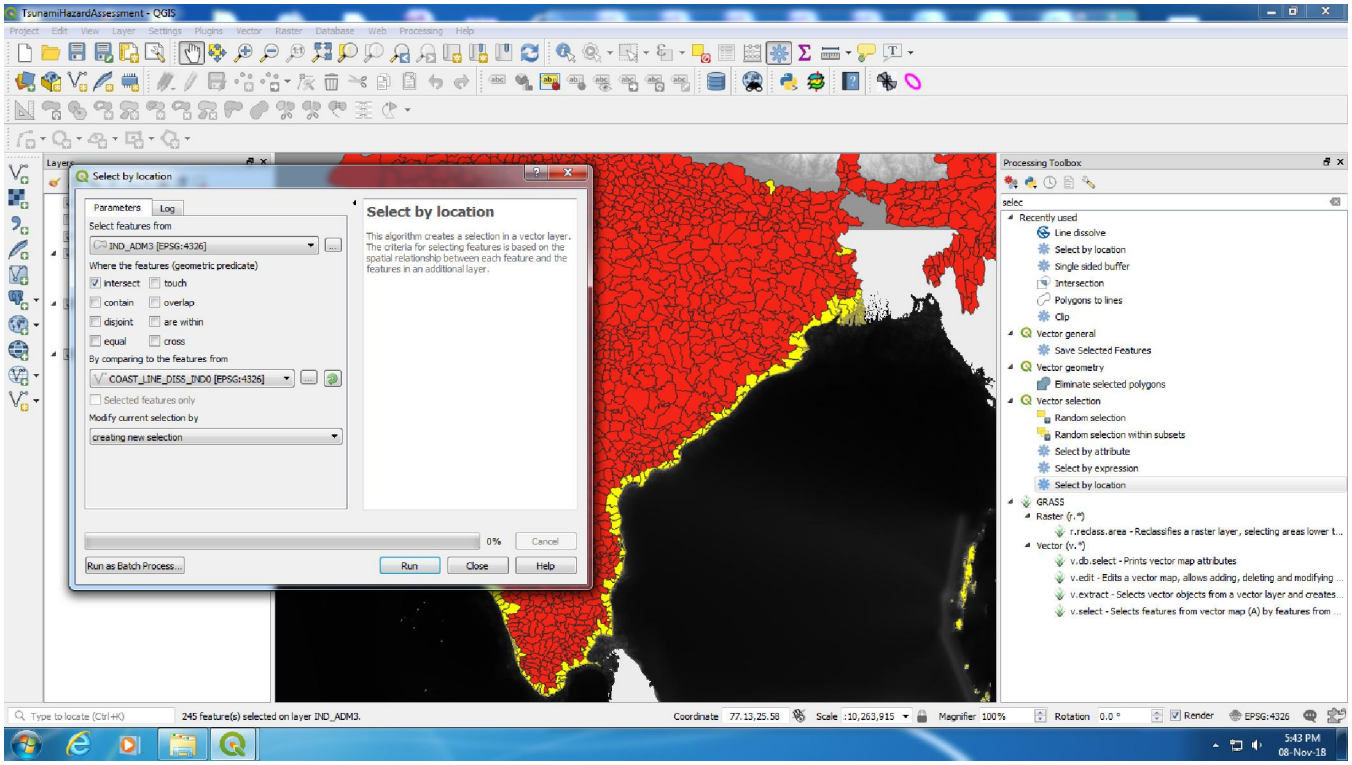
Vector download and manipulation

Download Admin boundary data from www.gadm.org > open IND_ADM0.shp (Country) data > Convert Polygon to line> cut land part of boundary line using editing mod> save new line (Say Coast_line_IND0.shp)> Dissolve Coast_line_IND0.shp using line dissolve tool based on ID (under SAGA tool) to make single feature



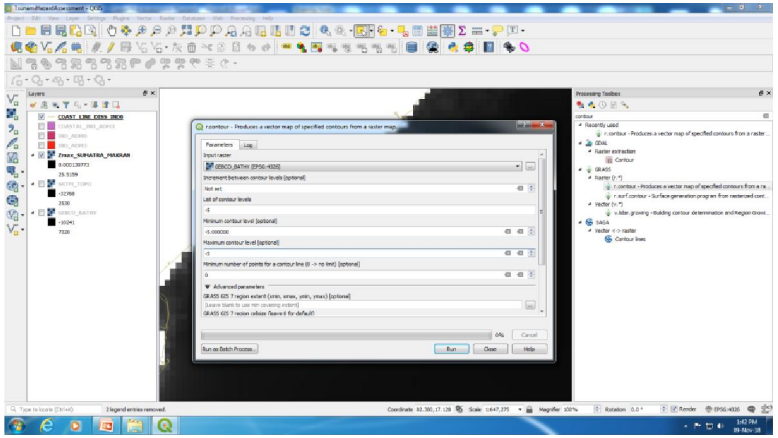
Extraction Coastal Taluk:

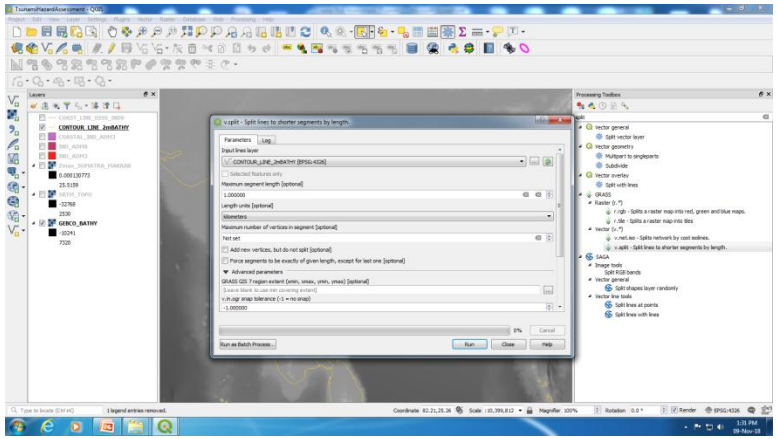
Extract Coastal Taluk: Select Coastal Taluk from IND_ADM3.shp using Dissolve Coast_line_IND0.shp using select by location tool> after selection save new file (Say Coastal_IND_ADM3.shp

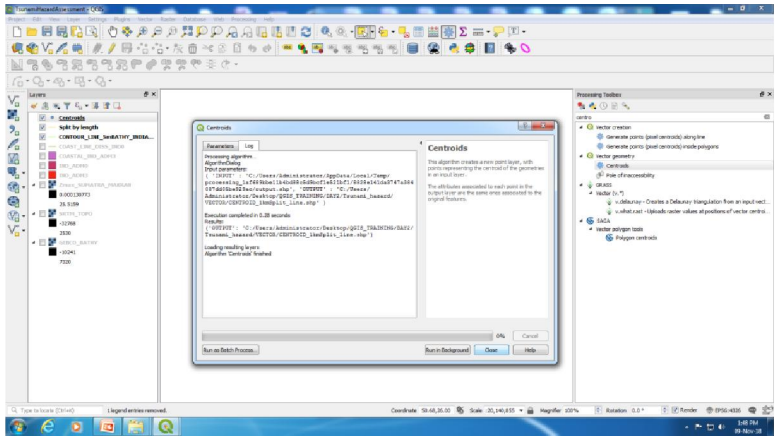


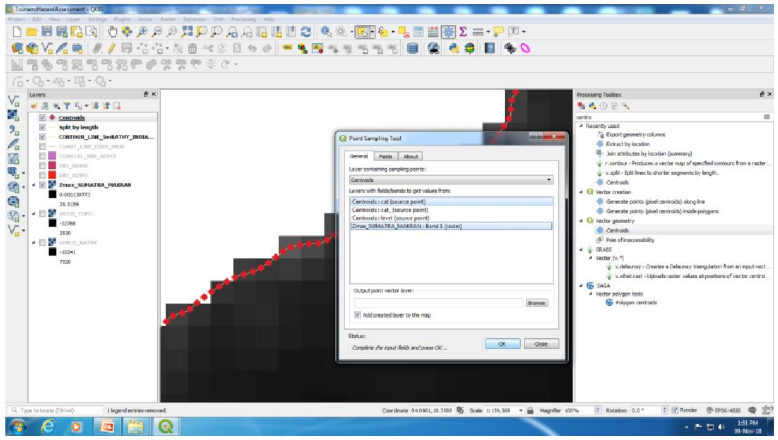
Extraction Tsunami wave Height

Extract Tsunami wave Height: create contour line (-5m) from GEBCO_BATHY.tif file using Specified contour from raster tool> split 1km segment using split line to shorter segment by length tool> generate split line to point using centroids tool> Extract Tsunami wave height at the point location using point sampling tool (Say TsunamiWaveHeight_pointLocation.shp)



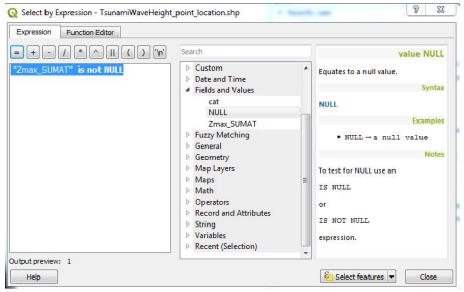


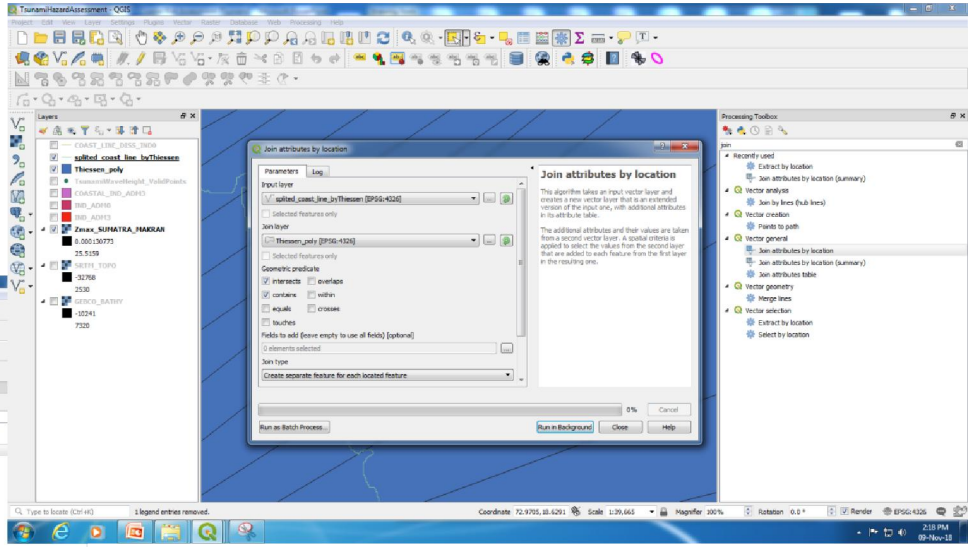


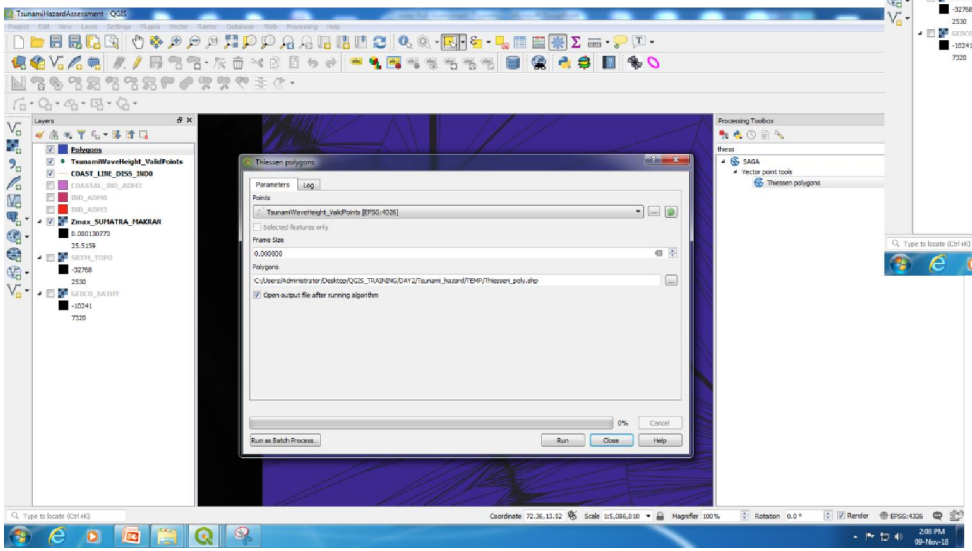


Spatial Join of Tsunami Wave Height:

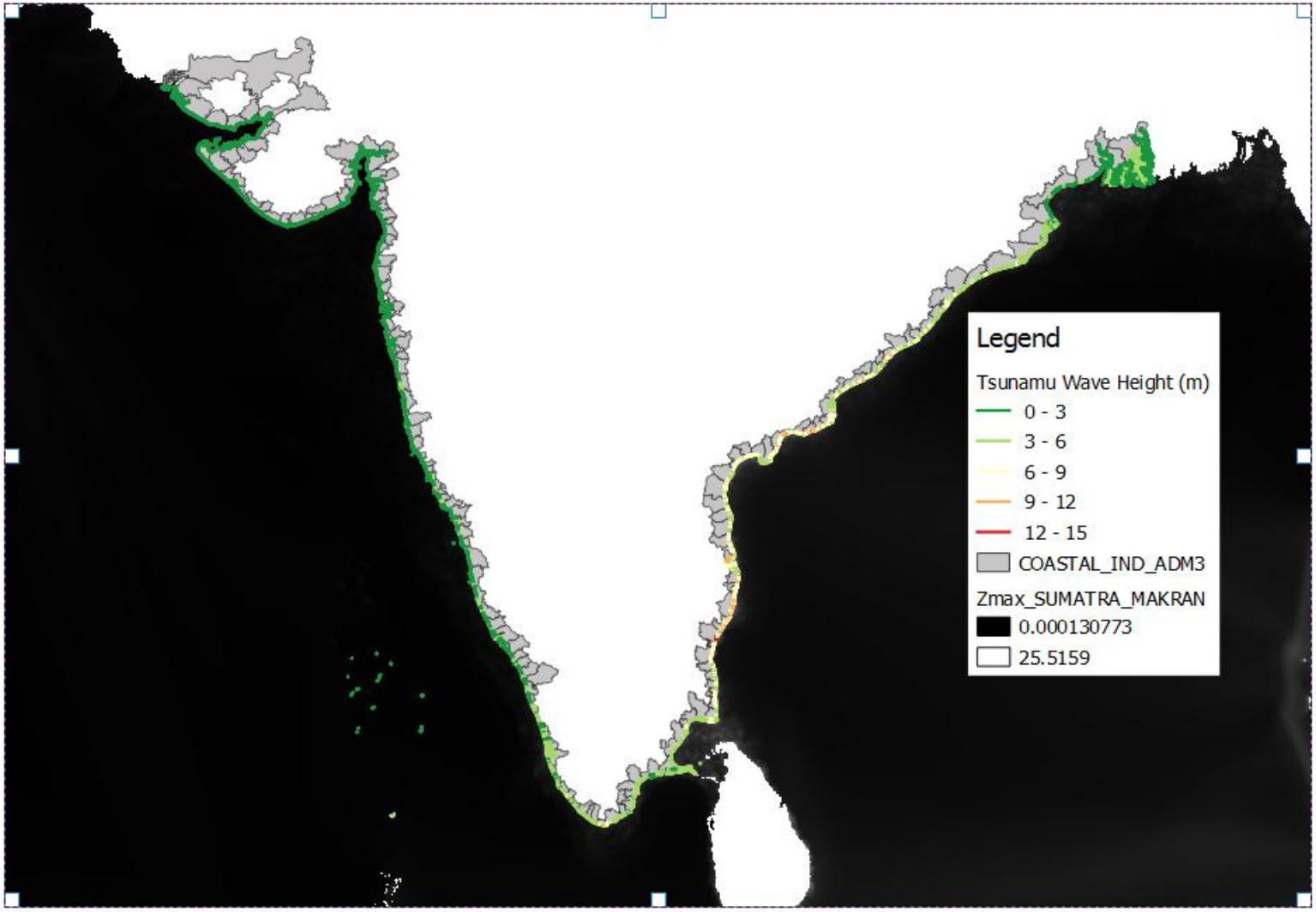
Transfer Tsunami wave height data to coast line: Open attribute of TsunamiWaveHeight_pointLocation.shp > for select valid point using select using attribute by command ("Zmax_SUMAT" is not NULL) and save new file (Say TsunamiWaveHeight_ValidPoints.shp) > create thiession polygon, input as Validpoint data> Intersect coastline(Dissloved_ind_adm.shp) with ThiessenPolygon using line-Polygon intersection tool (here split coastline w.r.t thiessen poly)> Join Zmax_value (i.e Tsunami wave height from Thiessen poly) to respective spited coast line) using join attribute by location tool (say ZMAX_COASTLINE_JOIN.shp)> Again Join Taluk Name to ZMAX_COASTLINE_JOIN.shp using join attribute by location tool save New Layer(Say Zmax_taluk_name. shp)





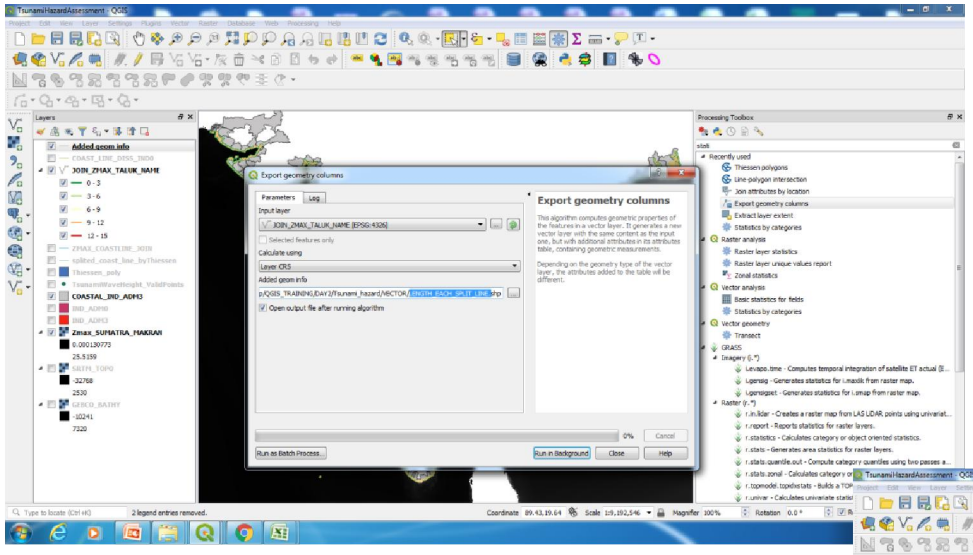


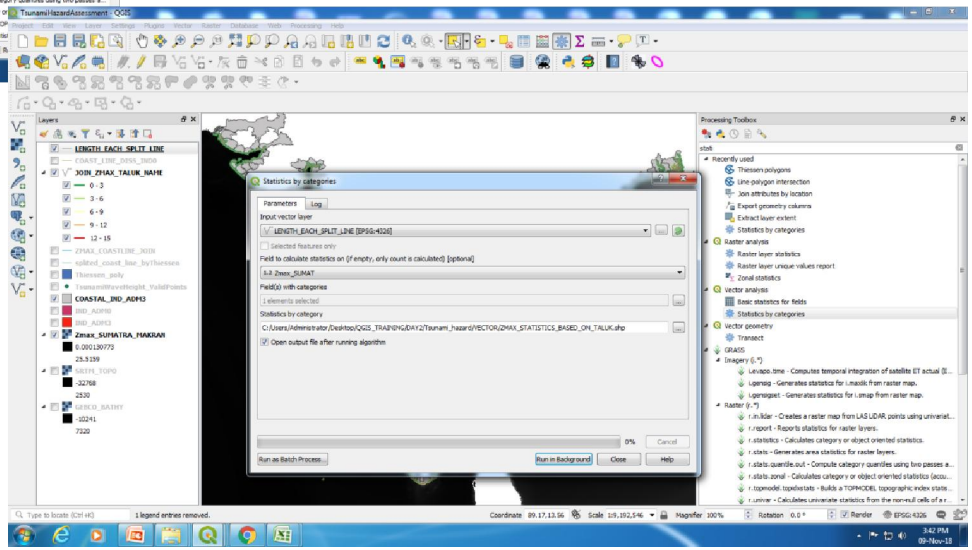
Tsunami Risk Map



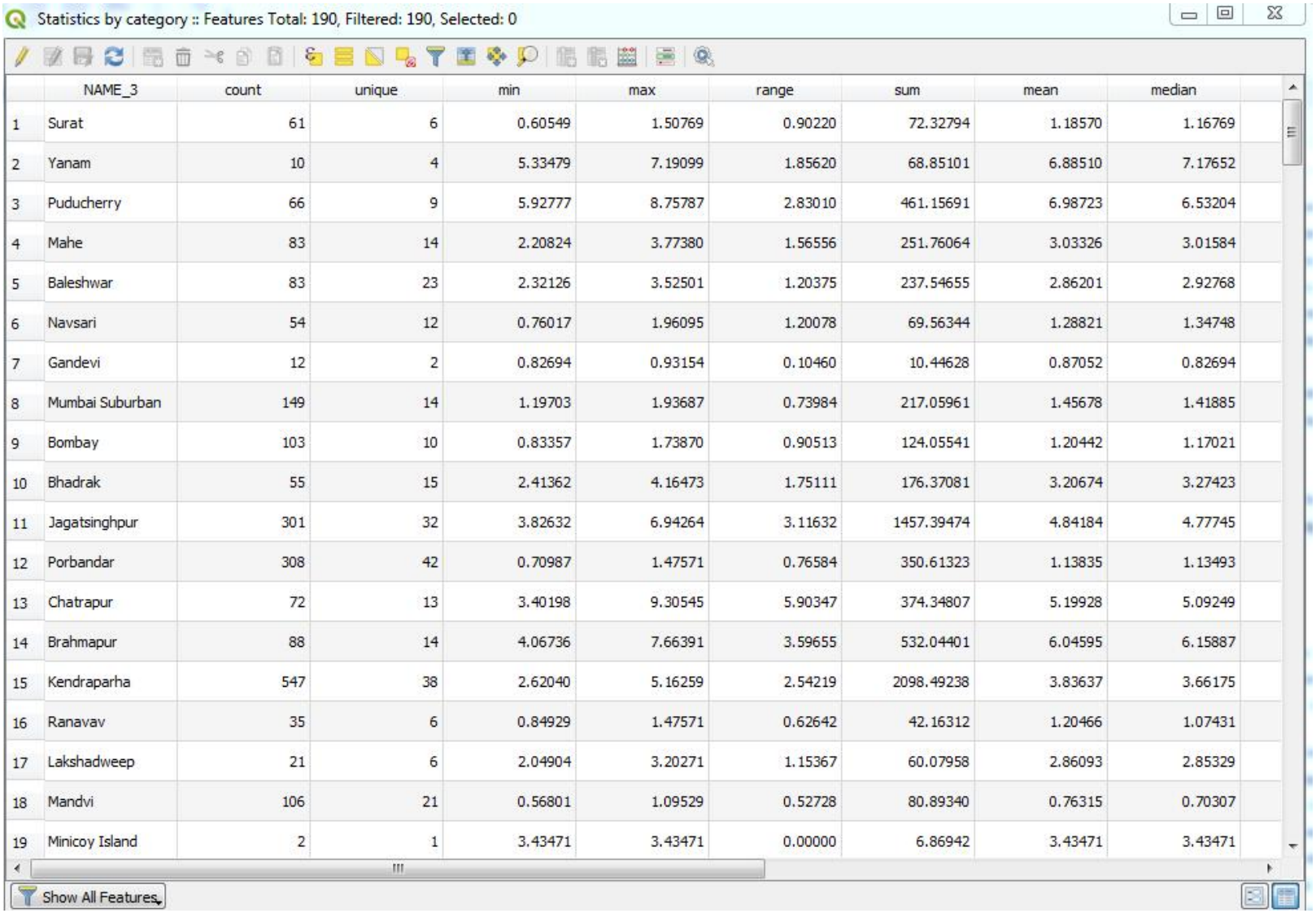
Taluk level Statistics

Tsunami Risk Statistics Taluk Level: Extract length of each Split line from JOIN_ZMAX_TALUK_NAME.shp file using export geometry column tool> Calculate Statistics (Mean, Nin, Max and SD of Zmax and length of the coast in each taluk. Using Statistics by category tool (here calculate zmax value using the Taluk (Name 3) filed category





Taluk wise Statistics Table


Statistics by category :: Features Total: 190, Filtered: 190, Selected: 0

	NAME_3	count	unique	min	max	range	sum	mean	median
1	Surat	61	6	0.60549	1.50769	0.90220	72.32794	1.18570	1.16769
2	Yanam	10	4	5.33479	7.19099	1.85620	68.85101	6.88510	7.17652
3	Puducherry	66	9	5.92777	8.75787	2.83010	461.15691	6.98723	6.53204
4	Mahe	83	14	2.20824	3.77380	1.56556	251.76064	3.03326	3.01584
5	Baleshwar	83	23	2.32126	3.52501	1.20375	237.54655	2.86201	2.92768
6	Navsari	54	12	0.76017	1.96095	1.20078	69.56344	1.28821	1.34748
7	Gandevi	12	2	0.82694	0.93154	0.10460	10.44628	0.87052	0.82694
8	Mumbai Suburban	149	14	1.19703	1.93687	0.73984	217.05961	1.45678	1.41885
9	Bombay	103	10	0.83357	1.73870	0.90513	124.05541	1.20442	1.17021
10	Bhadrak	55	15	2.41362	4.16473	1.75111	176.37081	3.20674	3.27423
11	Jagatsinghpur	301	32	3.82632	6.94264	3.11632	1457.39474	4.84184	4.77745
12	Porbandar	308	42	0.70987	1.47571	0.76584	350.61323	1.13835	1.13493
13	Chatrapur	72	13	3.40198	9.30545	5.90347	374.34807	5.19928	5.09249
14	Brahmapur	88	14	4.06736	7.66391	3.59655	532.04401	6.04595	6.15887
15	Kendraparha	547	38	2.62040	5.16259	2.54219	2098.49238	3.83637	3.66175
16	Ranavav	35	6	0.84929	1.47571	0.62642	42.16312	1.20466	1.07431
17	Lakshadweep	21	6	2.04904	3.20271	1.15367	60.07958	2.86093	2.85329
18	Mandvi	106	21	0.56801	1.09529	0.52728	80.89340	0.76315	0.70307
19	Minicoy Island	2	1	3.43471	3.43471	0.00000	6.86942	3.43471	3.43471

Show All Features

Thank you