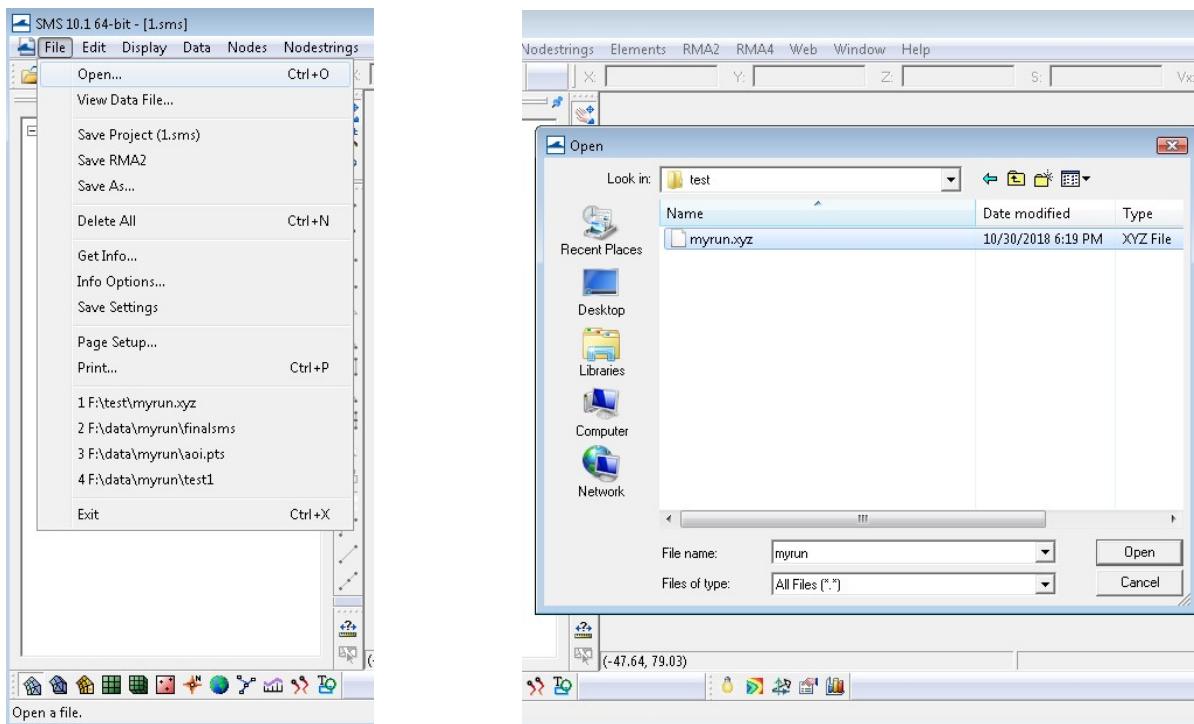
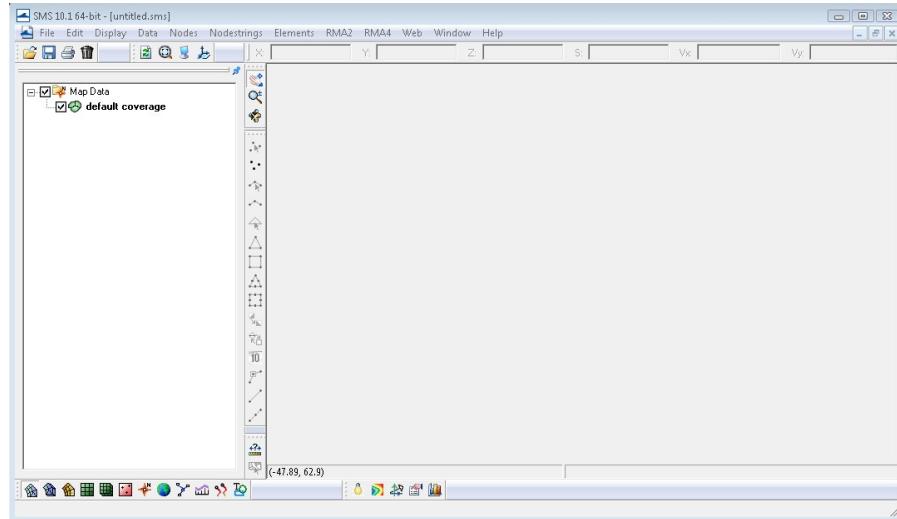
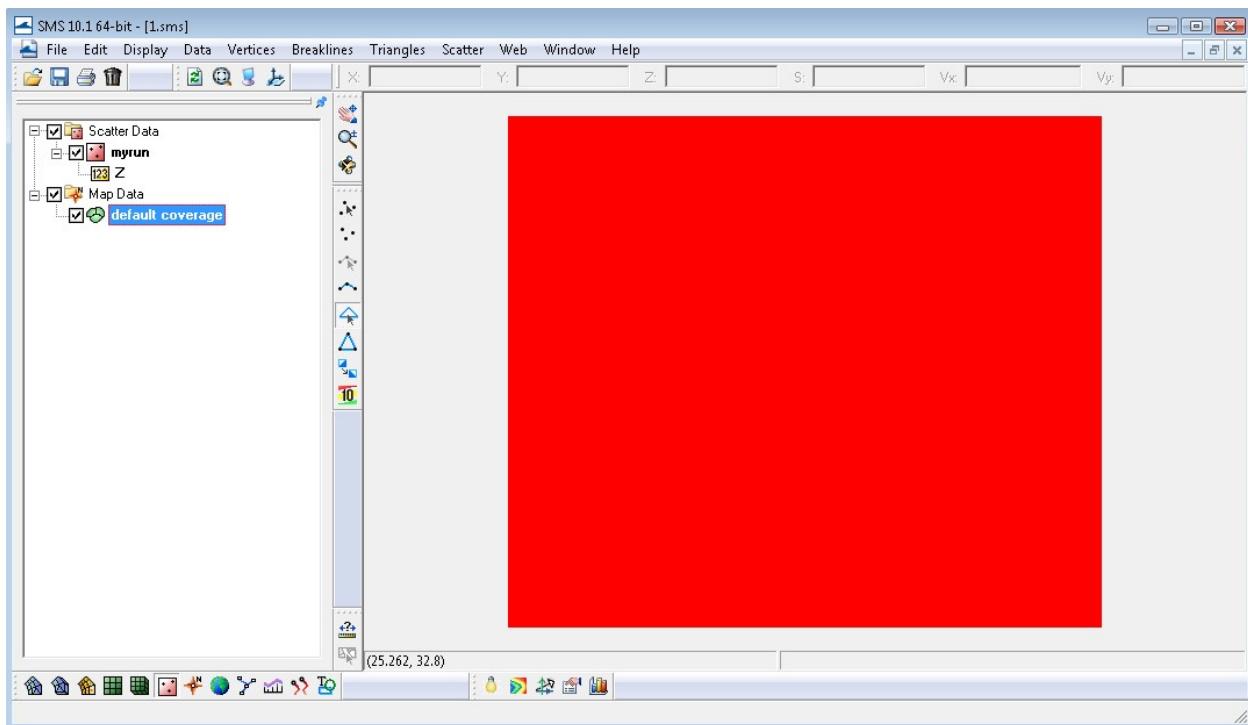


Mesh (FEM) Generation in SMS software

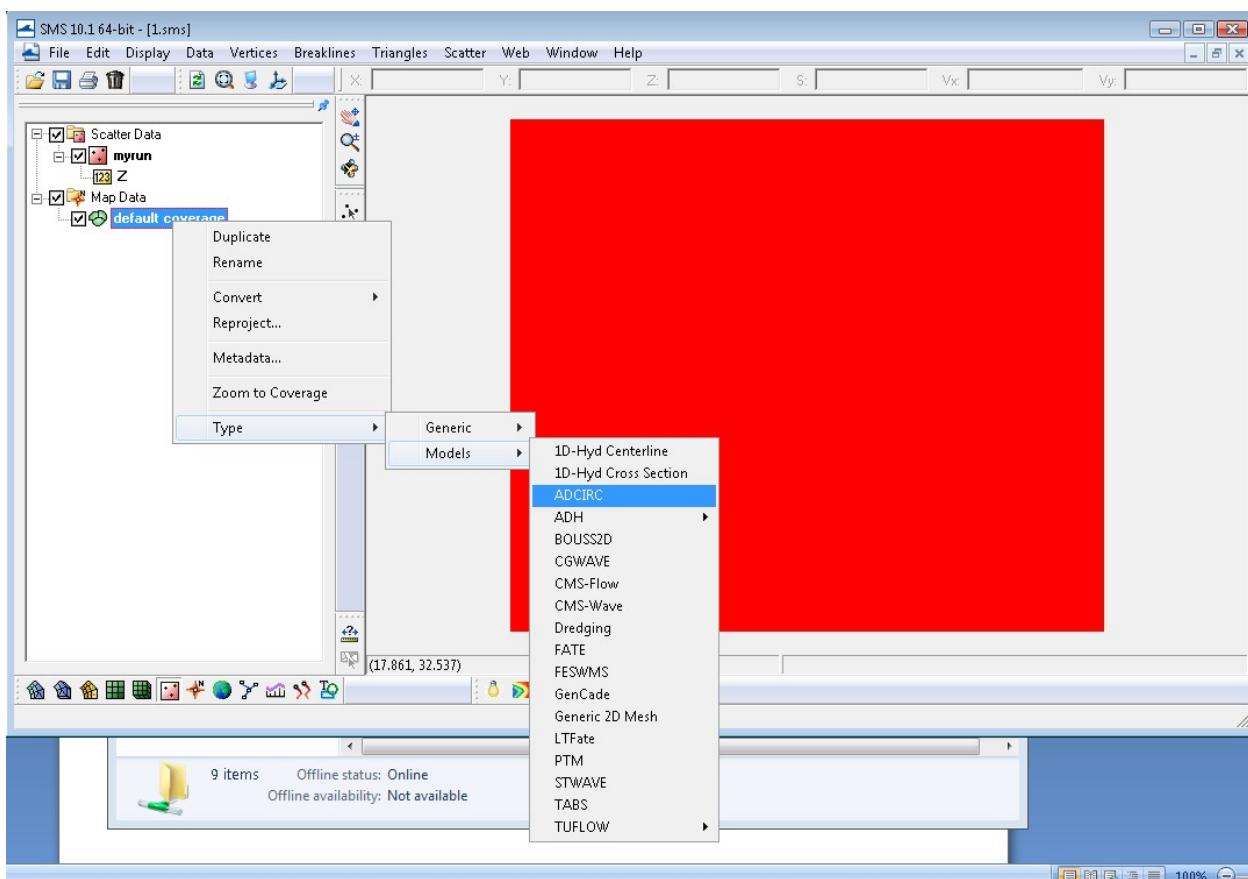
STEP1: Import xyz file and display

1.1. Open sms tool--> go to file then open option click -→ open the xyz file



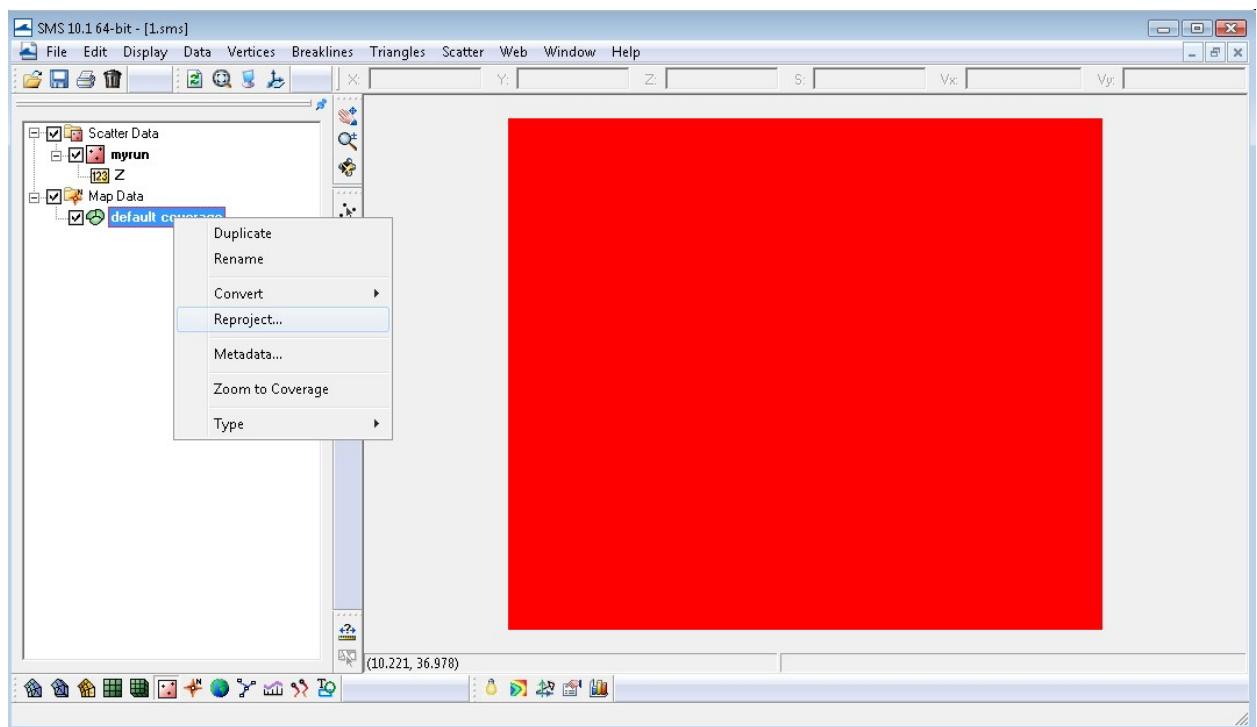


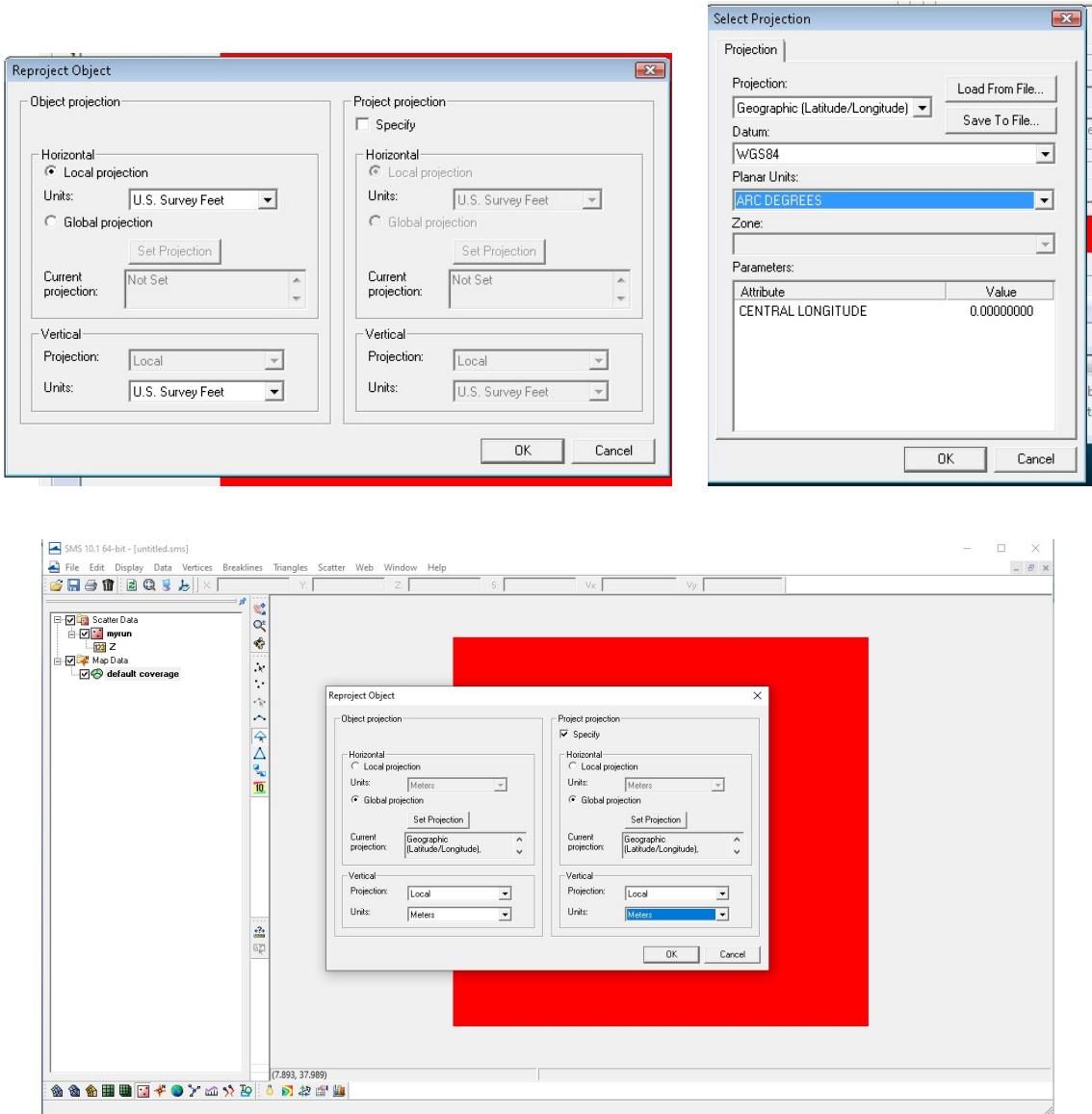
1.2. Right click on default coverage then type →model→adcirc



1.3. Again right click on default coverage then reproject click then reproject object.

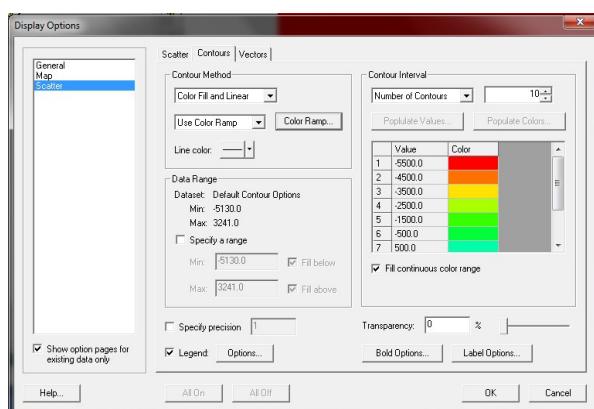
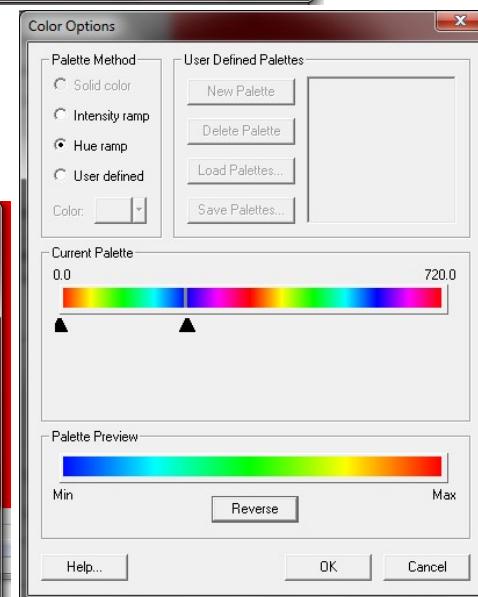
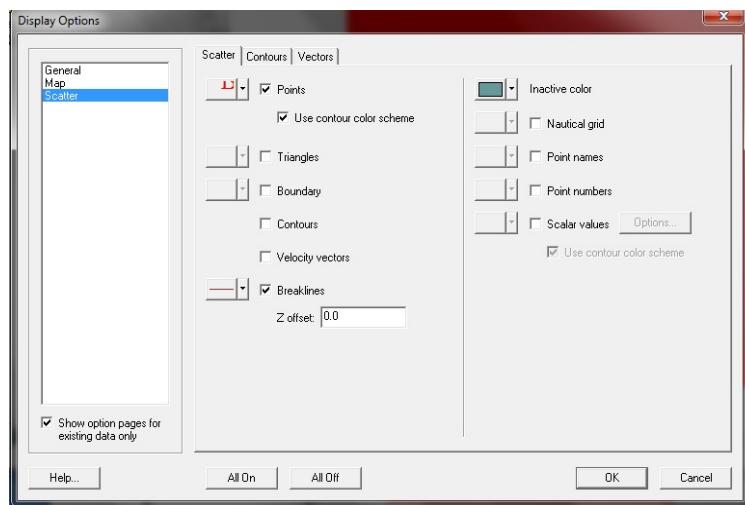
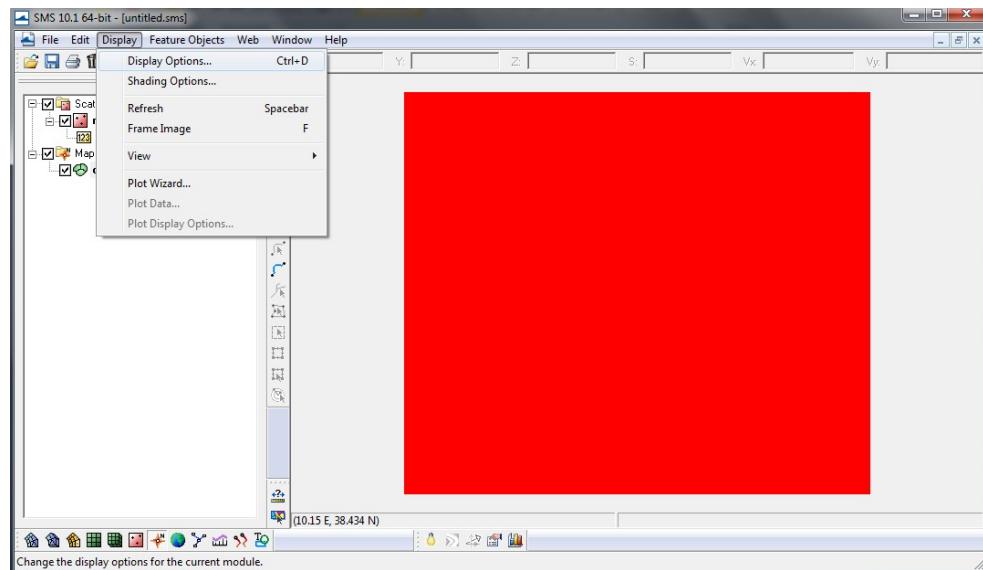
- Click on global projection -→ *select projection -- > geographic latitude longitude , datum--wgs84 , vertical units—meters then ok*
- Check on specify , click on global projection-→ *select projection -- geographic latitude longitude , Datum--WGS84 , Vertical Units—Meters Then Ok*
- *Ok*

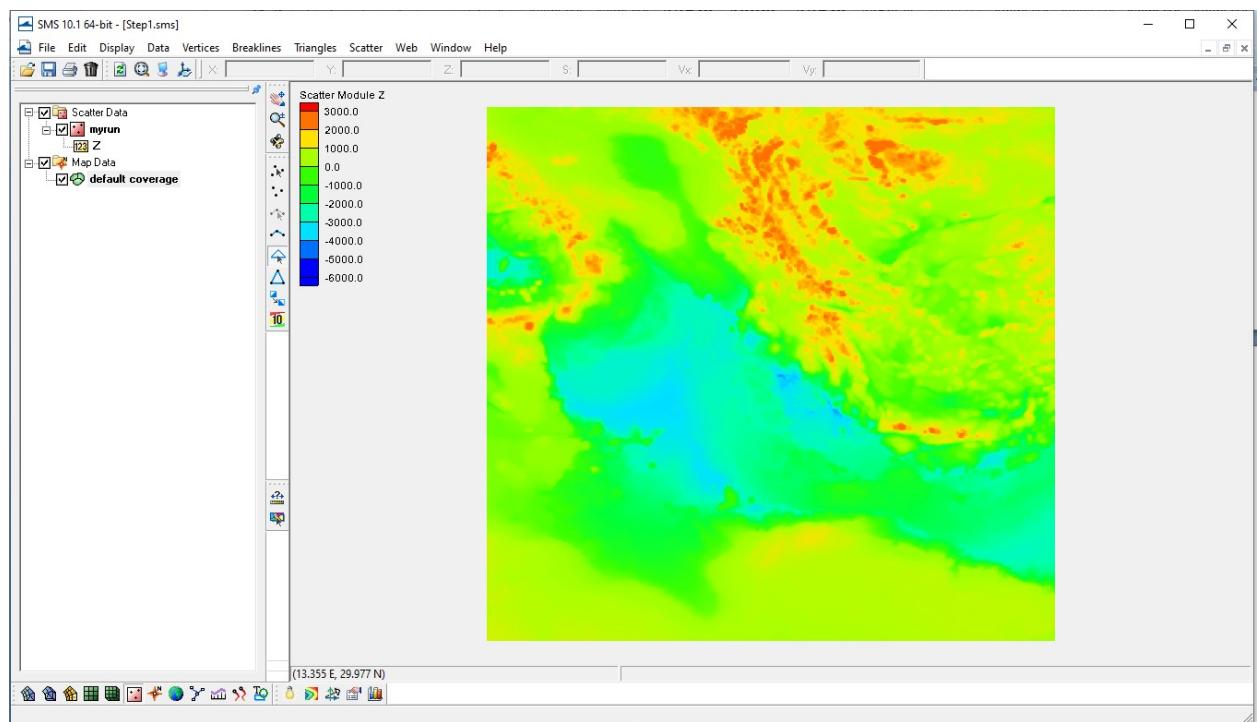




1.4. Go to display then click display options

- Go to scatter and check use contour color scheme
- Then go to contours tab in contour method select color fill and linear
- Beside use color ramp click ,click color ramp
- In color option go down and check reverse (min-blue ,max -red) →OK
- Again ok

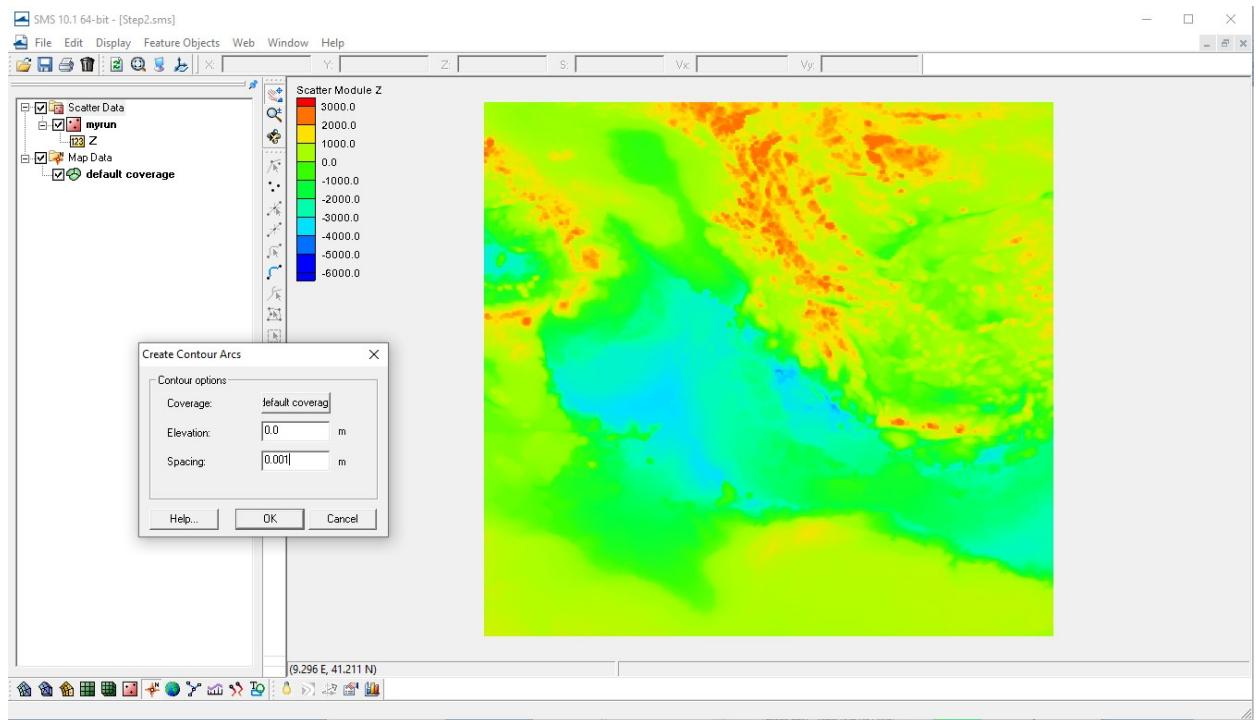


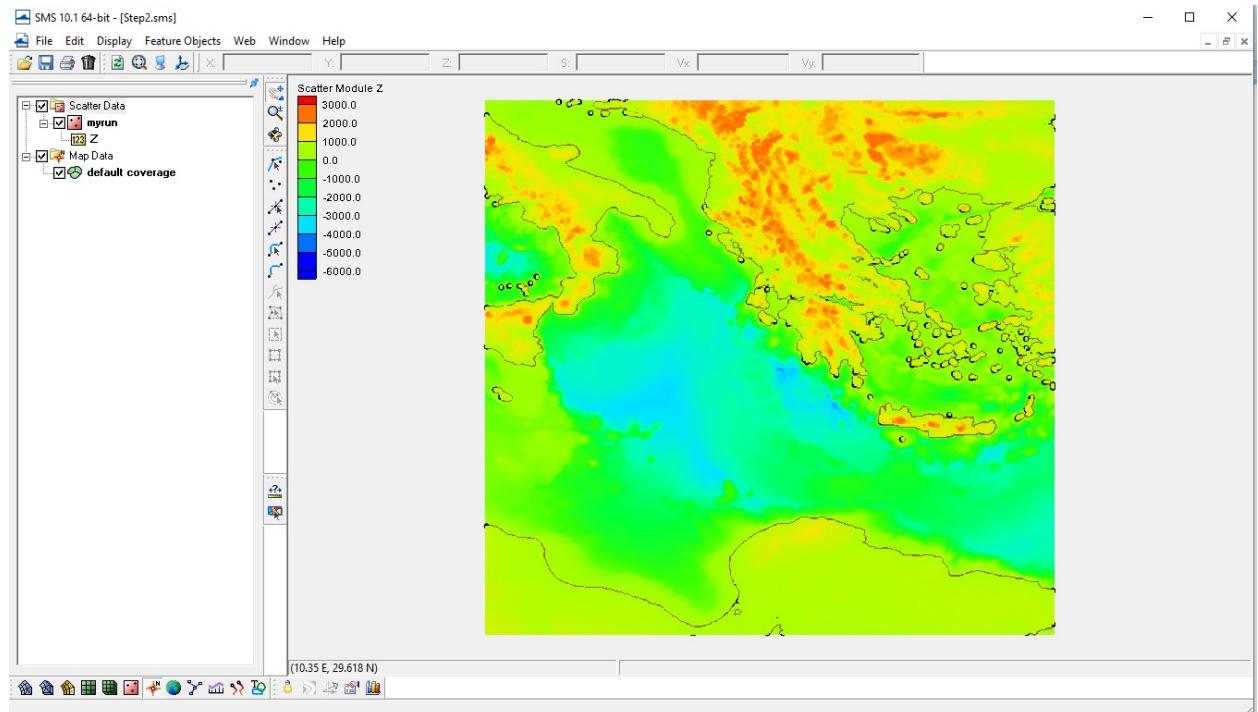


STEP2: Creation of Coastline (.cst) and Scatter Point (.pts) files

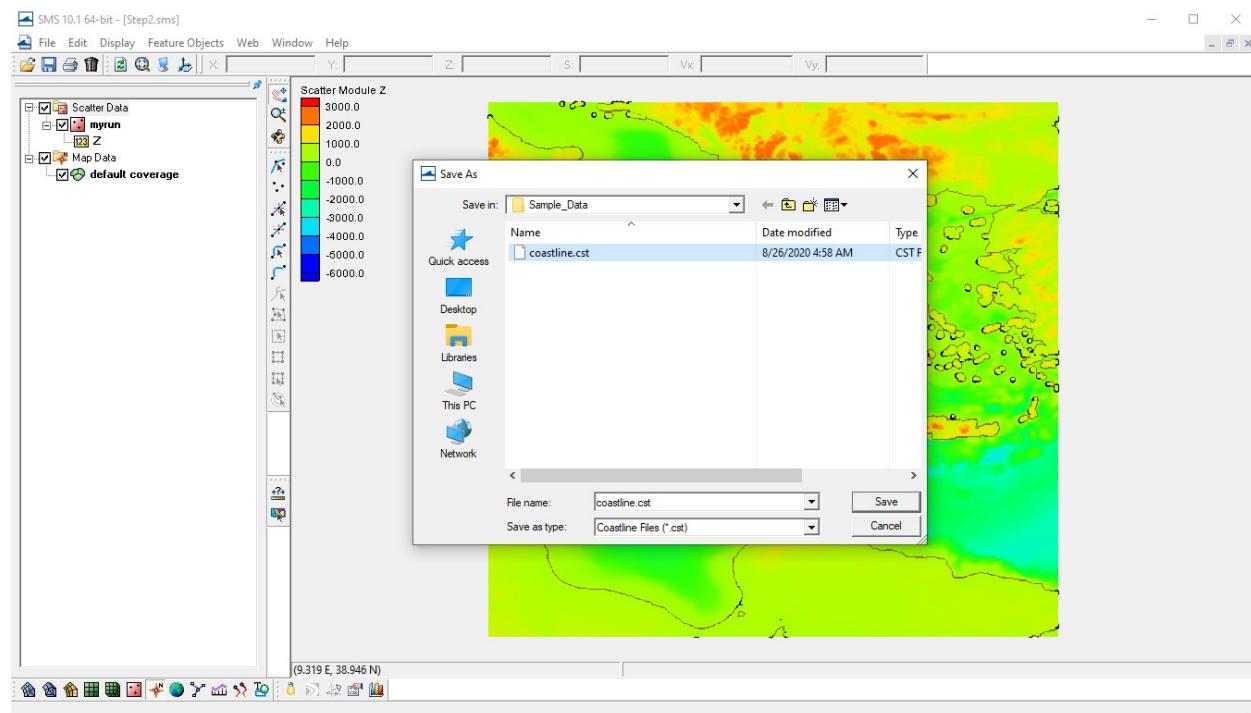
2.1. Switch to “Map Module” from ‘Scatter Module’ (In Lower left corner), then Click to feature objects for creation of coastline

- Create contour arcs window will be appear in this put spacing to 0.001
- Click ok coastline will appear in xyz file

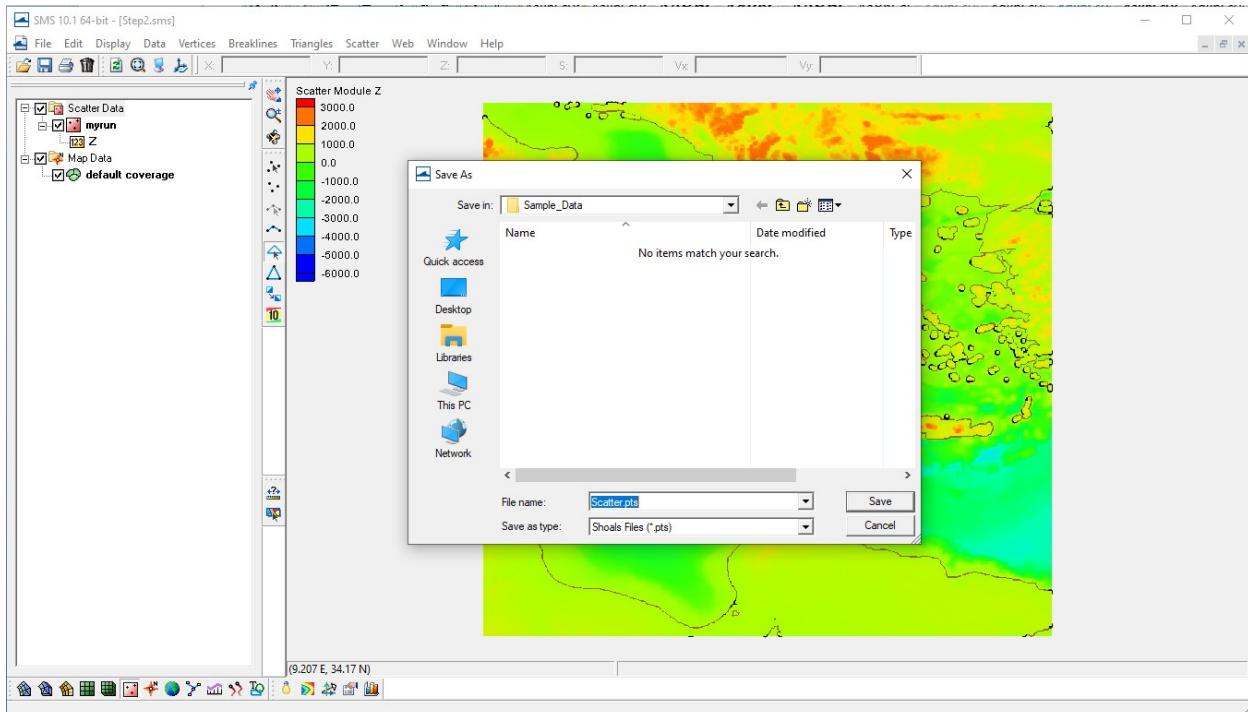




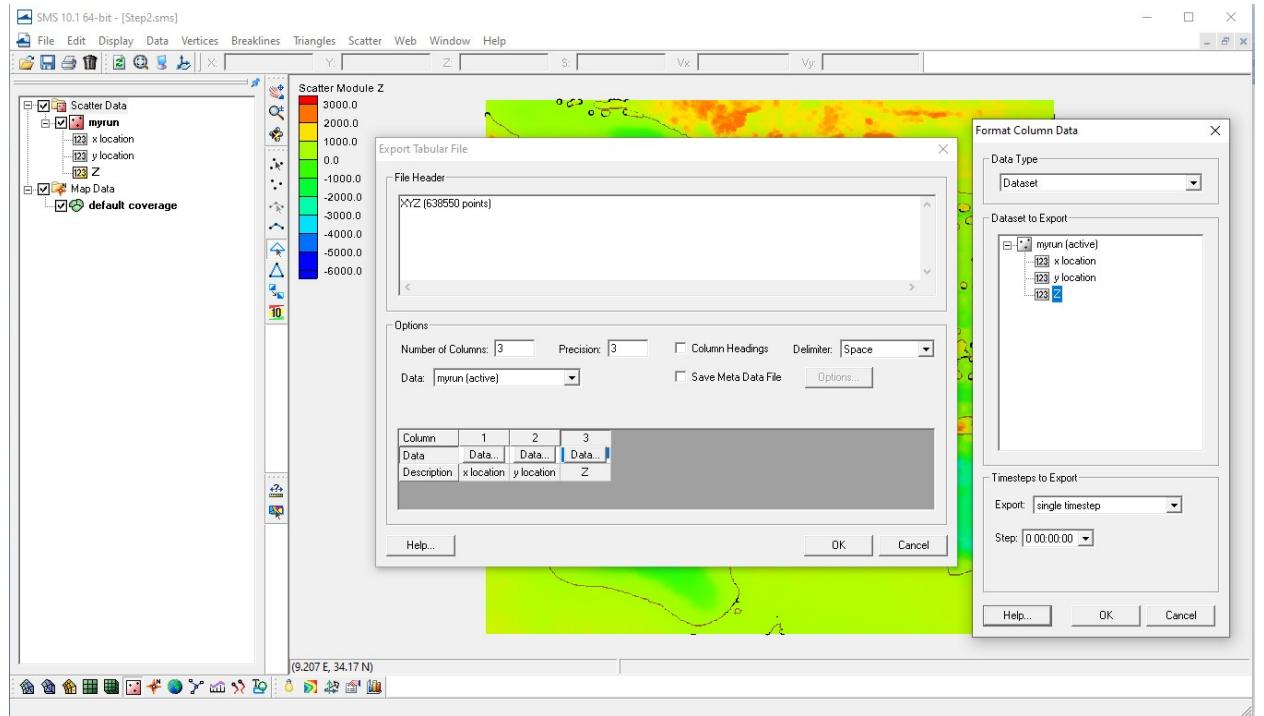
2.2. Go to file and click save as file name, save as type →coastline files (.cst) - →then save



2.3. Switch to ‘Scatter Module’ from “Map Module” (In Lower left corner), go to file menu -→Save as →File Name →Save as Type --Shoals Files (*.pts) then Save.

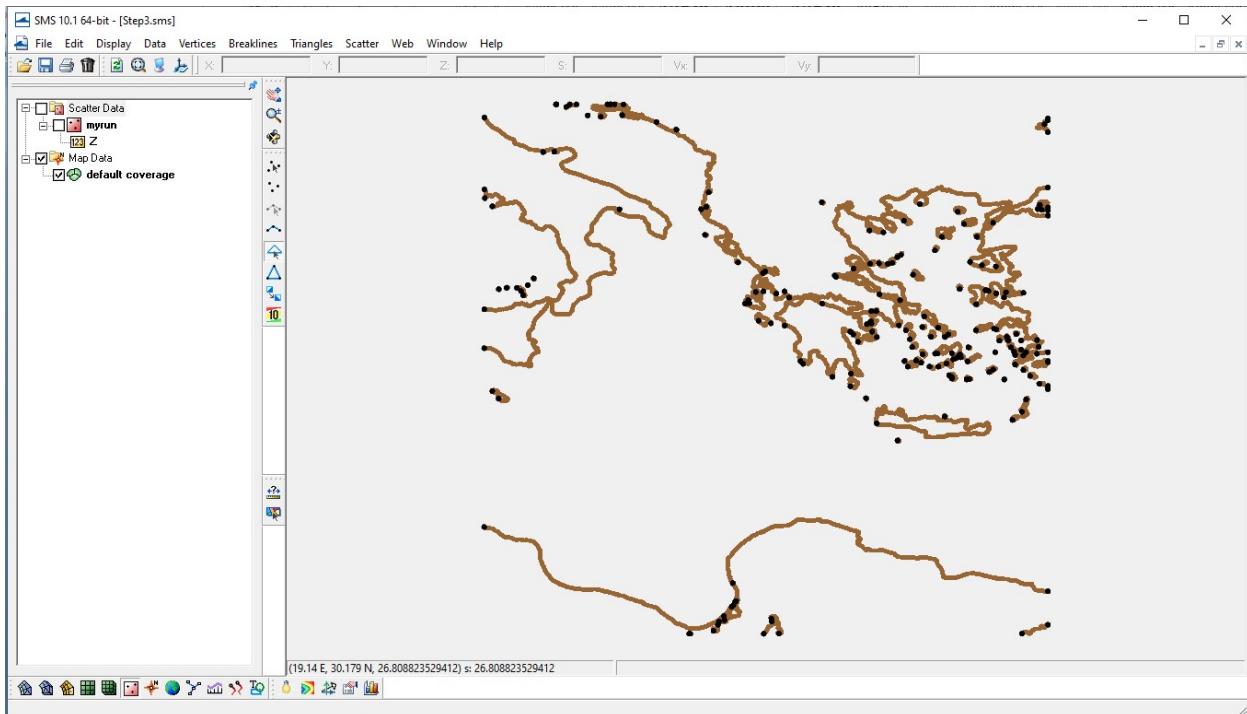


- Click save then Export Tabular File will be appear
- Click data below 1 then format column data will appear then click x location then click ok
- Similarly click data below 2 select y location in format column data and click ok
- Similarly click data below 3 select z location in format column data and click ok
- Then click ok then save.

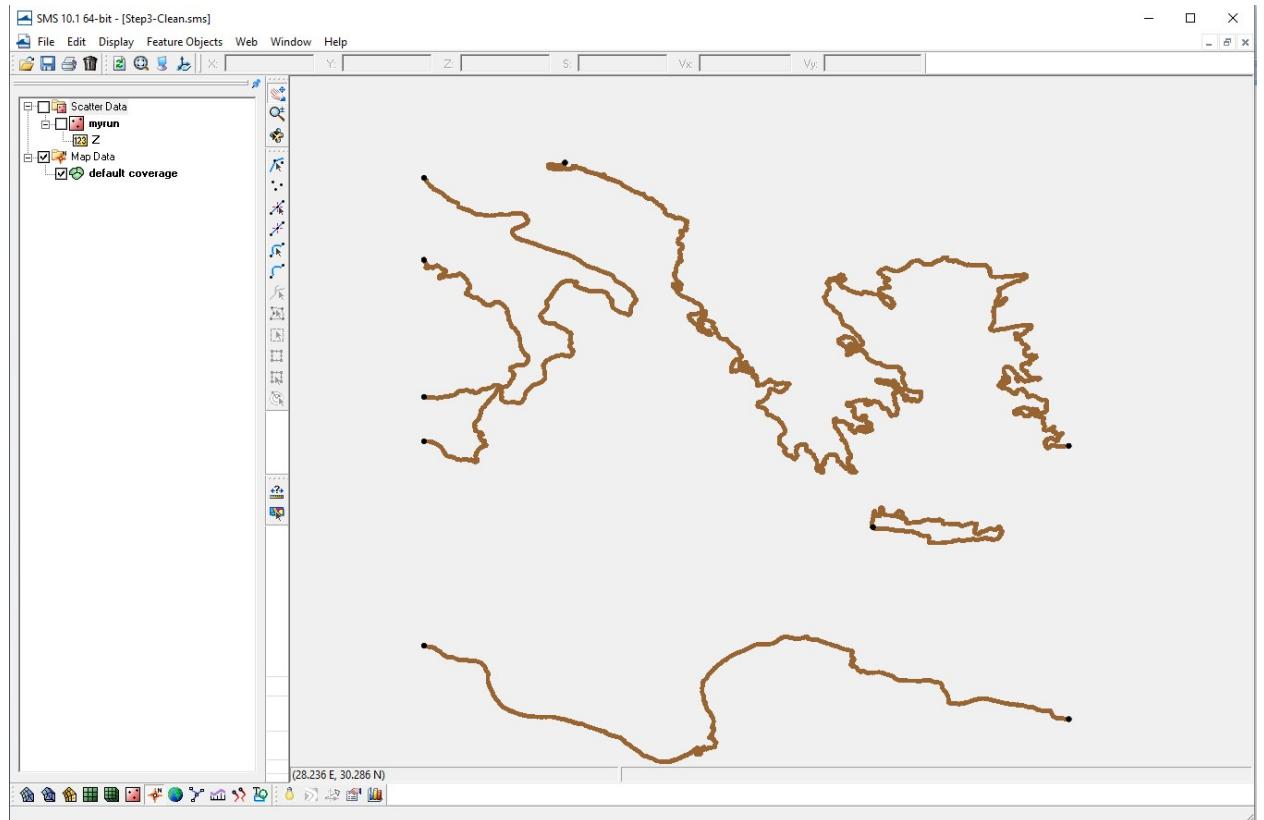


STEP3: ARC CLEAN and Attribute Assignment (Land / Ocean)

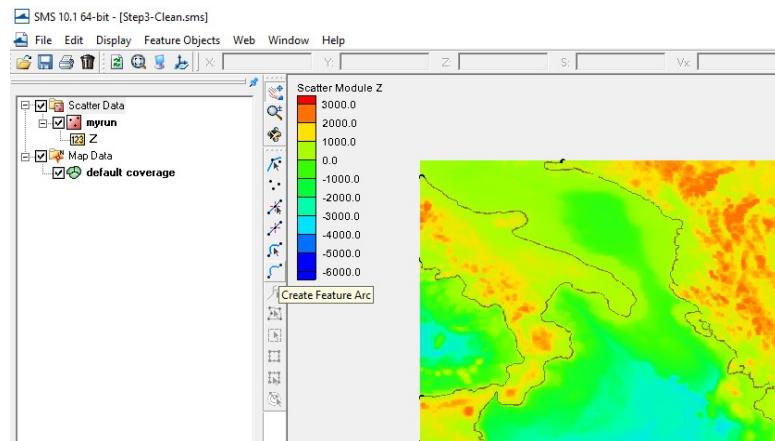
3.1. Switch to “Map Module” and click on default coverage (center tool boxbar), click on Select The Feature Arc (), Zoom coastline and Delete the Unwanted Arcs



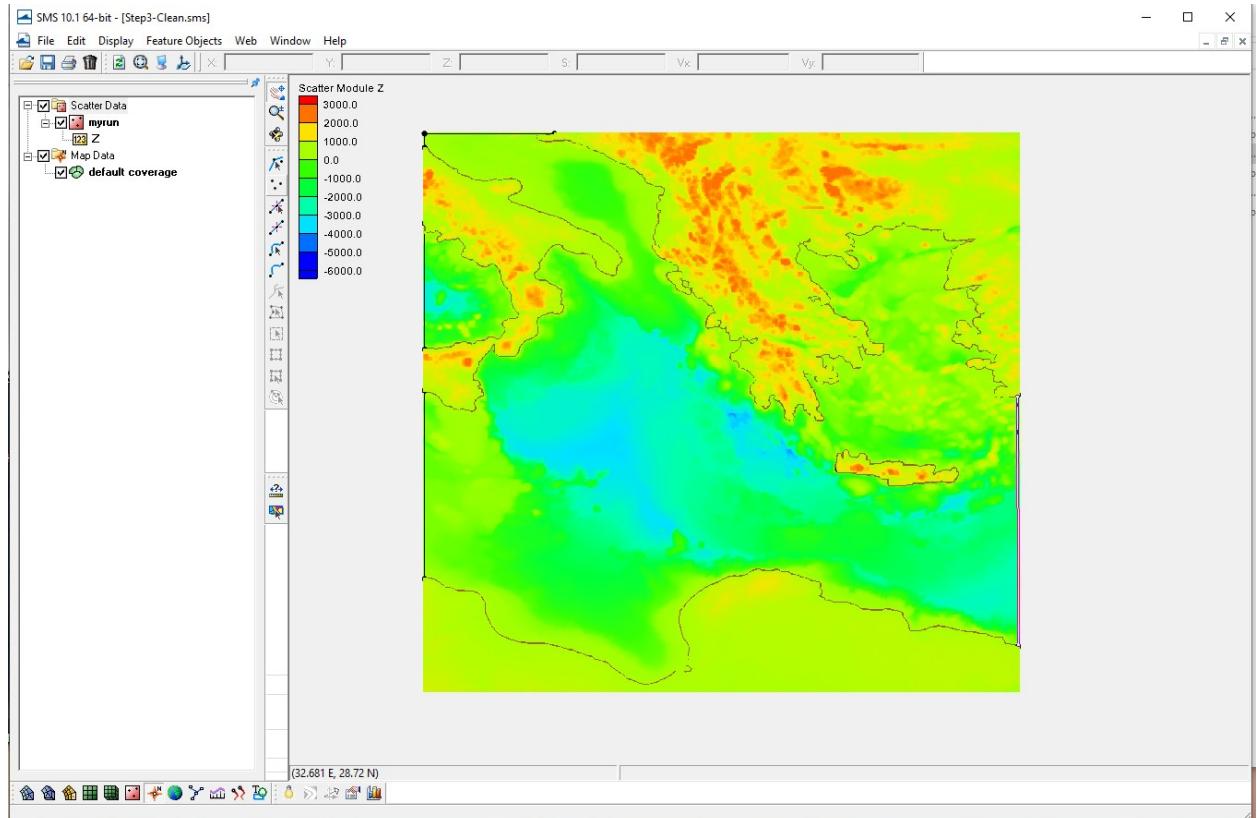
- Repeat The Procedure For All Arc Select And Delete Unwanted Arcs
- Arc Cleaning Complete By Selecting And Deleting Arc
- Go To File And Save As Name Clean Example Test_Clean.Sms (Project Files (*.sms))



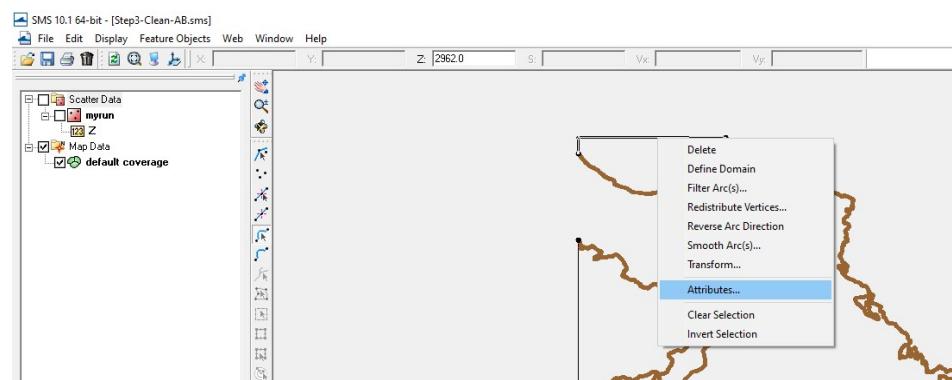
- Now click on create feature arc  and create features by clicking on land and ocean boundaries

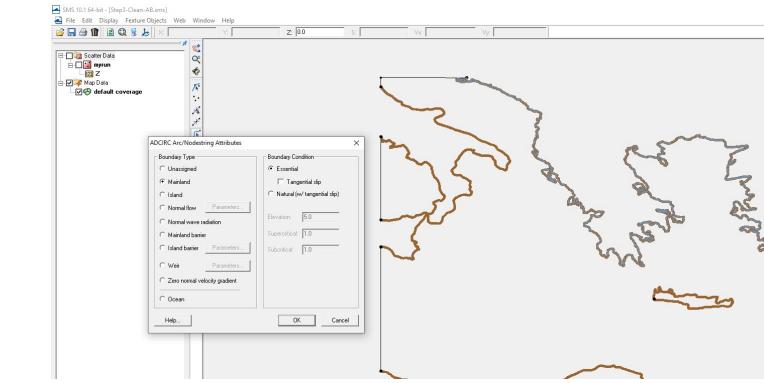


- first click at one point then click on other point which will create ocean boundaries

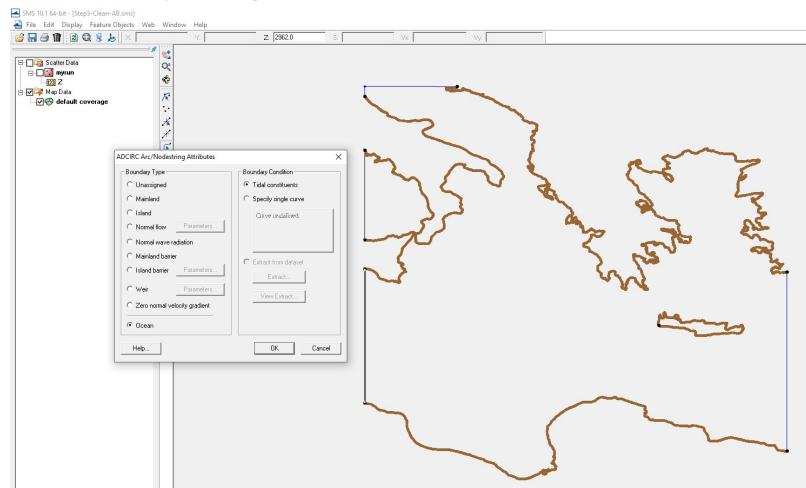


- Uncheck scatter data and save
- Click on select feature arc, select the feature and right click on it (on boundary line) options menu will pop up, go to the attributes and click it adcirc arc node string attributes will appear, click on the ocean-mainland or -island and click ok



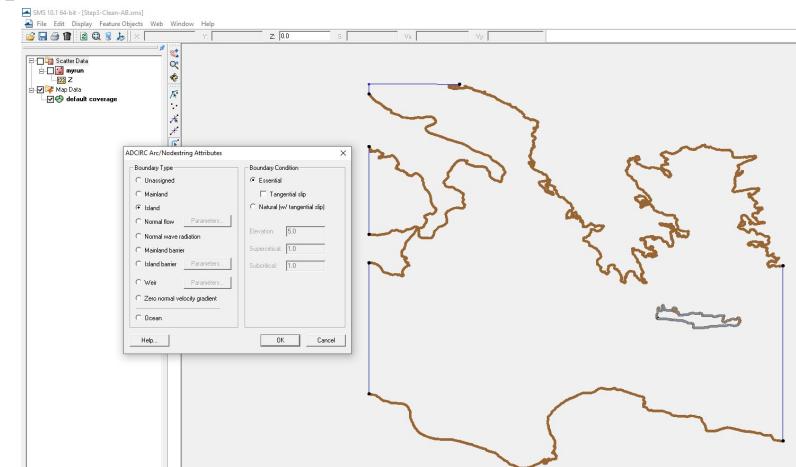


Boundary assignment (Main Land) – **Brown color**



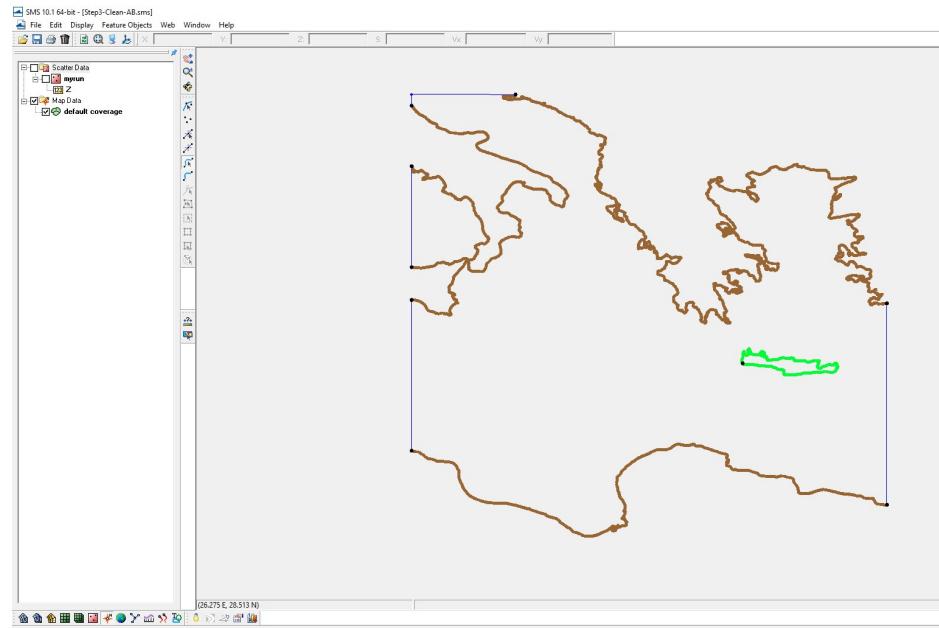
Boundary assignment (Ocean) – **Blue Color**

- Repeat for other arcs, after assigning attributes as ocean
- Repeat the process for mainland and island also



Boundary assignment (Island) – **Green Color**

- After complete editing and assignment of attributes then Main land, Ocean

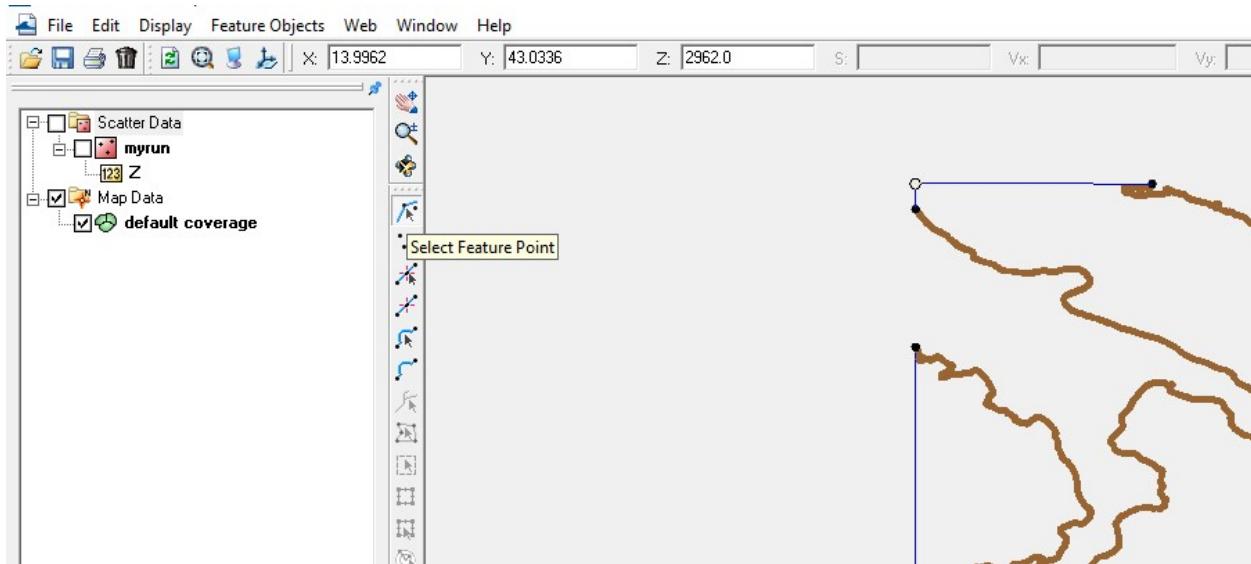


and Islands of Brown, Blue and Green color Poly Lines will appear.

STEP4: ARC – Redistribution of Nodes and Vertices

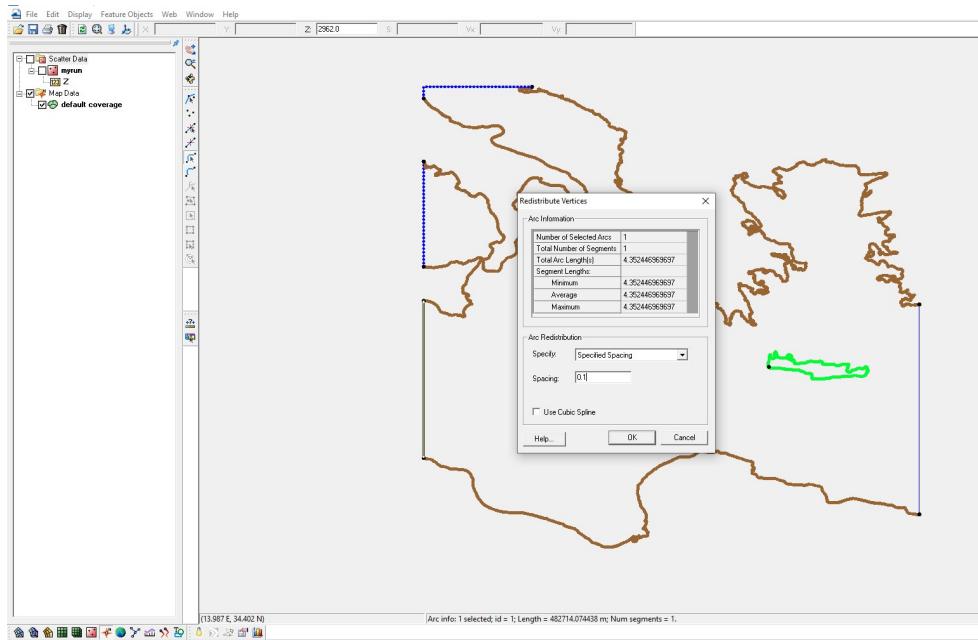
4.1. Switch to “Map Module” and Select feature point

- Select the point then right click convert to vertex
- Convert all feature point (those “nodes” intermittently present in Ocean boundaries / Land boundaries / Island ploy lines) to vertex, if any

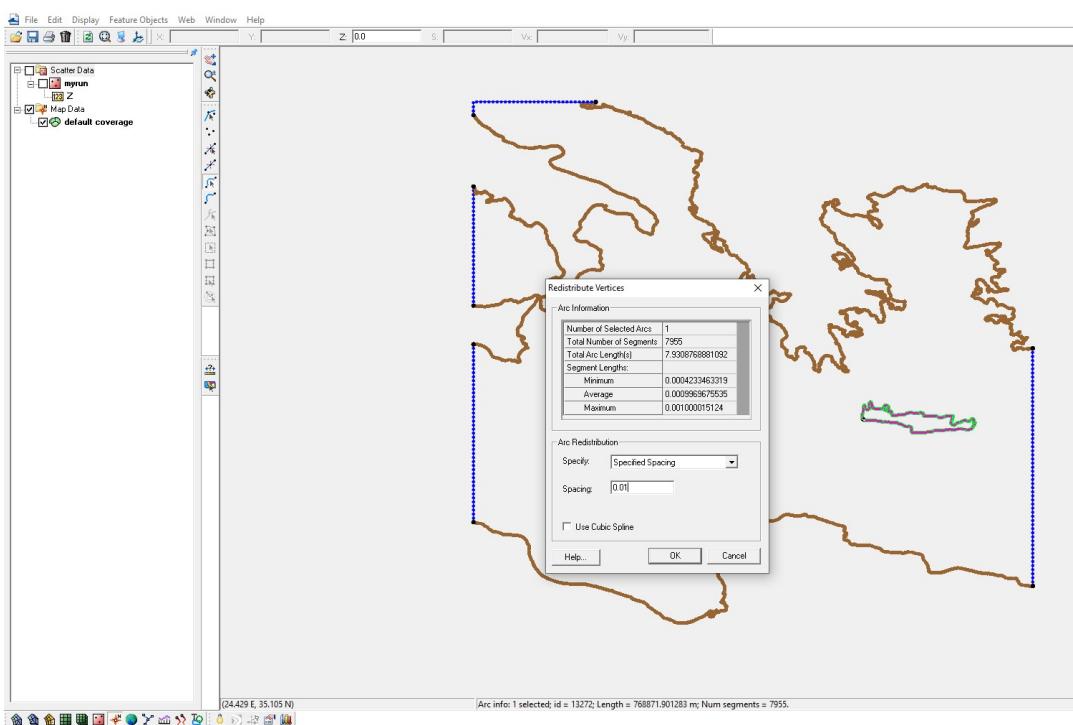


2. Now go to select feature arc and right click on arc - either on ocean, main land or island

- Click on the feature point and right click to convert node to vertex, if any
- Click on the arc and right click to redistribute vertices
- Redistribute vertices and select specified spacing and give spacing to Mainland, Ocean boundaries, Islands (resolutions e.g. 0.01, 0.001, 0.1 etc.) and Higher resolution to area of interest
- In this tutorial test case specified spacing given to ocean is 0.1, to land is 0.01 and to islands is 0.01



Redistribution of Boundary vertices (Ocean) – **Blue Color**



Redistribution of Boundary vertices (Islands) – **Green Color**

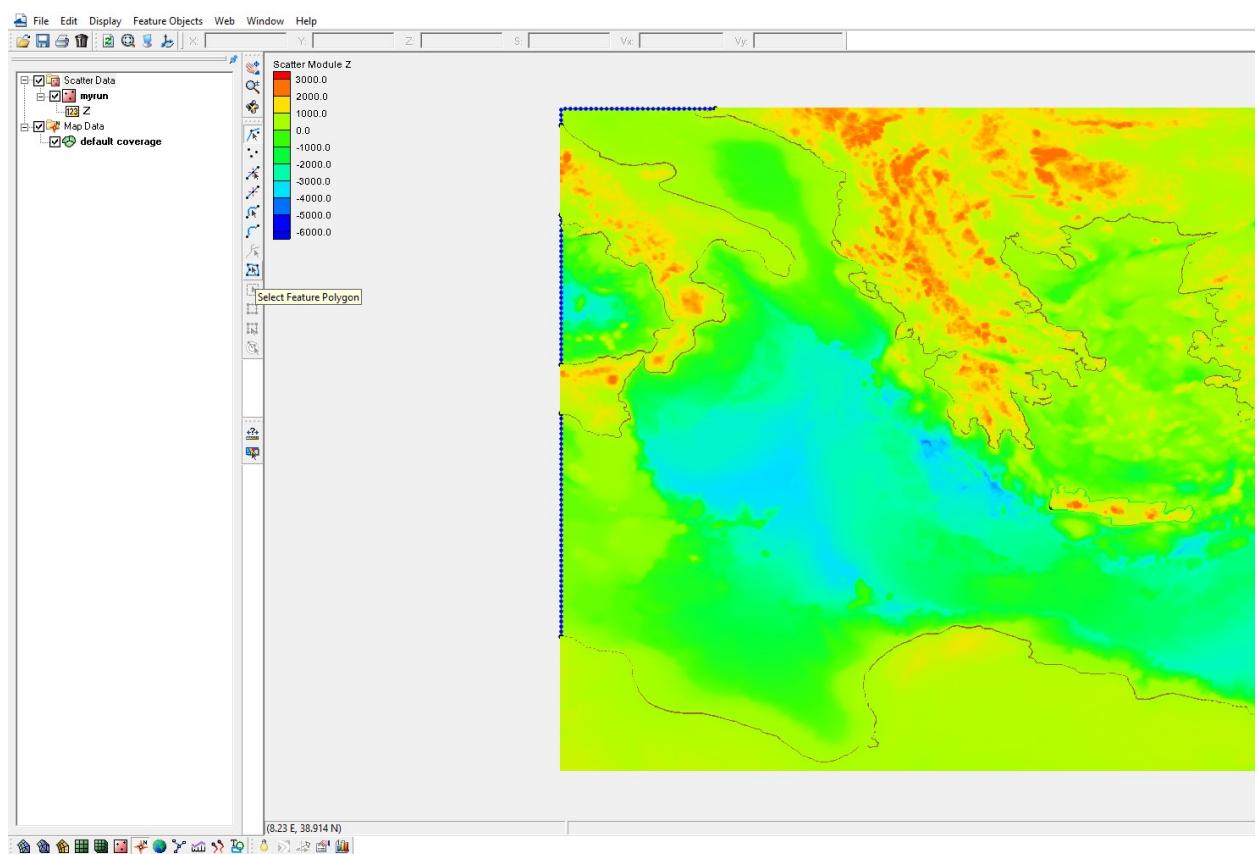
STEP5: ARC - Build Polygons

5.1. Now go to Feature Objects menu then select clean

- Clean options will come then click ok (with default values)
- Now save the project as test_clean_rd_clean_bp go to feature object clean again, clean options will come then make it clean again

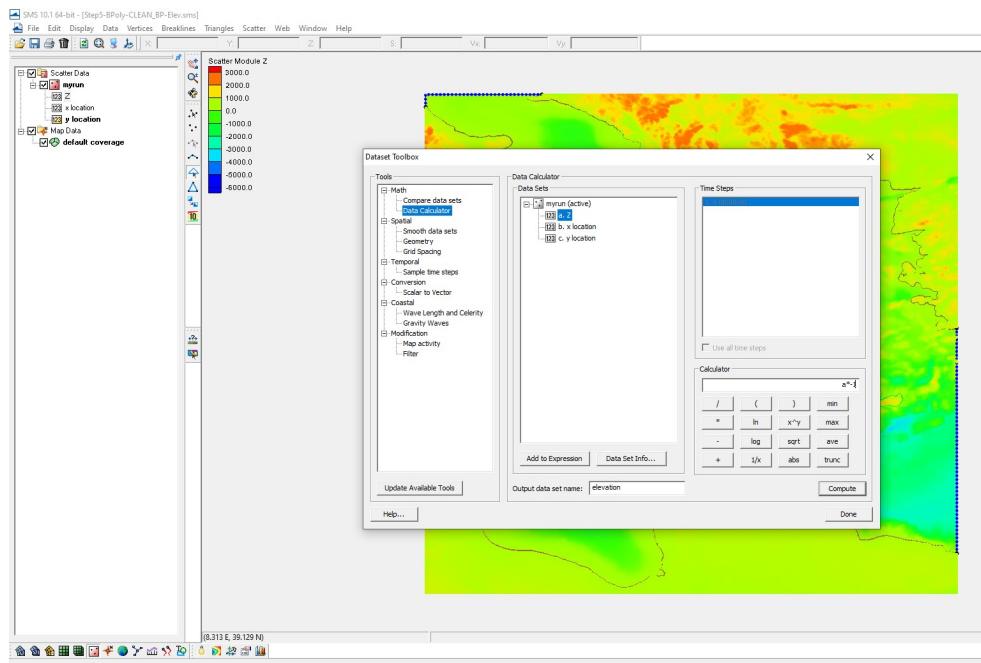
5.2. Then go to feature objects and build polygons

- Now select polygon option is displayed

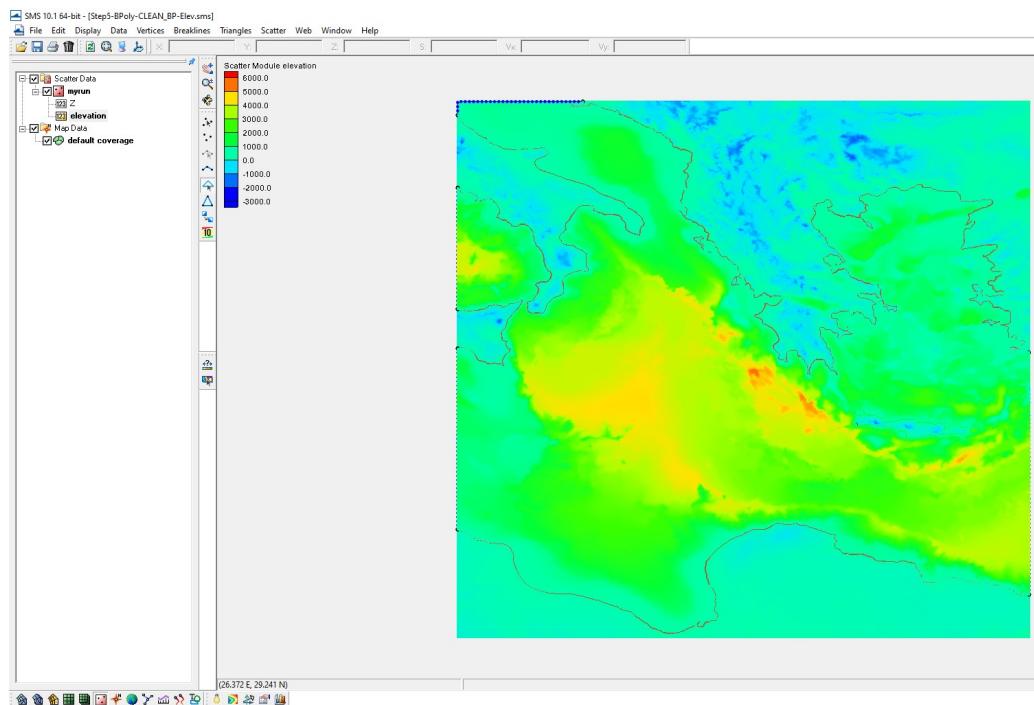


5.3. Now click on scatter data and go to Scatter Module

5.4. Go to data then data calculator → dataset toolbox will appear



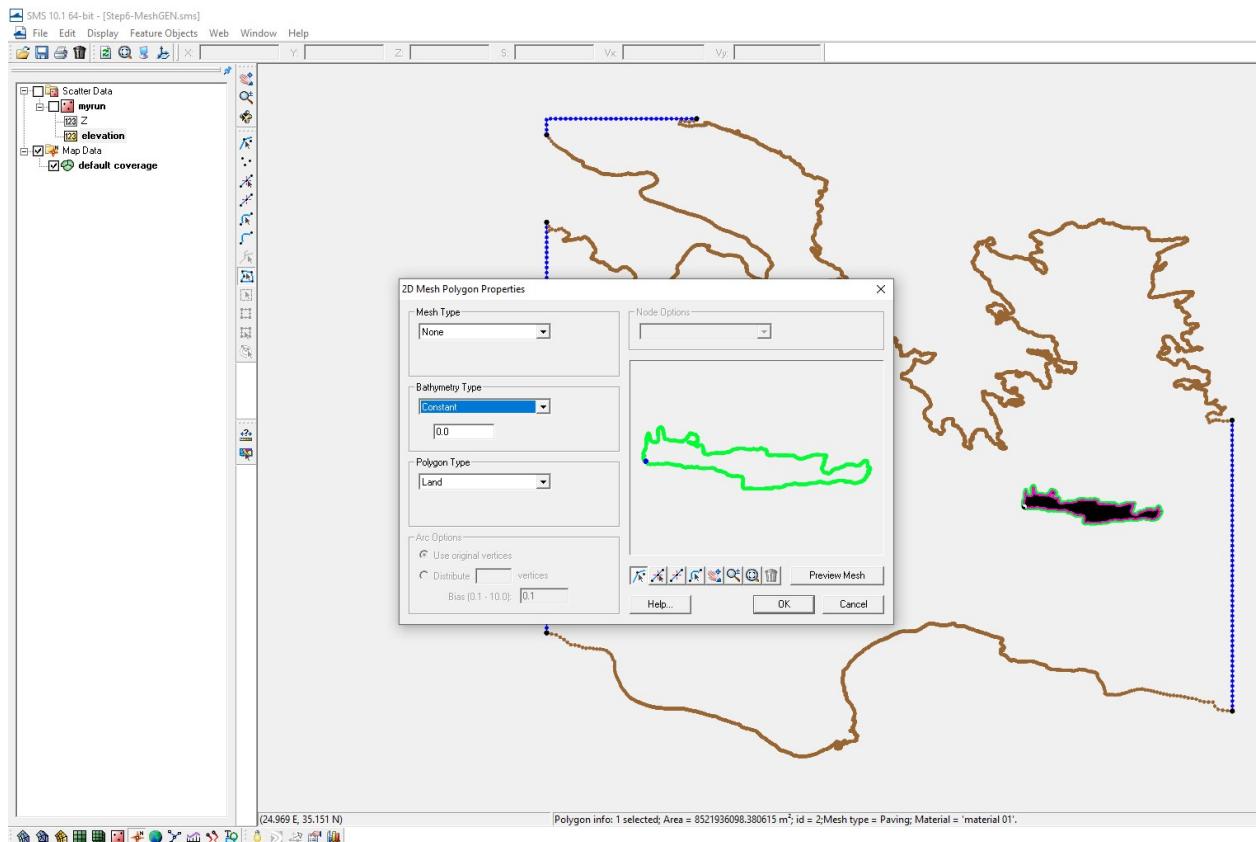
- Double click a.z and put output data set name to elevation
- In calculator field multiply a by -1 then click compute → d.elevation will appear in data sets → then click on done



STEP6: Generate Mesh

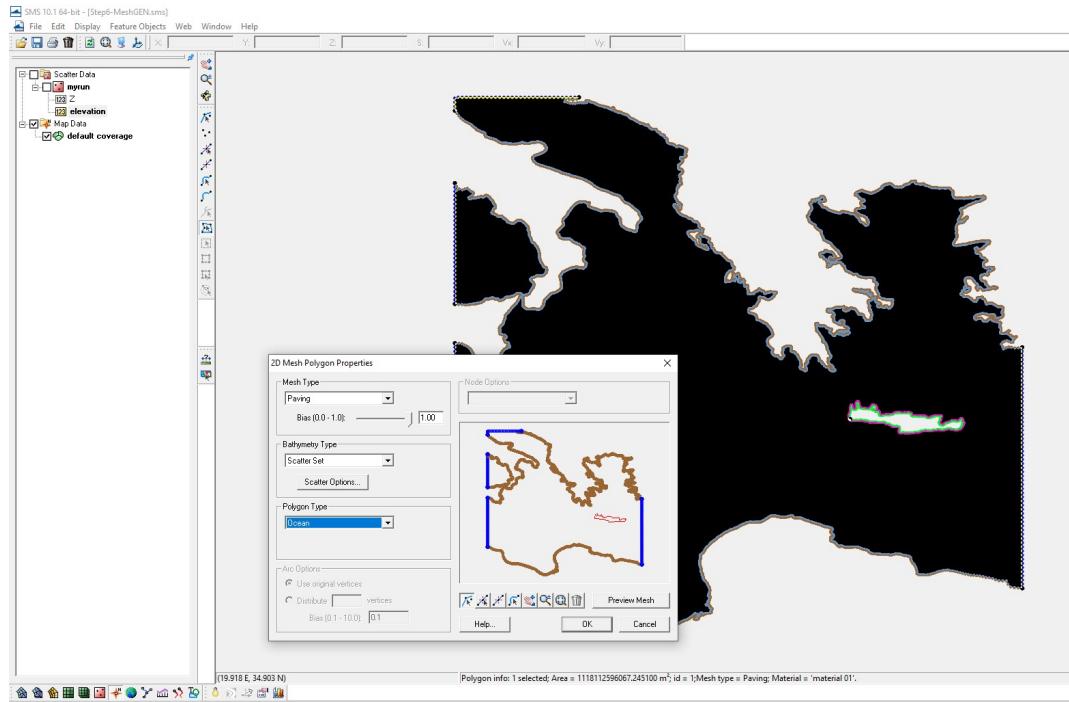
6.1. Switch to Map Module

- Uncheck scatter data → select polygon features  → Click on the island → then double click on the island 2d mesh polygon properties will appear
- In mesh type click none and polygon type click land → click ok
- Repeat for other islands also

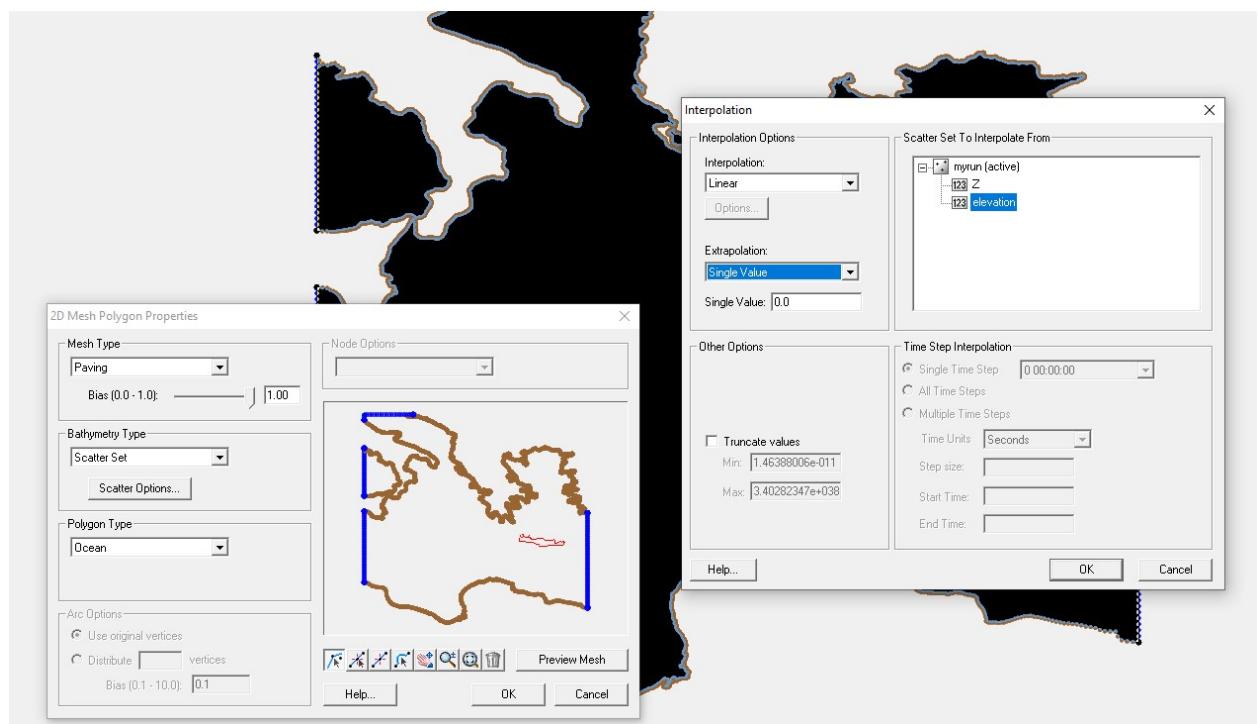


6.2. Now select ocean → then double click on the ocean 2d mesh polygon properties will appear

- In mesh type click paving , → in bathymetry type select scatter set, → then click on scatter option below it interpolation pop up will appear



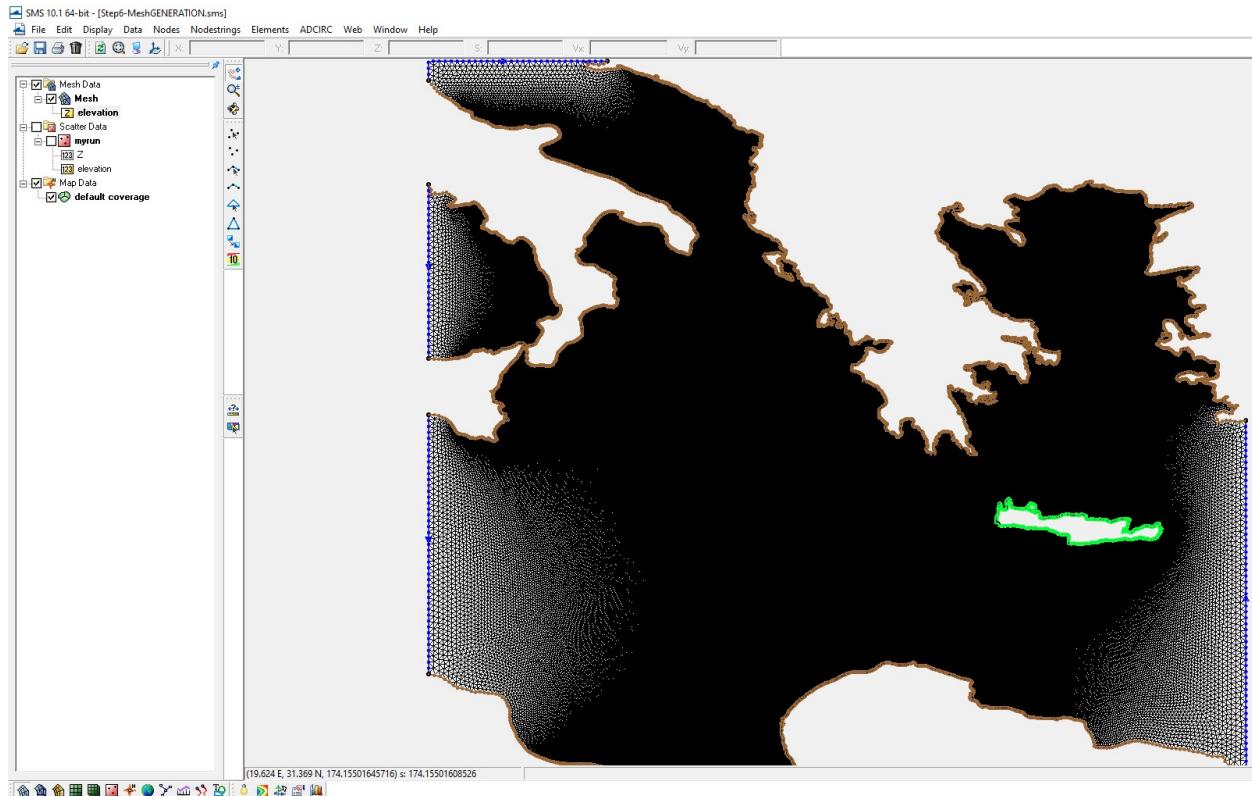
- In scatter set interpolation option to give linear and to interpolate from click elevation
- Click ok → polygon type click ocean, → click ok
- Now check scatter data and save it



6.3. Uncheck scatter data and save it

6.4. Go to File menu and save as test mesh (optional)

6.5. Go to Feature Object menu and click on ‘Map-->2d Mesh’ to generate mesh



6.6. Finally generated mesh → save in the file menu as SMS project

6.7. Switch to Mesh Module then in File menu save as “fort.14” select adcirc file