

**Hands-On**

# **Preparation of base map**

**Training Course on  
'Marine GIS for Operational Oceanography'**

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# What is Base map ?

- Basemaps contain **reference information** which provides different **geospatial information** based on what the cartographer is trying to communicate.
- Typical GIS data and imagery that make up the layers for a basemap: **streets, parcels, boundaries** (country, county, city boundaries), shaded relief of a digital elevation model, waterways, and aerial or satellite imagery.



# Overview

- I. Create new feature class (point, line and polygon)
- II. Digitize feature class: River, village, administrative boundary and others
- III. Features Selection Criteria
  - Select by attribute
  - Select by location
  - Select by graphics
- IV. Layout view and generation different maps (Base map, Rainfall, maximum Tsunami wave height and topography maps)

# ArcGIS view port

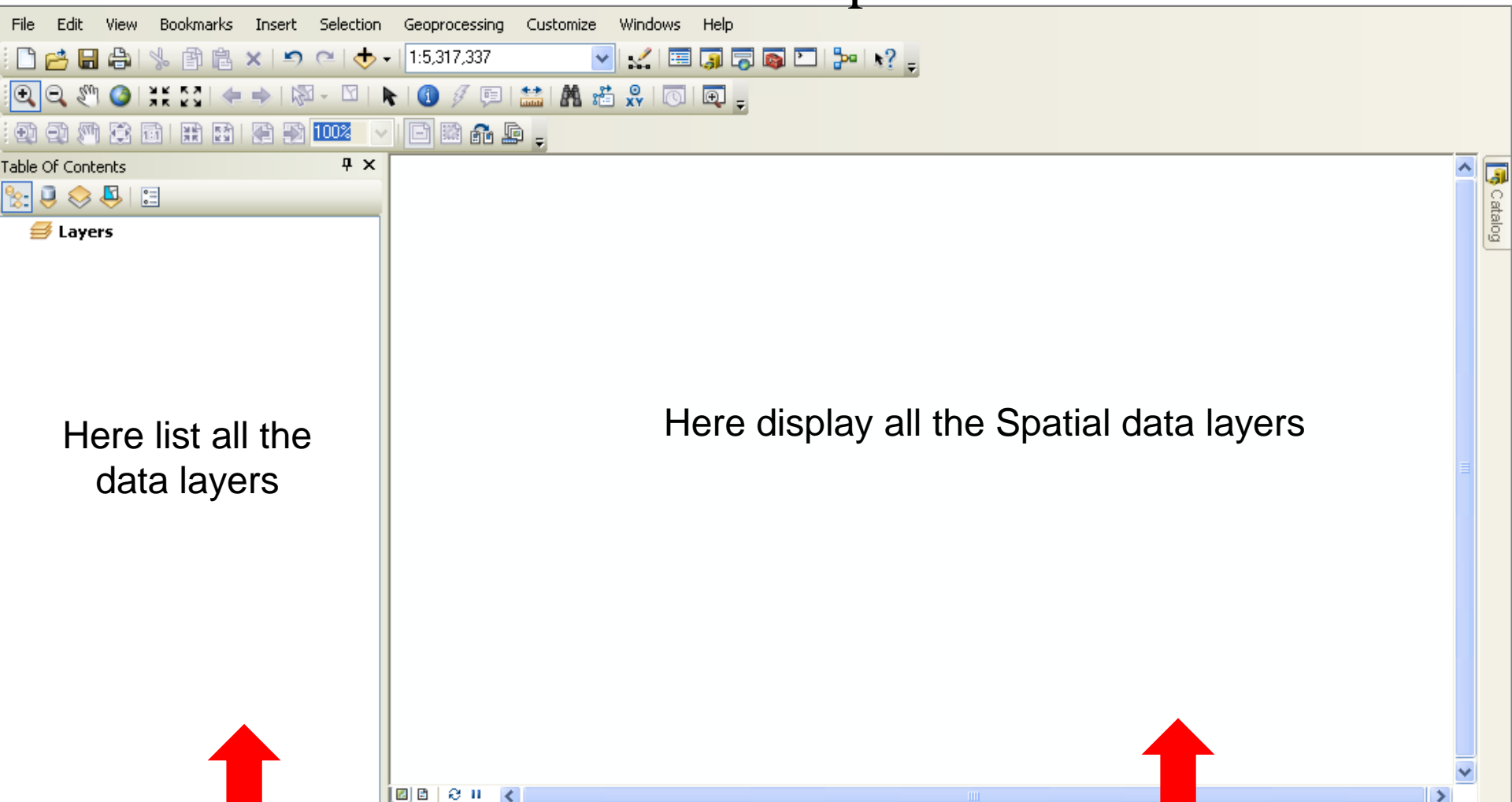
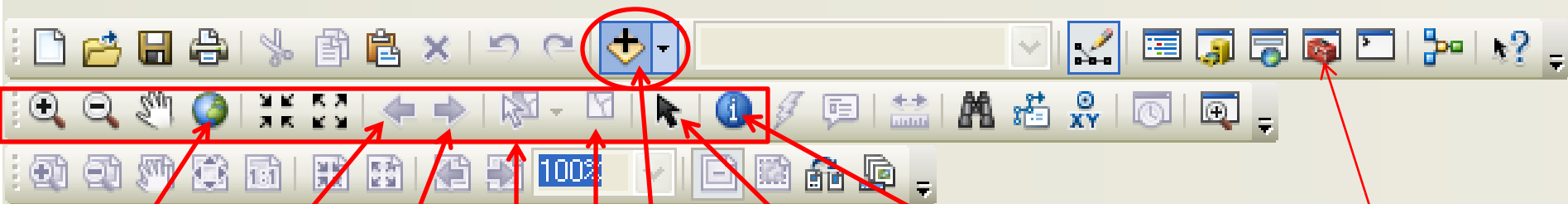


Table of contents that shows the doc's layers.

"data frame"



Go to full map extent

Go to previous extent

Go to next extent

Select features (by hand)

Clear selected features

Add data

Select elements (to move or edit)

Identify feature

ArcGIS tools

Download Landsat data from <http://earthexplorer.usgs.gov/>

The screenshot displays the Earth Explorer web interface. The top navigation bar includes the USGS logo, the text "science for a changing world", and links for "USGS Home", "Contact USGS", and "Search USGS". The main header area shows "EarthExplorer" and a "Page Expires In 1:59:14" timer. Below the header, there are tabs for "Search Criteria", "Data Sets", "Additional Criteria", and "Results". The "Data Sets" tab is active, showing a section titled "2. Select Your Data Set(s)" with instructions on how to search for data sets. A "Data Set Search" input field is present. A list of data sets is shown, with "Landsat Archive" highlighted by a red box. Under "Landsat Archive", the following options are listed: "L8 OLI/TIRS", "L8 OLI/TIRS Pre-WRS-2", "Landsat Surface Reflectance - L8 OLI/TIRS", "L7 ETM+ SLC-off (2003-present)", "L7 ETM+ SLC-on (1999-2003)", "Landsat Surface Reflectance - L7 ETM+", "L4-5 TM", "Landsat Surface Reflectance - L4-5 TM", and "L1-5 MSS". The "Search Criteria Summary" section on the right shows a map of the Pacific Ocean with a red polygon highlighting a region around "North Reef Island". The map includes a coordinate display: "(12° 57' 18\" N, 092° 29' 07\" E)". The map also shows a "Map" button, a "Satellite" button, and a "Clear Criteria" button. The bottom right corner of the map area shows a "Mayabunder" label and a "223" marker.

USGS  
science for a changing world

EarthExplorer

Page Expires In 1:59:14

Home Save Criteria Load Favorite Manage Criteria

Item Basket (0) prakash.marine Feedback Help

Search Criteria Data Sets Additional Criteria Results

2. Select Your Data Set(s)  
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.

☐ Use Data Set Prefilter (What's This?)

Data Set Search:

- Digital Elevation
- Digital Line Graphs
- Digital Maps
- EO-1
- Global Fiducials
- Global Land Survey
- HCMM
- ISERV
- Landsat Archive**
  - ☒ L8 OLI/TIRS
  - ☒ L8 OLI/TIRS Pre-WRS-2
  - ☐ Landsat Surface Reflectance - L8 OLI/TIRS
  - ☐ L7 ETM+ SLC-off (2003-present)
  - ☐ L7 ETM+ SLC-on (1999-2003)
  - ☐ Landsat Surface Reflectance - L7 ETM+
  - ☐ L4-5 TM
  - ☐ Landsat Surface Reflectance - L4-5 TM
  - ☐ L1-5 MSS
- Landsat Legacy
- Landsat MRLC
- NASA LPDAAC Collections
- Radar

Search Criteria Summary (Show)

Map Satellite

(12° 57' 18" N, 092° 29' 07" E) Options Overlays

North Reef Island

Interview Mayabunder

223

# Download Landsat data

The screenshot displays the EarthExplorer.usgs.gov web interface. On the left, a sidebar shows search results for Landsat data, including a table with columns for Path, Row, and Entity ID. The main map area shows a satellite image of a coastal region. A 'Download Options' dialog box is open on the right, listing various download options with their respective file sizes. A Windows 'Save As' dialog box is also open in the foreground, showing the file name 'LC81340512015295LGN00.tar' and the save type 'WinRAR archive'.

EarthExplorer.usgs.gov

the dropdown to see the search results for each specific data set.

Show Result Controls

Data Set Click here to export your results

L8 OLI/TIRS

Path	Row	Entity ID	Coordinates	Acquisition Date
134	51	LC81340512015295LGN00	13.01236, 82.73085	22-OCT-15

Entity ID: LC81340512015295LGN00  
Coordinates: 13.01236, 82.73085  
Acquisition Date: 22-OCT-15  
Path: 134  
Row: 51

Download Options

- Download LandsatLook "Natural Color" Image (4.8 MB)
- Download LandsatLook "Thermal" Image (1.7 MB)
- Download LandsatLook "Quality" Image (1.0 MB)
- Download LandsatLook images with Geographic Reference (7.6 MB)
- Download Level 1 GeoTIFF Data Product (772.9 MB)

Save As

ADCIRC

Organize New folder

Name	Date modified	Type
aa	19-Nov-15 5:04 PM	File folder

File name: LC81340512015295LGN00.tar

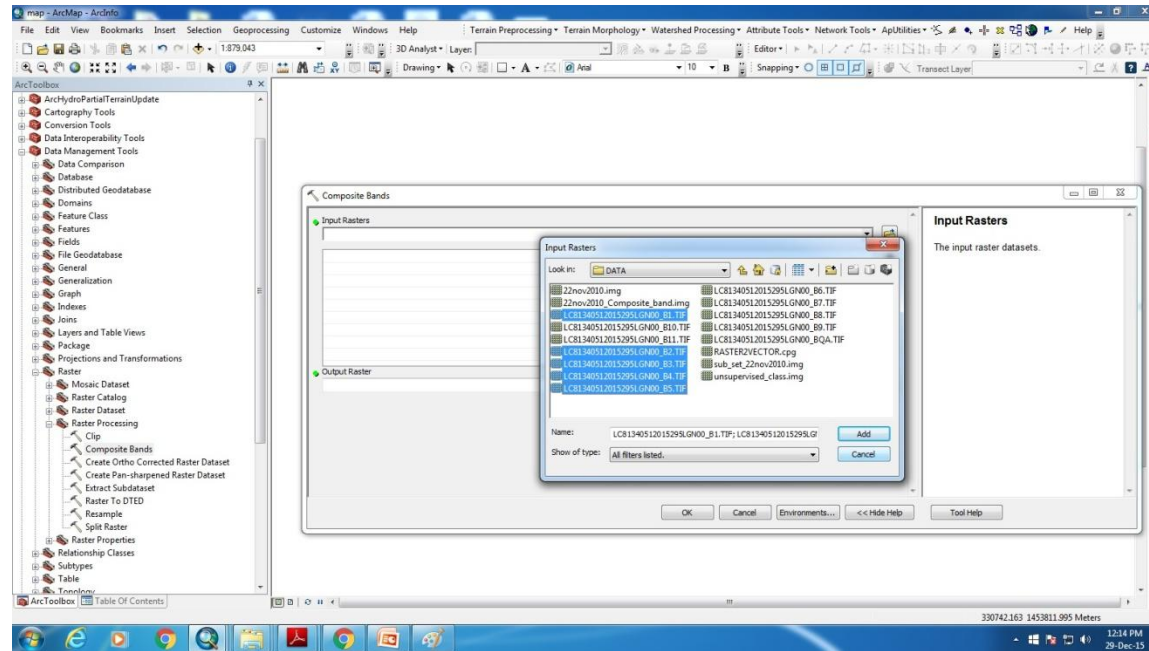
Save as type: WinRAR archive

Save Cancel

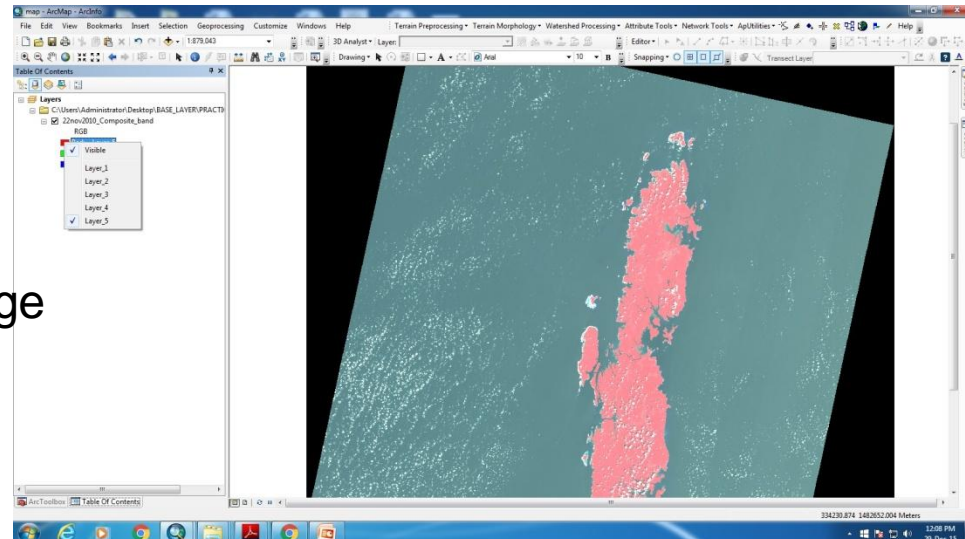
11:24 AM  
20-Nov-15



# Band Composite



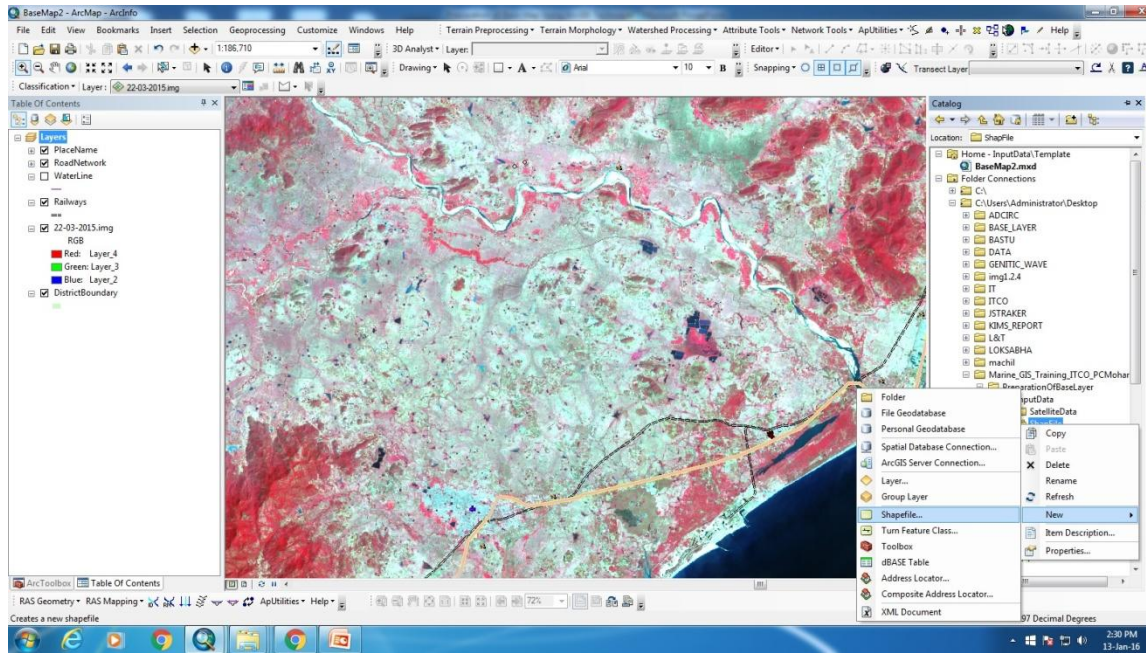
Go to Data Management Tool→ Raster → Raster Processing → Composite Bands then select band1,2,3,4 and 5



FCC Landsat Image



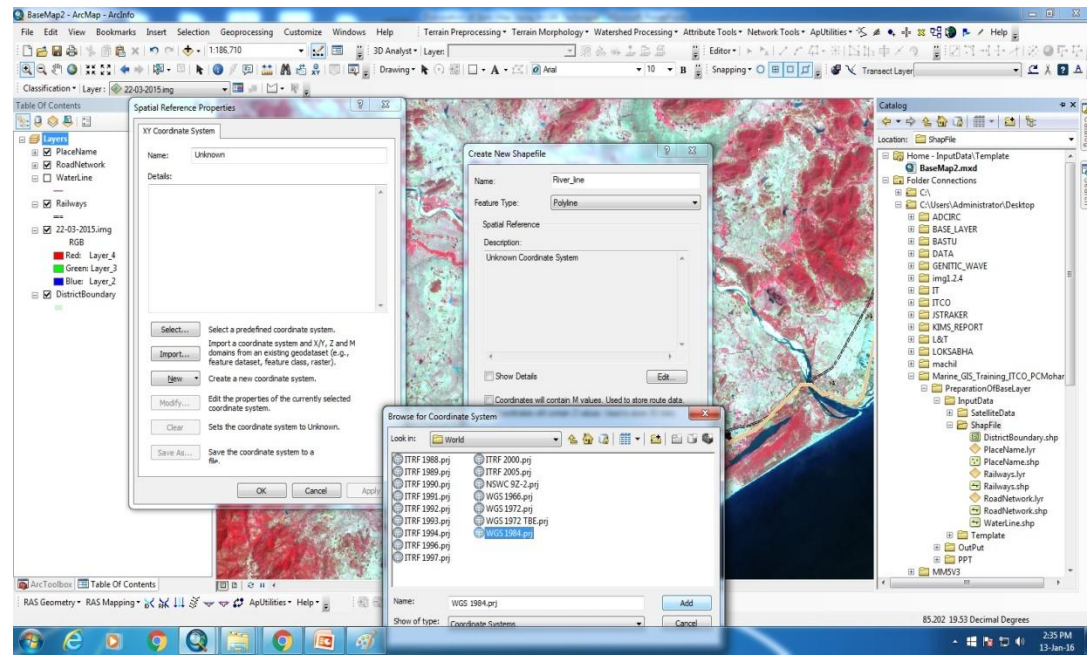
# Create New feature shapfile

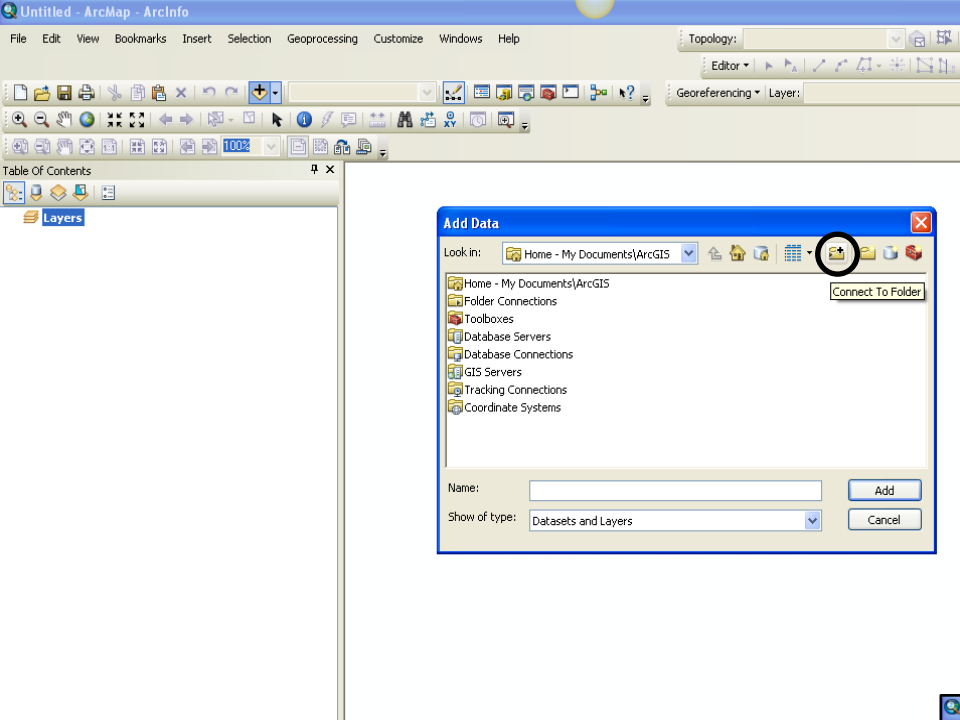


Go to Catalog → Navigate to Working folder → Right click on folder and Create Shapefile

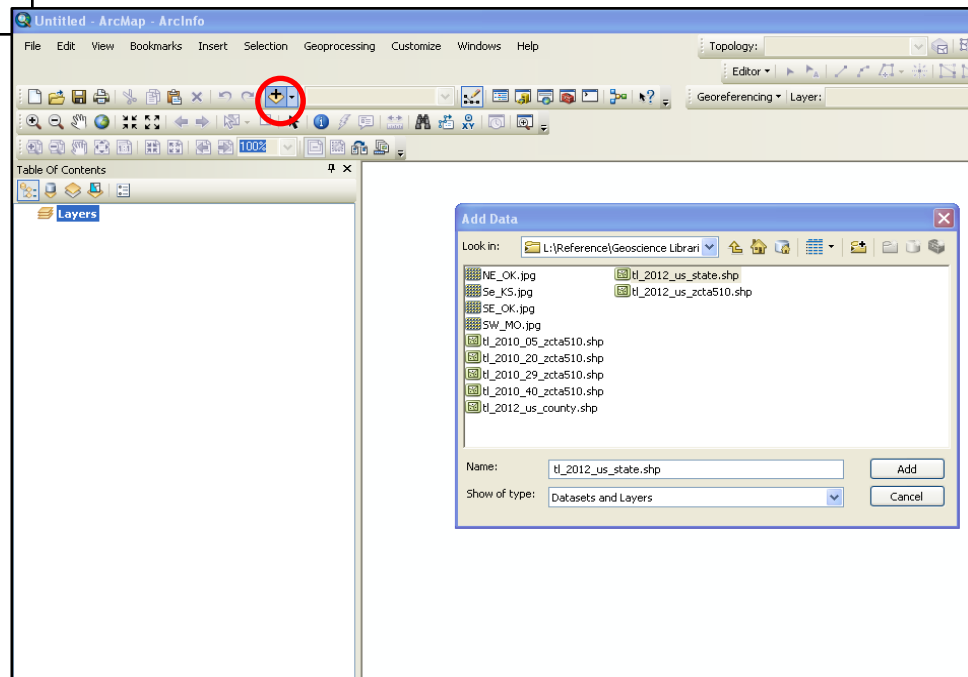
Assign projection to shapefile

- Create New shapfile window will popup.
- Insert File Name and feature type as polyline.
- Go to edit button, then select predefined coordinate system and assign to geographic wgs84 projection.



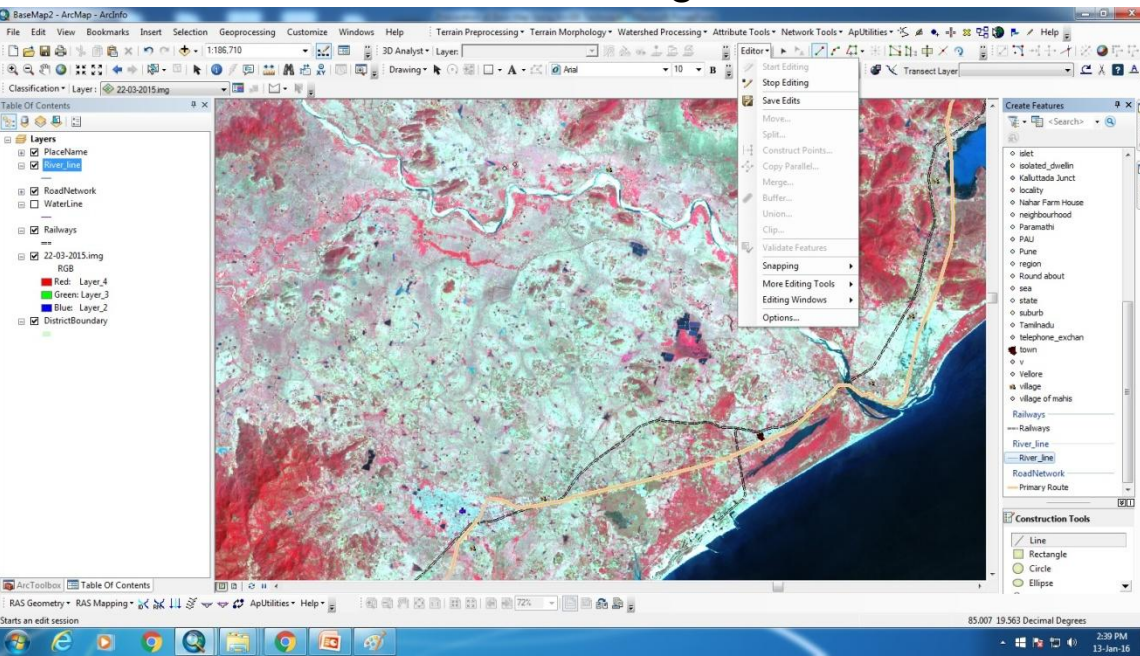


Add all blank feature class (line, point and polygon) files and satellite data to generate base layer database using add data button.



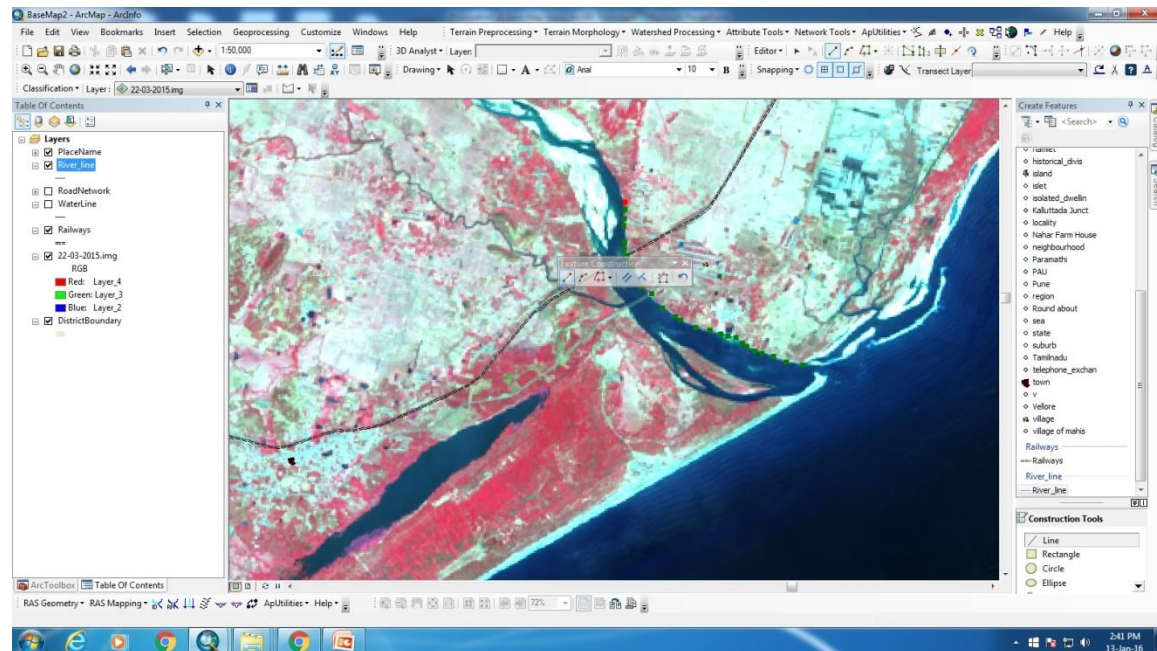


# Start Editing

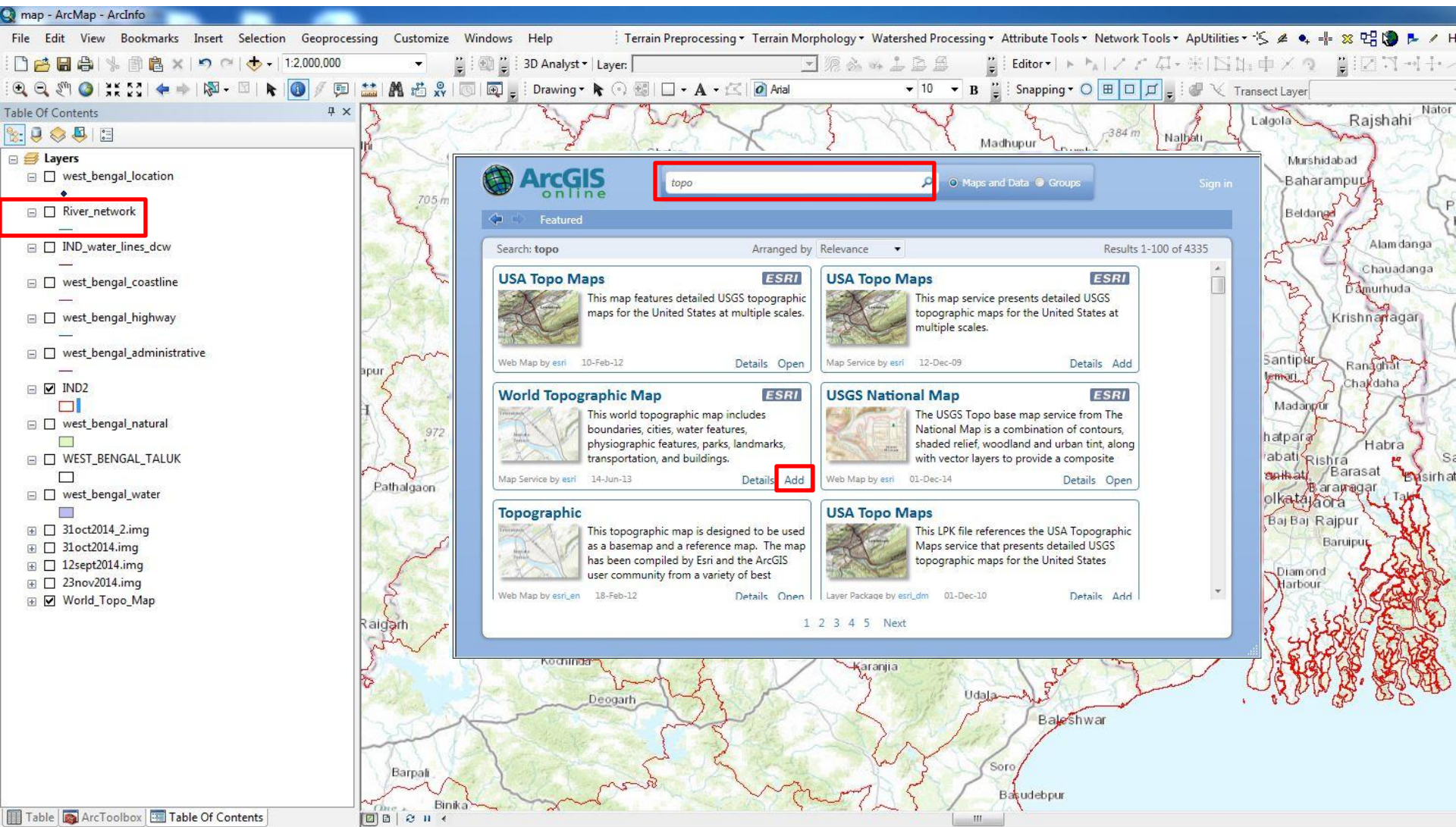


## Feature Digitization

Go to customize and navigate to toolbars → Check Editor button.  
Click on Editor button → Start Editing and fix the map scale for digitization of feature class



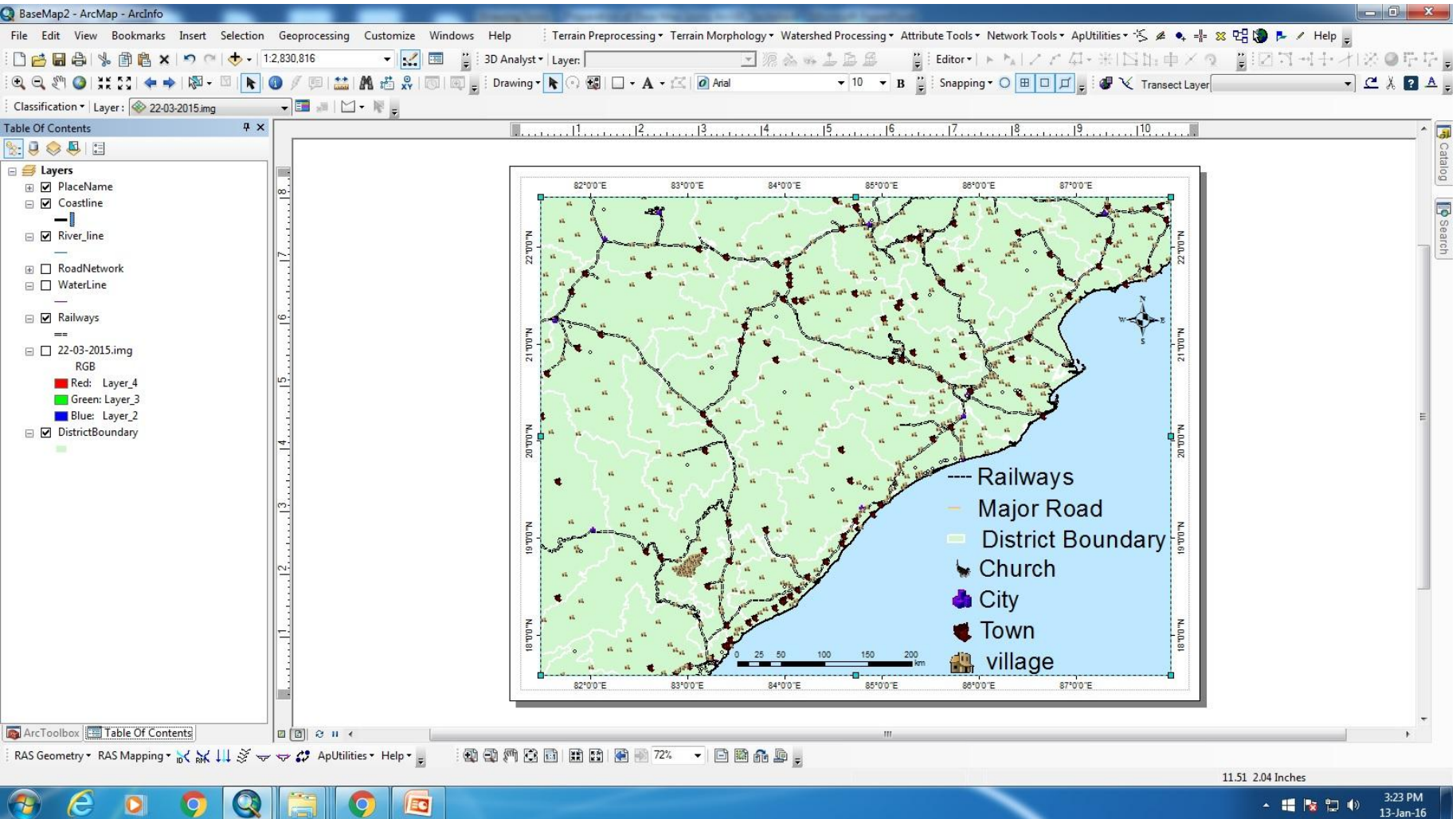
# Add online base layer Data



Go to file → Click on ArcGIS Online and add world Topographic map

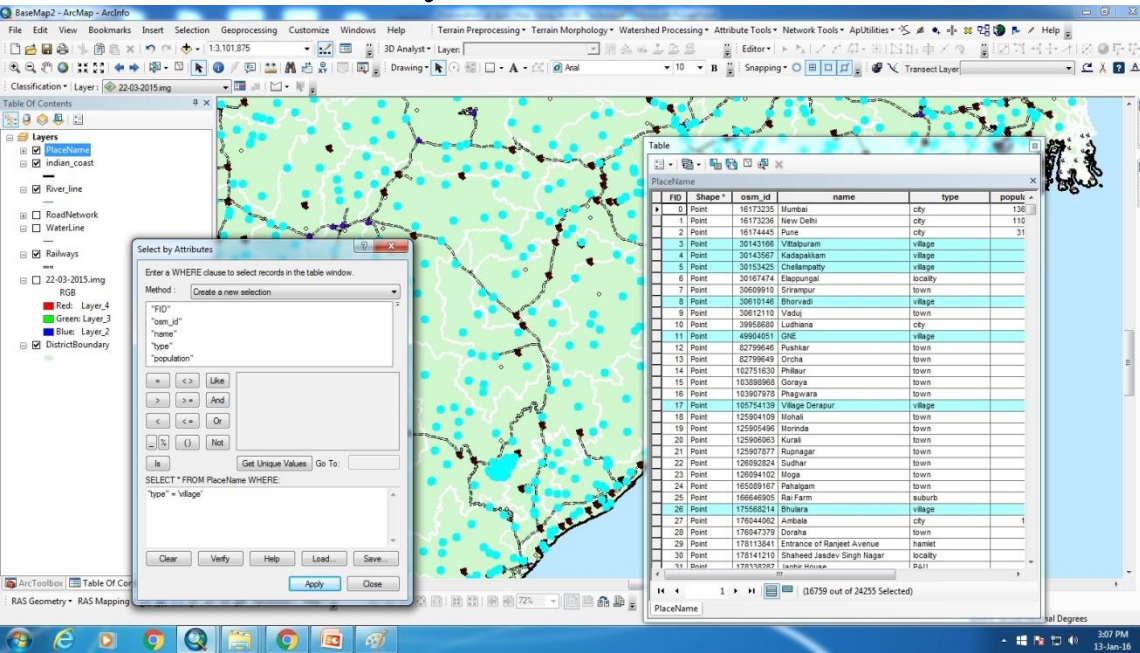


# Add Base Data



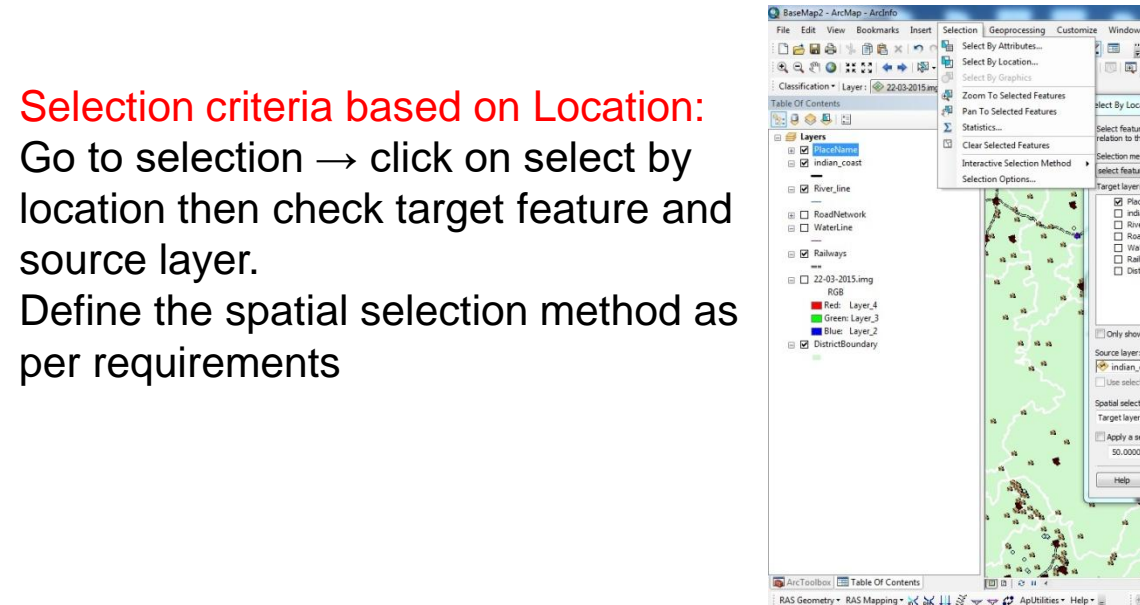
Input Base Layer: RoadNetwork, Railways, PlaceName, WaterLine, Shoreline and DistrictBoundary

# Select by Attribute



**Selection criteria based on Attribute:**  
Right click on data layer → open attribute table → Table option and click select by attribute. Define the selection methods and based on unique value Build a query for geo-spatial analysis.

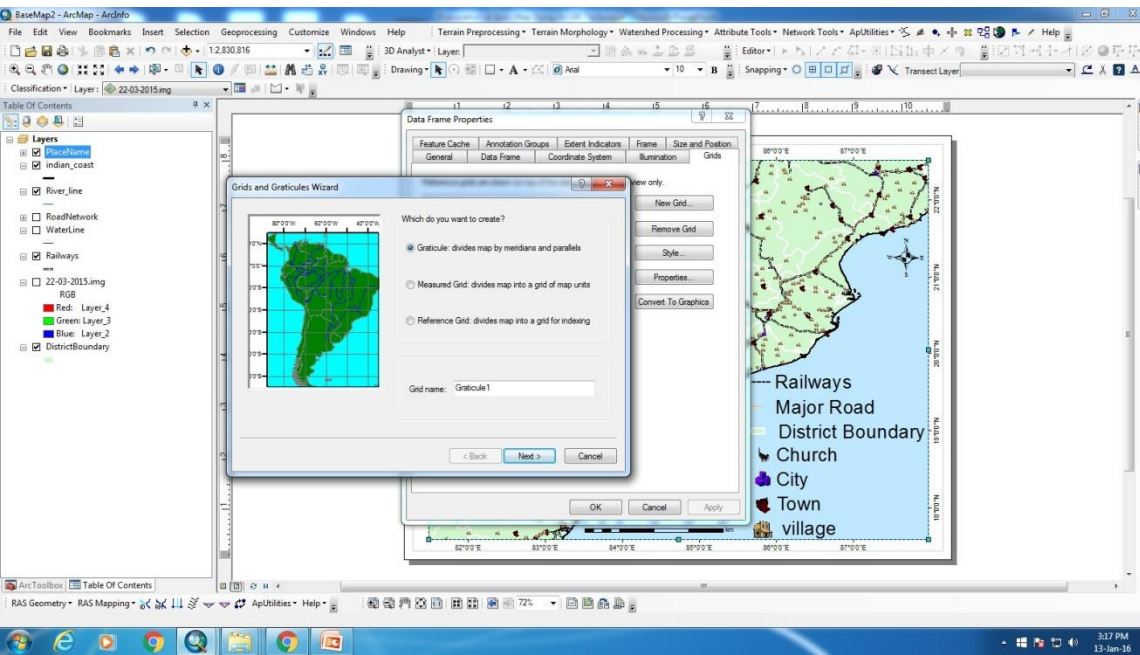
# Select by Location



**Selection criteria based on Location:**  
Go to selection → click on select by location then check target feature and source layer. Define the spatial selection method as per requirements

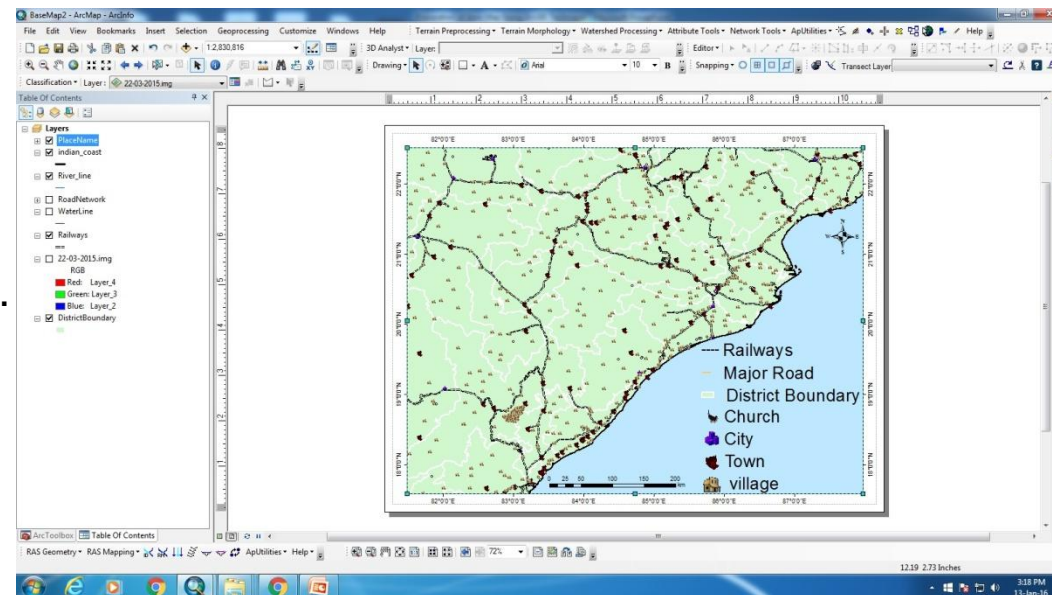


Go to C:\Users\Administrator\Desktop\Marine\_GIS\_Training\_ITCO\_PCMohanty\PreparationOfBaseLayer\InputData\Template  
Open BaseMap2.mxd in ArcGIS



## Generation of Base Map:

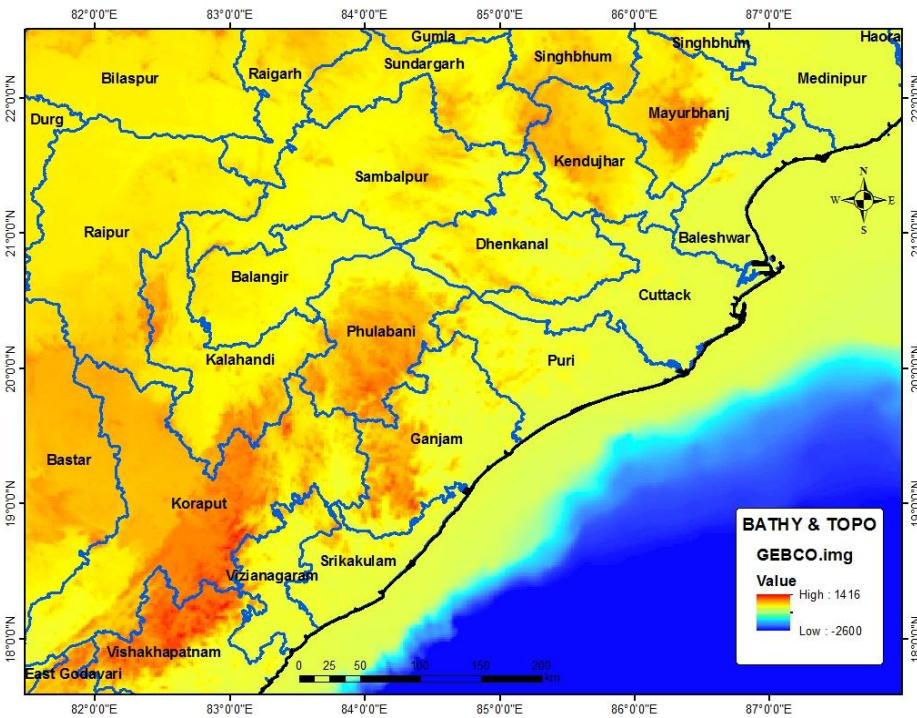
- Click on Layout View → Right click on layout window → go to properties and click on grid.
- Insert → click on legend, North Arrow and scale bar and other marginal details.
- File → export map to generate final Base layer map



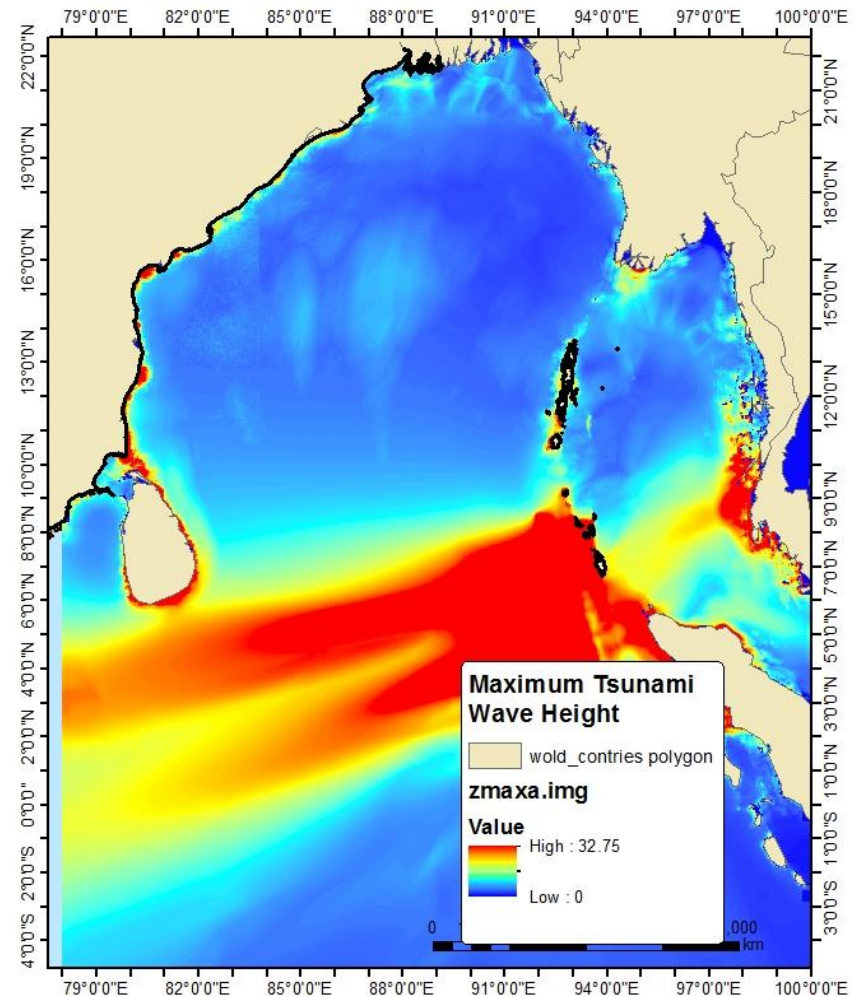




## Topography & Bathymetry Map

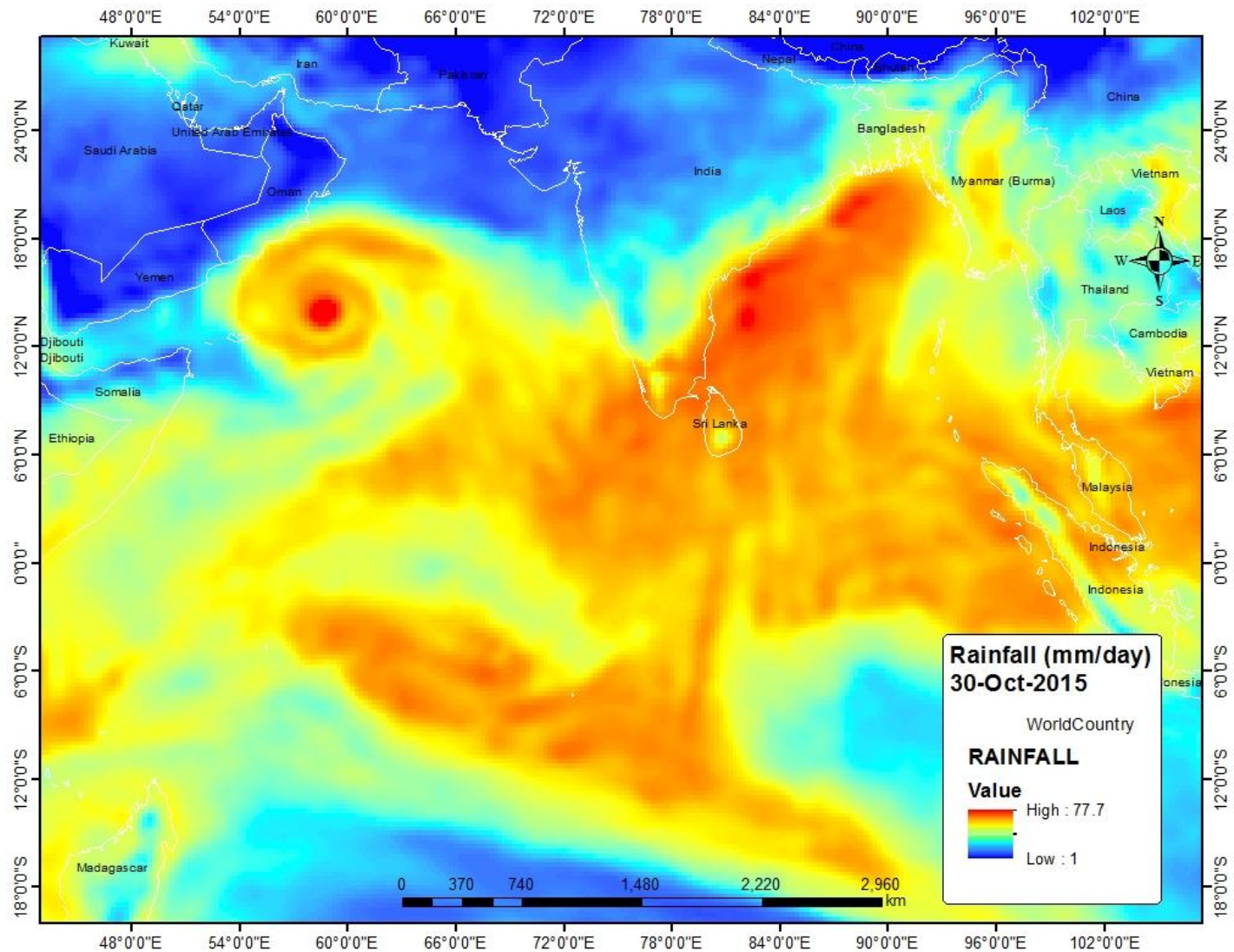


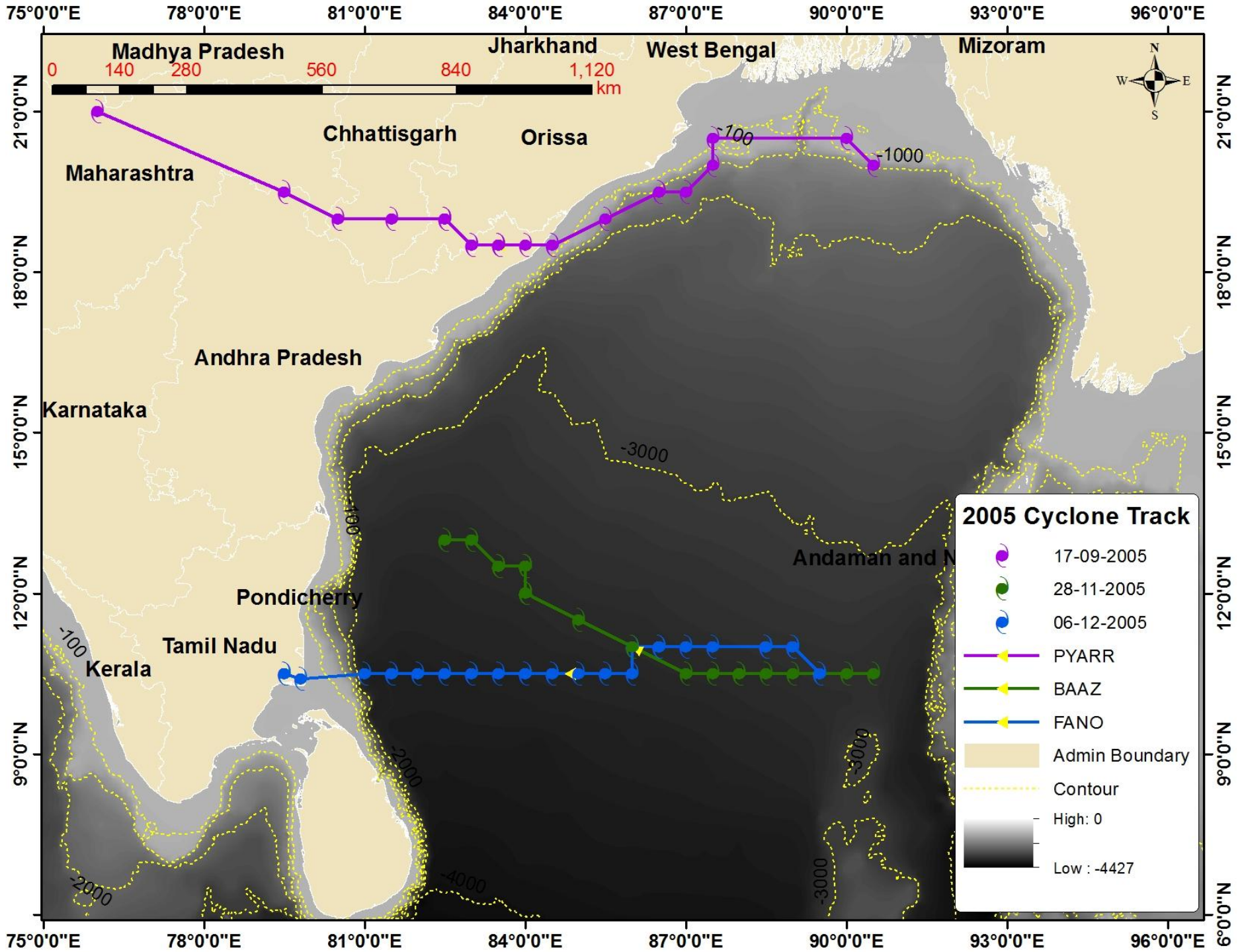
## Maximum Tsunami Wave height





# Rainfall on 30<sup>th</sup> Oct 2015





Thank You