Laboratory Practices in Earth Sciences: Landscape Mapping

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Hello everyone. So, in our last lecture, we saw how we can generate different kinds of shape files and we can trace the different tectonal geomorphological features using those shape files. So, in today's lab, we will see how we can generate our map in a JPEG, PNG or TIFF format with the help of a print layout manager. So, in this lecture, we will see. I will also give a demonstration of how a detailed tectonal geomorphological map looks like. So, I will show you a map which we have prepared for our research. So here you can see that this was the map or this was the digitization we have prepared in our last lab.

So here we have traced the different levels of terraces, the river system, alluvial fan surface and the fault. So, in this lecture, we will also give a demonstration on how you can use these vector files or vector layers to be more precise or enhance your vector layers. So here you can see that these are the two vector shape files and you can see the boundary line clearly here. So, you have to dissolve this line or you have to remove this line.

So that you can do simply using your symbology options. So, when you go to your symbology and from here, when you click on a simple fill, here you can see this stroke color. So, this stroke color is basically your boundary color or the boundary lines. So, either you can simply choose no fill option or another way to dissolve your boundary or remove your boundary from different shape files is to use the dissolve option with the, that you will find in the vector layer. So here the first way to dissolve your boundary or remove the boundary is that you choose the stroke color as no color.

So simply you can choose this as a, so simply you can choose this stroke line from the solid line to no pen option and when you will choose this no pen option, so all the stroke line will be removed from your layer. So here you can see earlier, when it was on the solid line, so that time you can see the boundary of the different shape files and if you change it from solid line to no pen, then this layer will be gone. So, this is one way to remove the stroke or the boundary of different shape files. Similarly, you can remove this stroke line for the alluvial fan surfaces and also for the terraces. So that you can simply go to the symbology option.

Another way is to that when you have created multiple shape files or multiple ID for your particular layer, for example in the case of river, I have drawn the multiple unit or ID for

the single layer, so that you can simply dissolve with the going to this vector layer from the geoprocessing tool. So, you can use this dissolve option and when you will choose this dissolve option, you can choose which layer you want to dissolve, so that simply all the layers which you have created for that particular layer, so that shape files will be dissolved and that will generate a single shape file. So that is another way to dissolve or remove your stroke lines or dissolve multiple shape files into a single shape file. So that you can do it simply by using this dissolve plugin. So when you will run, here you can see a new shape file or a new layer will be generated and in this new layer when you will go to your attribute table, here you will see only one ID.

But in the earlier case, in your raw layer in the river, here you can see two ID or two layers present on your previous layer and when you dissolve your layer, here you can see this two shape file has been generated or dissolved in a single shape file. So, this is another way with using this dissolve option, you can simply dissolve multiple layers or multiple shape files into a single layer. So, this type of features you can use or you can explore this vector layer because of the shape file which you have generated, these are all in a vector layer, so you can use or you can explore this vector options. So, this all vector of with the using this vector options you can you would be able to do multiple things. For example, you can also use this clipping, the dissolving, this intersection or the union.

So based on your interest, you can explore all these options or you can more precisely you would be able to draw or digitize your map. So, you can explore these options. So the another, so now I will show you that a detail map which we have generated for our research, so I will show you the yet detailed tectonic geomorphic map of the same region and that map we have prepared with the help of Enaclyph on the QGIS only and in that map we have traced the all the fluvial systems, the rivers, the river terraces, alluvial fan surfaces and the we have also marked the lithology for the area. The lithology part you can simply use the GSI map where they have mapped all the lithology for the Himalayas, so you can simply use their map. First you have to digitize their map or you have to georeference their map first and when you georeference their map, the GSI map and then you have to simply extract information by the digitization process.

So you can simply mark all the lithology in your respective area. So, for this lab I will show you how we have used the GSI atlas map and we have georeferenced that map and then we have marked the lithology for this particular area. For example, in this area as I already mentioned to you that this portion is your sub-Himalaya and this portion is your lesser Himalaya, the tectonic boundary between the sub-Himalaya and lesser Himalaya is your main boundary thrust. So that is MBT and the tectonic boundary between your sub the Indo-Gangetic plane and the sub-Himalaya is the Himalayan frontal thrust. So, this lithology is the sub-Himalaya, the lesser Himalaya we have marked from the GSI atlas

map.

So now I will show you the map. So, this is the map which we have prepared for our research. This map is also from the same region. So here you can see Haldwani, Chorgalia. So, to prepare this map we have used a total of 10 Cartosat-1 scenes.

So we have basically used the 10 Enneclif for this region and we have prepared the Enneclif on the NV software and then we digitize the geo when and we georeference that those Enneclifs and then we digitize the different tectonic geomorphological features and we prepare this map. So here you can see on the layer panel so you would be able to see that this is the fault. So, when I disable this fault here you can see this is the fault. So, in fault also we have categorized fault as a fault-scarf, infra-deductive fault or infra-sto-axial fault. So, based on your location you can categorize different faults or you can trace faults from your region and you can use different symbology. That is the symbology you would be able to get from the symbology option.

So you can assign different symbology for different structural features so that you can see the river, the contour lines. So, this contour line you can simply get from the DEM. So first you have to download the DEM data and then that DEM data you can import on your QGIS and from going to the raster and extraction option you will get a contour option. So, with using this contour option you will get a panel and here you have to assign your DEM. So first you have to import the DEM here and then you can assign the interval.

So this is your contour interval. So, by default it is set to 10 centimeters. You can change it based on your interest. You can change this number and when you will run this plug-in so your contour will be generated. So, this contour we have generated with the help of SRTM data you can also use the Cartosat-1 data if you have the Cartosat data you can use that data. Cartosat data is a high spatial resolution of 2.5 meters so you will get the contour line with very high resolution of contour lines so that you can extract from the Cartosat data you can also use the SRTM data that is the freely available DEM you can download from the Earth Explorer website USGS and you can extract the SRTM from the contour line from the SRTM data.

So that you can generate so here the another geomorphic feature is the terraces here you can see we have traced almost we have identified the 6 level of 6 to 7 level of fluvial river terraces so we have identified those terraces and we have traced all these terraces then the fan surface and then the lithology. So here you can see this lithology as we have traced from the GSI atlas map so here you can see the Lesser Himalaya, Sub Himalaya and Indo-Gangetic plain. So, such a type of map you can prepare by tracing all your tectonal geomorphological features with the help of Cartosat-1 stereo paired data. So, once you

finalize or you completed the tracing part then you can use all these features or all these vector files to generate a map in a JPEG, PNG or TIFF format based on your interest you can export any of this format. So to generate the map you have to go to the print layout manager so here you would see the a new print layout and when you click this print layout you will see a new window will open and in this window here you can see few options and with the using these options you would be able to get your data over here so to get your data over here you have to simply go to the add map and from this add map here you can see a plus symbol you can see on your screen and when you click on your left key with the help of your mouse and you have to drag so when you will drag so whatever information is available on your QGIS so that those information you will get over here.

So with this option here you can see once you drag once you click or drag so all your information you will get from here. So I will show you again how you can do this so you have to first click on this add map option and once you click on the add map option you will get a plus symbol here you can see a plus symbol on your screen and you have to start from one corner it is best if you start from the top left corner so put your your cursor on the top left corner and you click on your left button on your mouse and one click and then drag. So, with this dragging option you will get all your information which is available on the QGIS so that you will get here. So here you can see all the maps you can see over here so this map you can adjust by going to this option so here you would see this is your simply move tool so when you will get the move tool so you will you would be able to move this selection pen so that you can use that you can do with the using this selection or move item. So another option is move item content so with this option you would be able to move or drag the file within your map so the internal files or the internal features you would be able to drag or move with the this move item content option so that you can see over here.

So with this option you would be able to adjust your map or which portion of map you want to export that you can do. You can also zoom in or zoom out your map so you have to simply scroll up and down to zoom in and zoom out with the help of the control key of your keyboard. So, when you press your control key and you will drag down with your mouse you will get this zoom out so you can adjust your map with the help of this zooming in and zooming in and zooming out option. So once you finalize that which portion of map you want to get export suppose I want to get export of this map for this section only so first you adjust your map with the help of this selection and zoom in zoom out option once you finalize then you have to assign certain information for your map so you have to assign the north direction you have to assign the scale you have to also assign the legends so this type of information you can assign with the help of this layout panel. So in this layout panel you can see here so you here you can see any kind of label in the text format that you would be able to assign with this add label the another option just below of the text

label is add legend so this legend will you will get the all the information related to shape files so the add scale bar and add north arrow so with this north arrow so you will see that another plus sign on your screen and when you will click and drag this plus sign so here you can see the north arrow and if you are not comfortable with this symbol you can change this symbol from the this SVG image here on the right side of your screen you can see some information or some more available symbols you can choose any of this symbol based on your interest so you can choose any of these symbols you can also change the color if you do not like the default color you can change the color from the fill or SVG parameter option here you can change the color so here you can see a north symbol has been added in your map and then you can also add the scale bar so with this scale bar option you can see you can add the scale bar for your map you can also change the design for this scale bar from this item properties so here you can see whether you want to choose keep it as a single box double box single middle line take up line take so that you can do by this item properties options so the another important thing is to add the latitude longitude in your map so that you would be able to get from the item properties of your map when you will go to the item property here you will see some information that is your scale related information so this map is right now at the this 166000 scale and the map rotation if you want to rotate your map so you can do that the CRS you can choose the CRS so you can also change the CRS for your map that you would be able to do from the CRS option and from this is the map extent and to get the latitude longitude you have to go to the grid option from the grid option you have to first add a new grid and once you will click on the new grid option you will have new grid and once you will click on the plus option you will see the grid one and you have to modify the grid option so here you would see that a grid to add a grid first you have to assign some criteria about the grid and those criteria will apply to assign the latitude longitude on your map so first you have here you can see the appearance so what type of appearance you want in your grid boundary whether it would be solid cross marker or frame and annotation only so I would choose the frame and annotation only and the CRS you can choose the WGS 84 map unit so here you have to give the map unit so that you have to assign so at what interval you want your latitude longitude on your map so that you can choose from the interval panel and the frame type what type of frame you want whether it is jabra, interior tick only, exterior tick, interior exterior board tick, line border only so that you can choose from the frame option so here you can see when I choose the jabra so you will see such type of frame for your coordinates and if you simply choose the interior exterior tick so here you can see the single tick for up and down board you can also choose the exterior tick or interior tick so you some few options are available over here on the frame panel so you can choose any of these options so you can also modify or adjust the frame size the width of the frame so you can see here you can choose the width of the frame so that you can do with the help of this frame size so frame margin you can also keep some margin for your frame that you can do from here and then just below this frame option here you will see the draw

coordinate option so with this draw coordinate option this map you would assign the coordinates so here you can see the coordinate so this coordinate format also you can choose from this format option whether you want to keep it for decimal, decimal with suffix, degree minute, degree minute with suffix so you can choose any of these options so that you can do and you can also do some kind of modification with the alignment of this latitude and longitude so for example here you can see this left and right side of your longitude is in the horizontal direction so that you can change from the vertical ascending so that it will assign your coordinate in a vertical direction so same thing you can do for the right side also so here now you can see if you want to change the interval for this coordinate so that you can do from here so you simply keep it change the coordinate interval so here you can see this with the help of this interval you would be able to change the coordinate and now another option is you can also change the font for this coordinate level so that you can change it from here so this from here you can change the font type or the style whether it is you want to keep it for regular or bold and the size of the font so this you can change from here so this will increase your font size and font labels so that you can do from here and the another option is the coordinate precision so that you can see over here it is 29 degree 0 minute and 000 seconds so that precision you can choose from here you can change it based on your interest so you would be able to change the coordinate precision from here so once you are done with this coordinate option so you can also now you have to assign the legend for this coordinate for your map so that you can do from the add legend option so here on the on the left side of your panel layout panel you can see the one option is the add add legend option so one once you click on the add legend option a plus symbol you can see on your screen so when you will click and drag on your screen so all the legend which is available for your layer panel on your QGIS main window so you will get all the label from all the label on your screen so this label you have to modify so that you can do from the item property on the right side of your screen so here you can see now by default it is on the auto update option is enabled so you have to first close this auto option because if you if you are keeping it in auto update option so it will automatically update and it will automatically bring all the legend which are available for all your layers so because we have selected the our map for a particular reason and we want only we want information only which we which which which are available on our map so those this information I want in our legend options so that I will choose so for that you have to keep it keep this auto update disable mode and then you would be able to remove or add the your your your map to your legend features or your this vector layers so for example I do not want this stream or this fault so that you can remove simply from this option remove selected item from legend so that you can do so here you can see your stream and fault is removed from the layer so another thing you can remove this sand bar so and you have to also remove this sand bar because these are all the files which all the anaclyphs file raster file which we have used to generate this map so I do not want this this information in my legend so I have to remove this information so that I can do by

selecting this information so here you can see the the so here another in the locations to field location I have to remove then now here you can see the the information which I can see on my legend is location faults information regarding the faults terraces, alluvial fan surface and lithology so I want only this information for my legend so now you have to adjust and modify this legend for generation of your map so that first you choose your all the legend information then you can simply adjust all your legend in a in a order so that you can do by dragging your layers so for example I want to keep this terraces at the top of the legend so I can simply do that by the dragging option so and then I want my alluvial fan surface just below the terraces so you can do by the dragging option or you you can simply click any of the layer and then you can use this up and down arrow so if you want to keep your lithology at the top so you first choose this layer and then you click on the up up option so this will keep the your layer layer on the top and then you can choose the location I want to keep the stream just just below the lithology and then the location I want to keep it at the bottom so here you can see the terraces alluvial fan surface lithology stream fault location and the contour line so you can you can modify you can do this kind of modification with the help of this panel the item properties panel and then you can also use this font and text formatting if you want to change the the font size or the text text size for different legends so that you can do with the help of this font and text formatting so and the another option is the column if you want to keep this this panel into two column for example right now it is a in a single column so if you want here you can see your legend is covering most of the your map so I want to keep it into two columns so that will that will give a good representation of my map so I will keep it as a two column so once you keep it as a two column here you can see some of the information has been shifted on the right side of your legend panel if you keep it as a three panel so here you can see this this panel you can you you can keep it as a three or four according to your map size you have to adjust this legend panel and you have to do the modification on this legend panel and the to get a position on your map and then you have to change the font so that you can do with the help of this item property you can use the you can change the font text formatting you can use the column if you want to rotate or rotate your position and size so that you can do with the help of this rotation and the another option is the frame if you want to keep a color for your frame so here you can see you can give a color for the outline of your legend so here by default it is on the black color so here you can on the legend panel you can see that the outside boundary of of the legend panel is a black so that that information or that that information you can assign from with the help of this item property on the right side of your panel so you can also assign a background so here you can see the background is enabled and by default it is on the black color you can also change this black color to any of the color which you want to choose for your legend panel so that you you would be able to select from the background color option so you can do that and once you finish with with all these modification or all the information you have assigned on your map you did all the adjustment so once you done with this information or you done

with this exercise so I can also shift this or I can keep this little bit more in the background so you can see the methodology just below the fault so that would that might help to so once you finalize with all your modification and adding the feature on your map so when you done with this features so you can simply export your map by going to the layout option and the layout option you would see some of some features or options are available here you would see the export as a image export as a SVG file or export as a PDF format so you can if you want to generate your map in PNG or JPEG format you can simply go to the export as a image option and here you can assign your assign the directory for your you can assign the directory for your map and once you assign the directory you can choose the you can choose in which format you want to export your map so here you can see few options are available so the famous option is the PNG or JPEG or TIFF format so you can you can choose this format and you can save and once you save it will ask you to at the export resolution so you can change this resolution right now by default it will it is on the 300 dpi so if you want to get your image at high resolution so that you can change from here and once you selected the resolution so now your map will be exported so you can go to the your directory and on your directory your map is exported so here your pop-up will come up and it will show you that the map is exported and that map you can see by going to the your directory so here you can see this was the map which we have exported so similarly you can use this mapping tools or with the help of different satellite data you can use the digitization different digitization tool and you can digitize the different tectonal geomorphological features and you can prepare a detail map for your use so we have give a demonstration to the different mapping tool on the QGIS so and with the help of the this mapping tools we have shown you that how you can digitize the Cartosad one data and we have also gave a demonstration to how you can export the map in different format so thank you we will stop here and in next lecture we will explain you a new lab on the extraction of different drainage patterns and different basins with the help of digital elevation model so in next lab we will give you the demonstration on the extraction of drainage pattern and basin thank you. .