Laboratory Practices in Earth Sciences: Landscape Mapping
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Week- 02
Lecture- 08

Welcome back. So, I am Mitrudh Hali, I along with my friend Mr. Nayan Sharma, we will take most of the labs for this course. So, today we will start with our first lab, how to download the different remote sensing data and explore the GIS platform. So, different space agencies have launched different satellite programs over the time and they have provided those data freely or as well as the based on the payment basis. So, today we will explore some of the websites from where we can download the satellite data, those satellite data are helpful for the landform mapping.

So, first we will explore this USGS website that is the Earth Explorer and this website is managed by NASA. So, with this website we can download the various remote sensing satellite data which was launched by NASA as well as the other space agencies. So, today we will see how we can download the SRTM data. SRTM is a shuttle radar topographic mission that was launched in 1994 by NASA and that data has been freely available since 2011.

So, the special resolution of this data is 30 meters. So, special resolution means that how closely placed two objects can be easily identified. So, we call it the special resolution. So, to download this data you have to explore this website that is the earth explorer. usgs. gov. So, I have opened the tab for you and when you browse to this website you will see such a type of window will open and here you can see in the right corner of your screen here you can see the login option. So, first you have to login to this website and then you have to create an account on this website. So, when you click on this login option you will see create a new account. So, with this new account they will ask you to put a username and a password.

So, certain criterias are given to create a username and the password. So, for that the username must be between 4 to 30 characters that may contain alphabetic or numeric characters and one special character. The special character must be this period at the red sign underscore and dash and your password requirement is that it must be between 12 to 64 characters and cannot contain 3 or more repeating characters. So, for me I have already created one account and so, I will login to this page. So, once you login to your website you will see the type of basic information which you have given during creating your

account   on   the   USGS   platform.

So, that you can see over here. So, when you go to the so, once you login in you on the USGS portal here you can see on the right corner of the screen your name will show here. So, now you have to download and then to get the data there are some criterias are given. So, first there is a search criterion on the left corner of the screen and here the two options are given one is geocoder and another is KML or shapefile uploader. So, with this geocoder there   is   one   option: select   a   geocoding   method.

So, this is basically for the United States. So, those who are living in the United States or want to get data from the United States can get the data by using this feature and there is another option: address and place. So, if you want to get a particular data for a given reason. So, you have to just search for that reason first. Suppose I want to get data for the central Himalaya. So, I will just search for a place name in the Himalayan region and here you   can   see   Ramnagar   Uttarakhand   and   click.

So, you can see that place you can see on your map and I want to get the data for this area. So, here you can see the latitude and longitude of this region and few more options are given to download the data so that you can use your map. So, when you choose this option use your map. So, you can see the system is automatically given a certain area of interest for you and you can modify this area of interest according to your area of interest. So, you have to just left click on your mouse and you have to drag these location symbols and you have   to   modify   your   area   of   interest.

So, for now I want to get the data for this reason only. So, I will just modify my area of interest accordingly. So, this is my area of interest and I want to get data for this particular reason. So, here you can see that of the four corners the latitude and longitude of these four corners is assigned on the left side of your search bar and just below this latitude and longitude you can see the date range. So, suppose you want to get data for a particular reason.

So, if I am, my choice is to download the SRTM data the SRTM was launched in 1994. So, if I want to get the data for example, from 1999 to 2000 in between 2005. So, I can assign that I can choose that date and I can get data for that particular range only. So, you can choose your date according to your interest. So, suppose I want to get data from 1 January   1999   to   2005   31st   of   December   2005.

So, for this time range the browser will only show you the data for this time range 1st of January 1999 to 31st of December 2005. So, now after choosing your area of interest the second option is a data set. When you go to the data set option here you can see various

satellite data are listed over here. So, for example, aerial imagery AVHRR and likewise there is a lot of data. For example, you can if you want to get the land set data so land sets are also available here.

So, you can see here the land set 1 to 5, 4 to 5, 7, 8 and 9. The most recent land set program is the land set 8 and 9. So, that data also you can get from here. So, for our interest we want to get the data for SRTM for that you have to choose the digital elevation because the SRTM data is a digital elevation model. Digital elevation means that it only represents the elevation from the bare earth and if your data includes the elevation from the manmade structure or elevation from the trees. So, that data you will call the DSM digital surface model.

So, we want to get the data only for the bare earth. So, that data is SRTM. So, to get that SRTM data you have to go to the digital elevation and here you can see the SRTM. So, when you click the SRTM. So, there are few options given SRTM one arc second global, SRTM non-wide field, SRTM wide field and SRTM water body data.

So, when the SRTM was launched in 1994. So, that time the SRTM data was only available for the United States and for rest of the world the data was not available or later on then NASA has made data for public use, but before 2011 only 90-meter resolution data was available for the rest of the world and 30-meter data was available for the United States only. And after 2011 the 30-meter resolution data was also made freely available for the public use. So, another thing is when the satellite was launched. So, this data was also associated with some kind of error.

So, over time they have rectified that data and for example, when the mission was launched this data was associated with some voids or some irregularity in the coastal lines. So, that kind of thing was later on rectified by NASA and so, this here the SRTM wide field means when they have most of the voids they have filled the data and make it available for public use. So, that data you can get that data is known as the SRTM wide field and the SRTM non-wide field means the raw data which was acquired by the satellite initially that data is the that data is associated with most of the voids. Means void means that the sum of the portion of the images do not have any kind of information. So, and the most advanced or the rectified SRTM data is the SRTM one arc second global.

So, this is the data which was of 30-meter resolution and it is the most corrected SRTM data. So, if you get the information of this SRTM data here this I option collection info you can click here and this will direct you to another web page where you can get all the information related to this SRTM one arc global data. So, you can read all this information here. All kinds of things are mentioned: the SRTM data product which was rectified over

the time or what kind of format this SRTM data is stored that you can understand from here. For example, the digital terrain elevation data D-TED and another format is the band interleaved by line BIL format and the geo reference tagged image file format that is the geo TIFF format. So, these are the all formats in which the SRTM data was stored and when you will download this data, you have to download one of these formats.

So, for our purpose we are basically downloading the geo TIFF format because the geo TIFF is associated with the geographic information with the precise latitude and longitude of this data. And apart from this you can see this data is the C band because this SRTM bus is a radar data means this satellite is this sensor is two antennas two radar antenna with the X and C band. So, this radar data is used to generate the digital elevation model of the globe. So, this SRTM is mostly popular and because the SRTM has most of the global coverage. So, now after selecting your data now you can, we have to download this SRTM one arc second global data.

So, you have to click in this box and now you can see there is some information to clear all selected additional criteria and results. So, now, if you click the result, here you can see these are the scenes for our selected EOI. So, here in the left corner of your screen you can see these are the data and, in this data, you see the entity ID, publication date, resolution and coordinate. So, there are few more options available.

Suppose this footprint, footprints mean this will show you where which scenes you want to download or which scenes are available. So, another option is the download option. So, to download data there are two options, one is you can manually download each and every file or another option is bulk download. So, you can suppose you want to download multiple data sets. So, in that case you have to just add your data in the cart and from there you can download it and you can download all the data in a single click.

For now for our purpose we just want to download one or two scenes. So, we can download them individually. So, first you can enable all this data by clicking the footprint option. So, here you can see. So, these are the scenes which are covering our area of interest.

So, I want to just download this scene because this is covering most of my area of interest. So, I just want to download this scene. So, you have to just click your download option. So, when you click your download option as I was talking about the data format in which the data is saved. So, here you can see the BILL band interleaved by band interleaved by line and detailed format and geo TIFF format.

For our purpose we will download this geo TIFF format because the geo TIFF is associated

with the geographic information. So, this file is 24.76 MB. So, when you click this download option your data will start to download.

So, you can save your data. So, likewise you can download your SRTM data. So, all the steps are written over here in this pdf and now we will go to another website called the Bhuvan. That website is managed and operated by ISRO. And so, the name of ISRO is NRSC. So, from this website you can download all the Indian satellite data as well as some of the data sets which are covering the Indian territory. So, that data also you can download from this Bhuvan website.

So, when you go to the given URL. So, this Bhuvan platform looks like this. So, in this portal you can see this data archive option. In this data archive, you can get all the data which is mostly freely available for the public use. So, when you go to this option now you can see your portal will look like this. Here you can see the map of India and on the left side you can see some of the options like satellite sensor, theme and product, program and project and in subcategory you can choose the satellite.

So, here you can see the some of the satellites or the Indian space programs are mentioned resource set 1, resource set 2, the LISS 3 is the sensor of the resource set and then hyperspectral image, ocean set 2, Carto set, resource set 1, 2, ABIFS that is the sensor for resource set 1 and 2. So, for our purpose we will see how we can get the Cartosat 1 data. The Carto set was launched by the ISRO in 2005 for the digital cartography of the Indian territory. So, that the resolution special resolution of this Carto set 1 is 2.5 meter, but that data is you have to purchase from the NRC, but they have made it freely available for the 30-meter resolution data.

The 30-meter special resolution data you can get from this website. So, for that you have to first choose the Cartosat 1 data and then select the product you have to just Cartodem version 1. So, here you can see on the right side of your screen these yellow patches are basically showing all the tiles which are covering the Indian territory. So, these tiles mean your sort of the Cartosat 1 data. And in the technical document you can read all the technical information related to this Cartosat 1 data.

If you click on this on the browser, the PDF will open and in this PDF all the information related to the Cartosat 1 data is given. So, you can read this information and to select an area of interest there are four options. First is the bounding box. So, if you know the latitude and longitude of your area of interest you can directly enter the latitude and longitude and you can select your area of interest. Another option is the map sheet. So, every tile this 30-meter Carto set data is similar to the toposheets number.

So, the survey of India toposheet maps. So, if you know the toposheet map number for your area of interest you can give it here and that will direct you to your area of interest. Another option is the tiles. So, on the right side you can see these yellow patches . You can manually select these tiles for which is covering your area of interest and which tiles you can download. So, another option is interactive drawing. So, you can draw your area of interest manually and you can select the data which you want to download.

So, here we will select by tiles because the tiles we can see here are the same portion for which we have downloaded the SRTM data. So, we will also download the Carto set data for the same reason. So, here to select a tile you have to just click on the start option and when you click now by the left click of your mouse you can select this tile. So, now you can see this tile is selected. So, now you just click the next option and here you can see the few options selection for backlog, toposheet number, bounding box, metadata, add to map and   download   option.

So, this toposheet number for which I have selected this tile is the same toposheet number of H44N and the coordinate for this tile is given here. The metadata is all the information related to this particular tile or the map number you can get from the metadata. When you click your metadata, you can see that some of the information regarding this scene is given over here. So, you can read all this information and to download this data you have to just click the download option. For that to download the data you have to first login in the Bhuvan portal and to login the Bhuvan portal first you have to create one account.

It is similarly what we did for the USGS portal. So, I have an account. So, I will login to the account. So, I have logged into this BHAP portal. So, here you can see and now you can download the data. So, after clicking the downloading option you can see that your file is   ready   to   download.

Now we will see how we can download the SRTM and Cartosat data which is freely available. Now we will go to another portal of the NRSC that is Bhu Nithi. From the Bhu Nithi you can download all the freely available data as well as the data which you want to purchase from the NRSC. That data also you can purchase from the Bhu Nithi.

So, now we will explore the Bhu Nithi portal. So, when you go to the Bhu Nithi portal, you will see such types of options will come and here you can see the Bhu Nithi browse and order option. So, when you click over there. Similarly, you have to login on this account to download or purchase the data from the NRSC. To purchase the data from NRSC you have to verify your user ID and password from the NRSC first and then only you can purchase data from this Bhu Nithi portal. So, in the next lecture we will see how we can download or purchase data from the Bhu Nithi NRSC portal. Thank you.