Remote Sensing Essentials
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Lecture – 55
Different Sources of Free Satellite Images

Hello everyone and welcome to new discussion today we are going to discuss different sources of free satellite images. Because, so far what we have discussed the details about remote sensing how data is gathered and how it is processed some applications we have also discussed, but when you start your own work and then you would be requiring satellite images. And earlier we used to buy satellite images which used to be very costly affair.

But nowadays a lot of free satellite data of very good quality high quality is available from different sources and of course, these are internet sources. So, I thought that it is now discussed this in this aspect also because now we are approaching towards the end of this course. So, before I go for the last lecture, I thought that I will also discuss this part which is very important and after all we have to analyze the data we have to get the data.

And from where we will get that part we will be discussing the current sources of data. So, you know this remote sensing or such datasets are available of course from web portals of different agencies.

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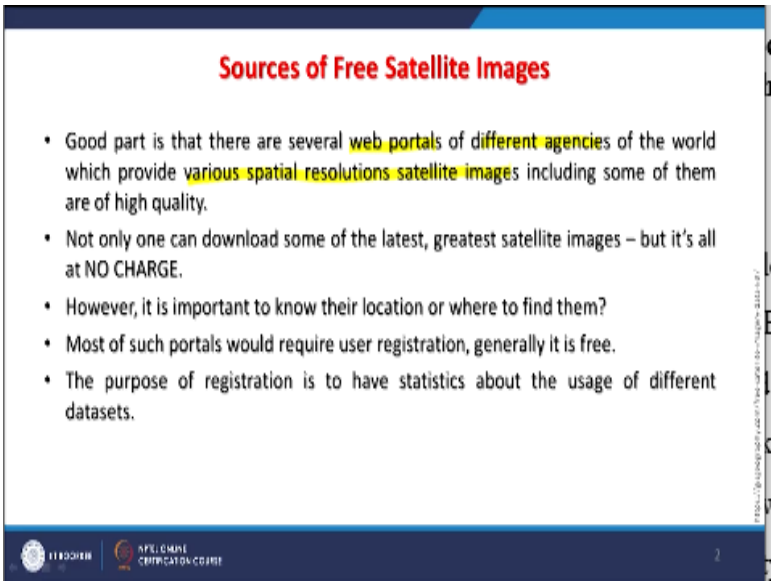

And from starting from NASA, which is US agency to European agency, ESA and ISRO also and ISRO instead of directly from ISRO we get the data from NRSA. So, all that we will be discussing also data from all these sources or agencies are available of the almost entire world except for a NRSA data and available data at various spatial resolutions and various types of data various types of data that means.

The visible infrared thermal infrared data is available and same time radar and microwave active microwave data is also available for SAR interferometry analysis. And sometimes you also get very good software's like from European Space Agency in order to process Sentinel data or and Envisat data earlier which was which we use to handle all the software's can also be downloaded from these sites.

So, we will be discussing in detail on those and not only one can download some of the latest greatest satellite images but also at no charge. So, these are free of course, some of these web portals will ask you to get registered some will not even asked to registration and you can just go them go on those sites search your data and you will get the link and you start downloading. I will be showing some examples of interfaces of such a big web portals as well.

And but before you download the data, you must know for which area you would like to download the data. So area of interest for should be decided and that be based on that then you

start searching for the data on different portals. And as I mentioned already mentioned that the registration some portals may required registration it is generally free. So, no issue just provide your email address, name and organization.

And within few minutes you are having access to the data and why these agencies go for registration of users because they would like to know that who are using their data, how many people are using their datasets, because after all, they do have to be answerable to their countries or government and therefore, this is required, there is no nothing kind of spying or anything.

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But just to know that who are using their data for what purposes they are using the data. And the datasets are offered by USGS earth Explorer which is one of the very popular web portal for downloading the data of USGS that is United States Geological Survey, which offers abundance of datasets various datasets are available from this web portal. And they acknowledge world supporter for of free data providers, access to Landsat satellite data.

So this USGS earth explorer there are various web portals may provide even the same type of data. So, it is as per your convenience, because different web portals are having different kind of web you know interfaces to search and download the data. So, the one in which you like you can start downloading the data that means what I am trying to say the like for example, Lansat data, you will let us data maybe I will label on 3 4 portals.

So, there is a it is not necessarily that only USGS you will download you can download from other also. So access to the satellite data because the Landsat data is very popular one and there is continuity from 1972 onward. So more than 40 years of history of this Landsat data is available in many spectral bands for entire globe. And also you can download the Aster data and settle topographic mission. That is SRTM also data of that is and Digital Elevation models.

So 2 different Digital Elevation models and that 2 and too many spatial resolutions like ASTER and SRTM dem's can also be downloaded from Earth Explorer, NASA land data products and services includes Hyperion's hyperspectral data as well. So, the when we have been discussing hyperspectral remote sensing at the time, I mentioned that there is only one satellite which is Hyperion and that can provide the data.

So, Hyperion data is also available, but it may not be available for the entire globe in a continuous fashion as compared to Landsat data. But nonetheless, some datasets for your own analysis and interpretations and having experience of processing such data are also available and very other popular data on daily basis because the coverage of the globe on daily basis by MODIS and AVHRR sensor.

And MODIS is one Terra and of Aqua satellites AVHRR one NOVA series of satellites. So the datasets of land surface reflection and dispersed radar data can also be downloaded from USGS. So USGS earth explorer is one of the biggest resources of such datasets.

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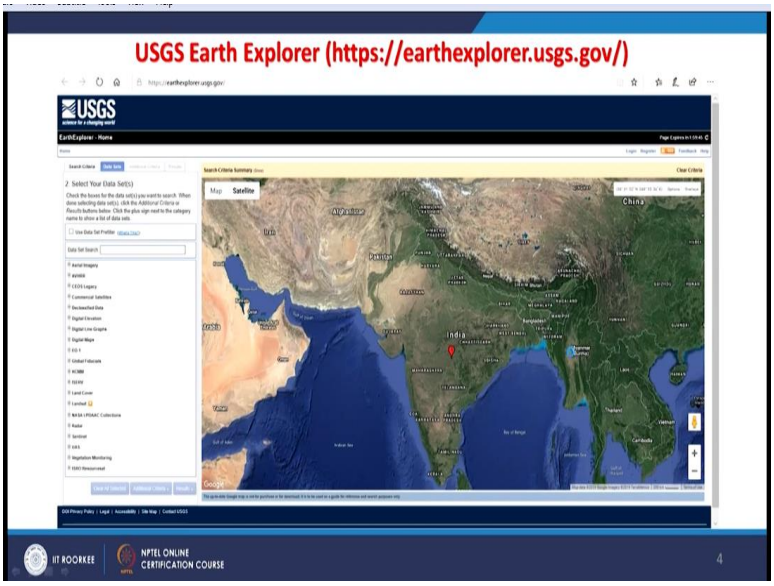

When you go and open this web portal. This is how you start getting the interface. And then on the left side, there are various options are available. You just go and download the data, make your query, search for results, provide your location, search the data and once that is there, you get the data

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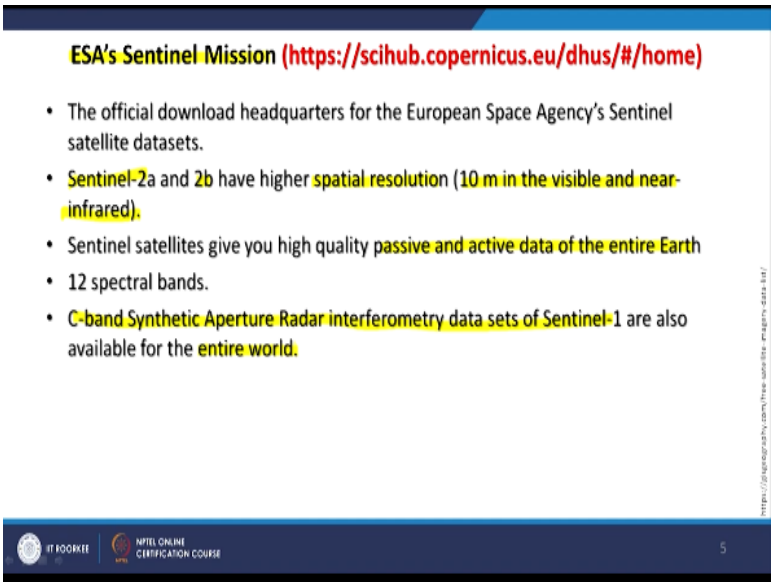

And the links available and then you can download the data. The next very popular and resource web resource that is the ESA and that 2 for the Sentinel data and you know both normal data that is visible infrared data as well as your radar data, interferometry data can also be downloaded from European Space Agency. And that is a satellite datasets Sentinel datasets and Sentinel 2a

and 2b have higher spatial resolution that is 10 meter visible and infrared that is also available free of cost.

You can also download Sentinel and high quality passive and active data that is microwave data active data microwave data interferometry data. And this Sentinel 2a to 2b data is available in 12 spectral bands of entire globe and this is what the C band synthetic aperture radar interferometry datasets from Sentinel 1 for entire world. It is available. Let me give you very latest Example of about this dataset, how useful it is that only very recently there were earthquake in Pakistan occupied BOK.

And we wanted to analyze the ground deformations which might have induced by and that particular earthquake. And we just downloaded as pre earthquake and post earthquake data and in within few hours we could do the analysis and prepare the ground deformation map very accurately and very promptly so that is the advantage of having and datasets from ESA of the sentinel one active microwave interferometry data.

And also it is free of cost it is available quickly once the data has been acquired within few minutes it is available on the portal for downloading, so this is how when you go on this side this is how you get the Copernicus.

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Open access hub and there you start searching the data lot of options are there and once say you are sure that you want to download the data click on the link.

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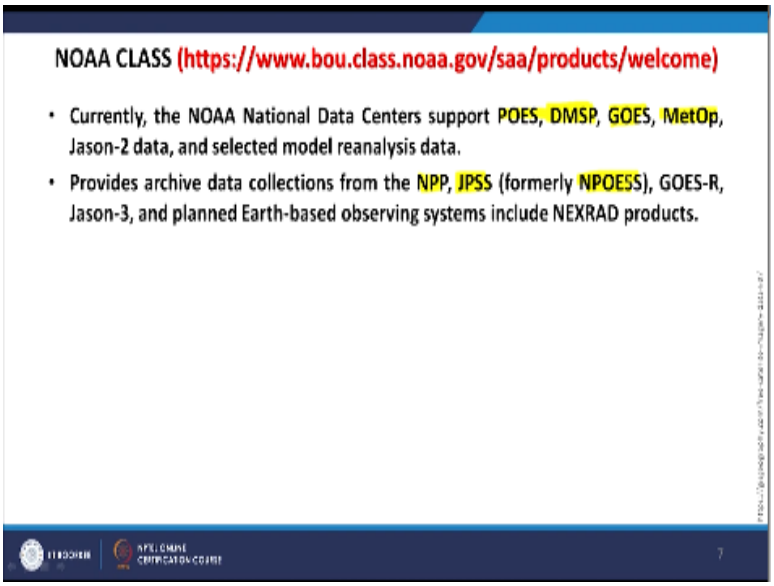

And get on your machine now another web portal which is NOAA class is there which currently NOAA and that is national data centers NDC supports POES data. DMSP, DMSP is the passive microwave remote sensing data then GOES data, me topped metOp data, JSON data and many data are there but these data generally are having relatively coarse at resolution data so if you are working on continental scale.

Then these datasets can also be downloaded and they also provides the archive data collection most of these sites will provide you archive and from NP, NPP, JPSS. And earlier we used to know about and pause and GOES-R jason-3 and many other data satellite data which might be available in future high quality atmospheric datasets can also be downloaded

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From these as this is what is again the NOAA site NOAA class site about this class is here and you can create a user account and then start downloading the data the best practice if you are looking for ground dataset ground for the satellite data is to spend some time on individual portals and explore the portal exhaustively and I am sure that after say half an hour or one hour you would be very comfortable you would know where exactly.

I have to go and search the data and from where I will download so just going first time may give you impression that is too heavy to search for the data so the best thing is spend some time and in half an hour time or one hour time you would we you are going to be comfortable with that particular portal and you start downloading the data now there is a another portal by NASA earlier.

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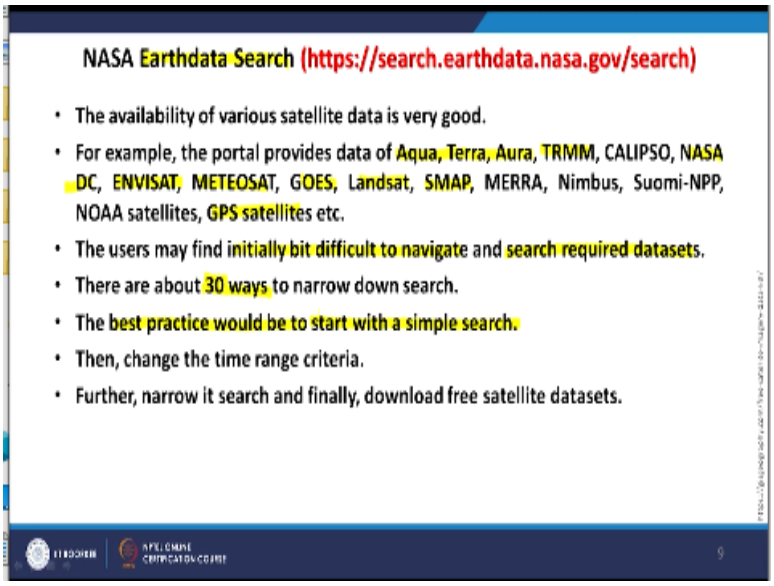

We saw the USGS that was also from USA NASA is also from USA that is earth data search is available as a use archival data is available of various satellites and it is I tell you this very good portal for getting free data and that data provides of Aqua, Terra that is MODIS data of Aqua, Aura and TRMM and NASA, DC, ENVISAT data, METEOSAT data, GOES, Landsat SMAP and the many such datasets are available from these including data from GPS satellites.

And for various kind of analysis sometimes you might be requiring the data so that dataset can also be downloaded from earth data search and as I am already mentioned that user may find initially bit difficult to navigate and then to search the datasets this is general impression this is how the experience the first time visitor experience ended oh it is too cluttered it is having too much difficult to navigate through different options.

But as I said the best practice is spend some time on that web portal I am sure in half an hour one hour time would be very comfortable there are various base of narrow down search 30 ways to narrow down search, so various options are available how to find out the best data, so we start with a simple search the first best practice for such a you know big portals and then change the time range criteria. You go to that time which for which you are looking for the data further narrowed answers and finally download free satellite datasets.

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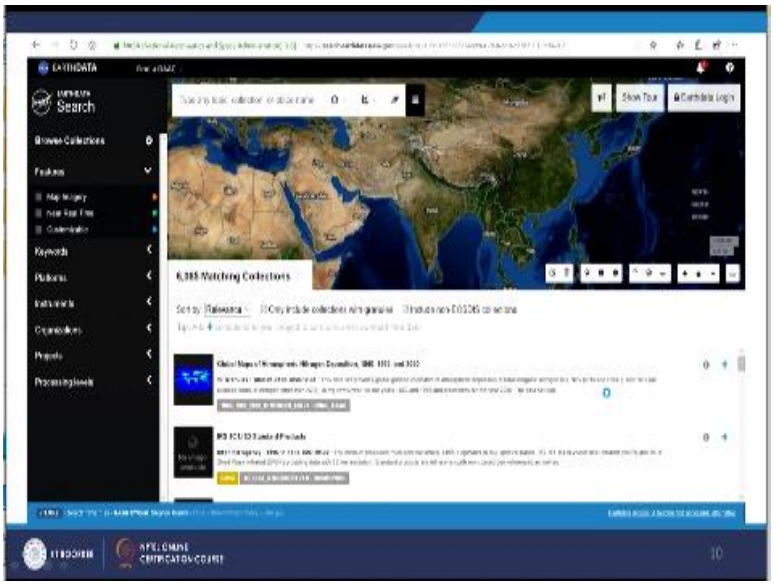

So that that is we and you can you can be very comfortable this is the interface of that EARTHDATA search a portal various datasets are available and various ways you can search 30 ways here you type here location of any part of the globe that location will come you can use your geographic search you can use some polygons overlay add that layer and overlay that one and then you get the and the appropriate data whichever. You are looking say for example I am looking for NOAA data I might get the indices of NOAA data or links of NOAA data and then I go for download.

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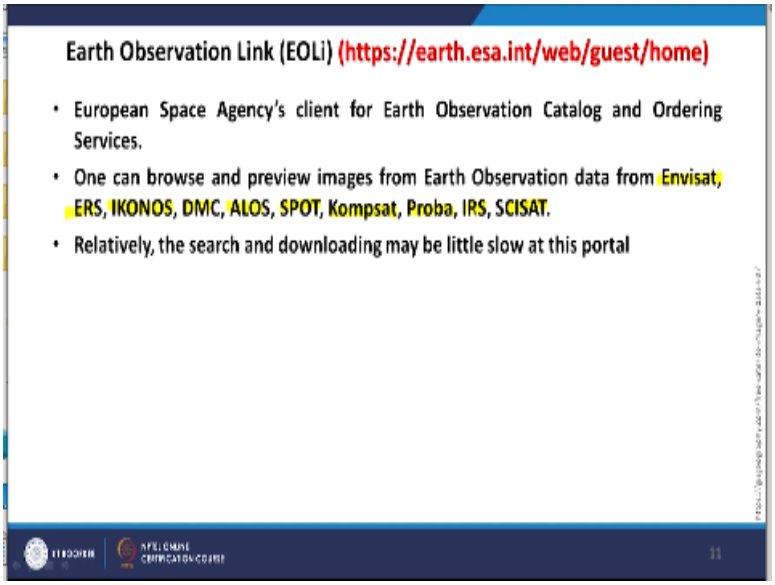

There is another web portal for different type of satellite data that is Earth Observation Link EOLi in sort that is European Space Agency client for Earth observing catalog and ordering

services and one can preview most of these web portals so far which we I have discussed will allow you to see the data in a quick look format that is in preview format before you download that it advantage of that one that you can assess the cloud coverage initially.

And you can also know roughly that whether your area of interest is being covered in that particular scene which you have selected for download or not because before and avoiding preview and just downloading the data and later on your system you are seeing and the image you find that it is not covering your area it is having cloud cover it would be a stage your time so the good practice is once you have selected the data look for the preview most of these portals will provide the preview have a look spend some time zoom it.

And once you are sure then you go for download link so this Earth Observation link provides the data of Envisat, ERS, IKONOS, DMC, ALOS, SPOT, Kompsat, Proba, SCISAT even IRS data need not to be directly from NRSA but from other organization of different countries. So in that way you can have the data access to the data IRS data is generally available free of cost only after 3 years of data acquisition and there are various searches downloading may be little slow

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For this portal this is how it looks like how to access the data sometimes you also get the tutorials available, so you can spend some time on tutorials learn a quick way best way to download that Search the data and then download the data.

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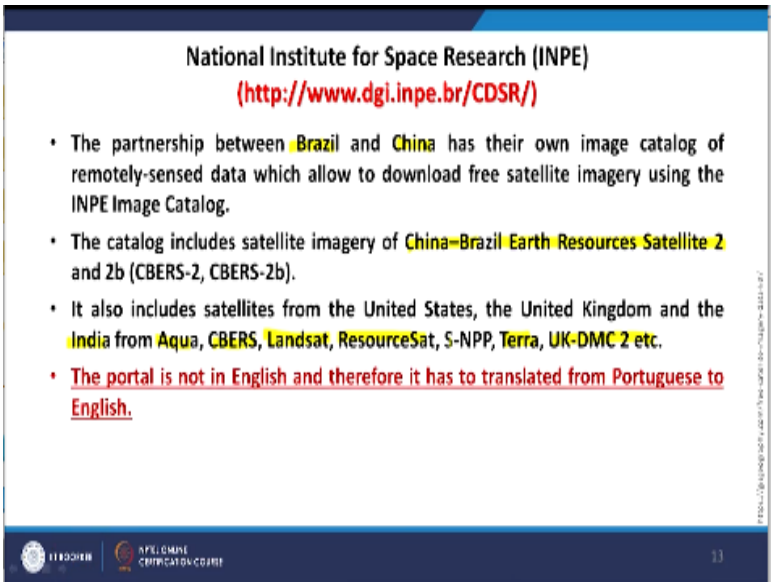

So these are the web portals for that now a one more about portal which is National Institute for Space Research INPE is available that is a partnership between Brazil and China has their own image catalog of remote sensing or satellite data which allowed to download such datasets and these datasets include the China - Brazil Earth Resources Satellite 2 and 2b and these CBERS-2, CBERS – 2b all these satellite data is available it also includes satellite from the United States, United Kingdom.

And other countries and other satellite including India data from Aqua, CBERS, Landsat see the Landsat, Landsat data might be available from various web portals sometimes one web portal might be having only the older data may not be the latest data or some web portals might be having the entire dataset so you have to search and find just making search on one web portal and thinking that is the only dataset available from Landsat will not be sufficient.

So all these their resources web resources should be searched and then you get the data the source set is of course Indian data which is also available and Terra, Aqua data, UK DMC data all kinds of data is available one has to be little careful sometimes and the web portals might not be in English, so you have to get a translated from Portuguese to English.

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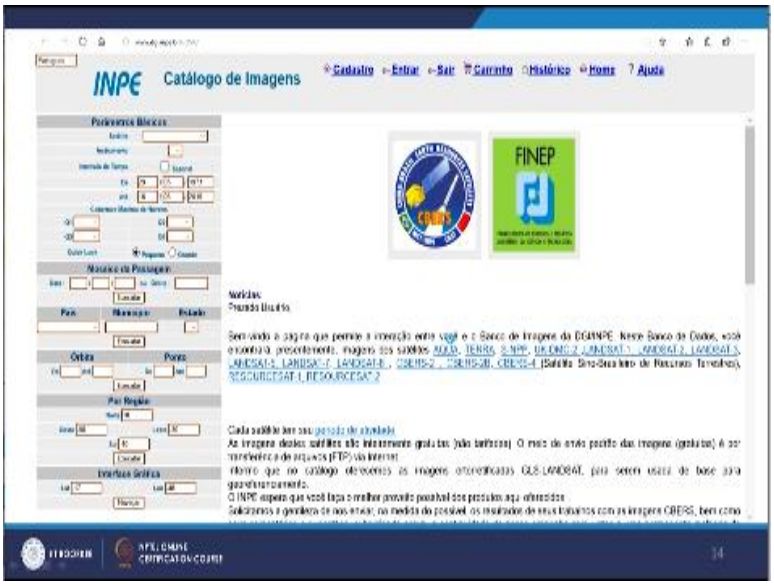

Those options are available like here this is the example that it is in Portuguese and you can definitely get it translated through web only that is not a big deal.

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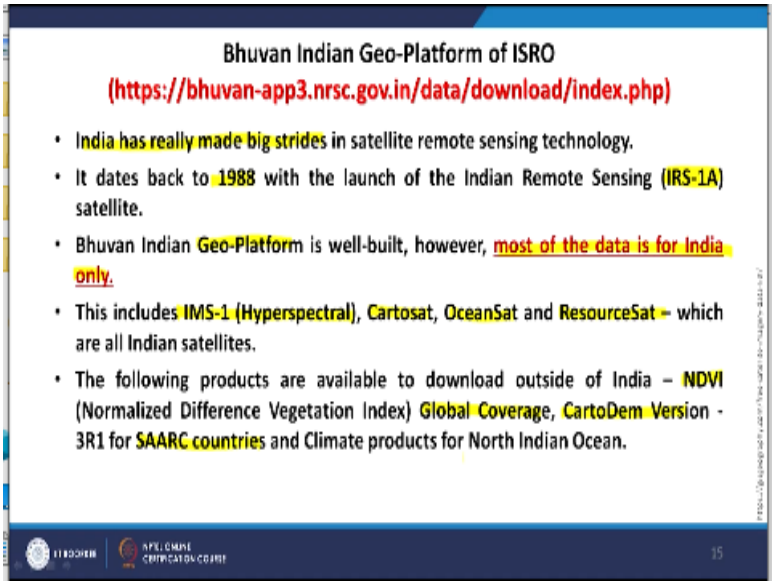

Now come to our own Indian web portal for downloading the data and the web portal is our Bhuvan earlier Bhuvan used to require the registration and only later we used to get the access to the data now it is registration free and you have to basically install in an app earlier now even you do not have to install the app and directly it will open and do it so it easily basically as I said it has in really big strides in in satellite remote sensing technology because earlier.

We were buying each and every dataset from NRSA and DC that is national data center of NRSA now most of the dataset is available older datasets is available free of course from this web portal that is Bhuvan and datasets up to 1988 because that is the first time when we launched our own Indian remote sensing satellite IRS-1A, so onward 1980 it is was the month of March so March 1988 onward.

And data on this web portal is available and Geo Platform is this is the India's Geo Platform and so most of the data is for India only as I have mentioned earlier also that the Bhuvan provides data only for India and may be little bit on the surrounding countries that data can be downloaded it includes the Hhyperspectral IMS data also to limited extent not fully for entire country it has in have a data on Cartosat it is having Oceansat, ResourceSat.

And Cartosat derivatives that is digital elevation models at a higher spatial resolution maybe 5 meter resolution available on this site as well and these are the products which are available and derivatives not only the raw data but derivatives like NDVI and for entire India or part often India global coverage and a CartoDem that is Cartosat digital elevation model and available for SAARC countries and some Climate products are also available for North Indian Ocean region also.

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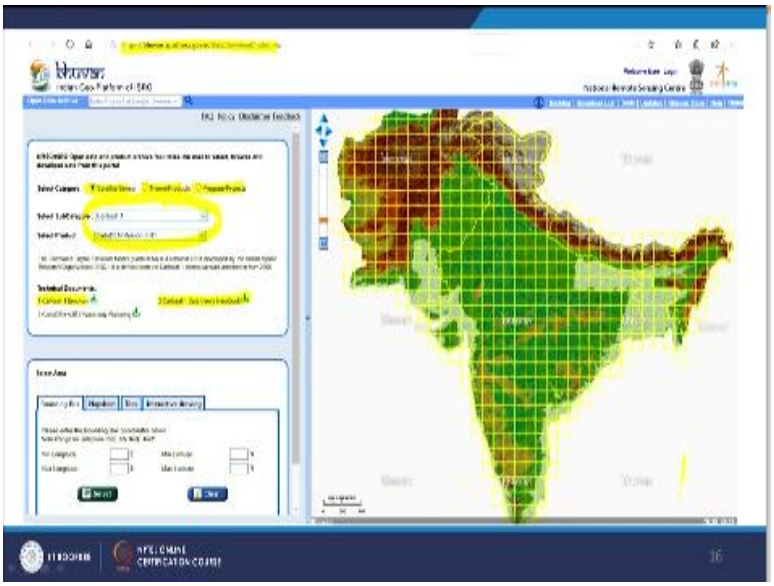

This is how it will look when you go for the web portal and using this address then you get the this kind of thing as I mentioned India and little surrounding countries are there so up to Pakistan and maybe up to Sri Lanka here you search here you make the search you that what you want to download whether you want to download satellite data or products or program projects and accordingly you will go and make the search you can have with a latitude longitude use the grid there are different search options are available.

And then finally the link would be available for download like here and you can also download the handbook you can also download the Cartosat Brochure and other things for detailed information about these products.

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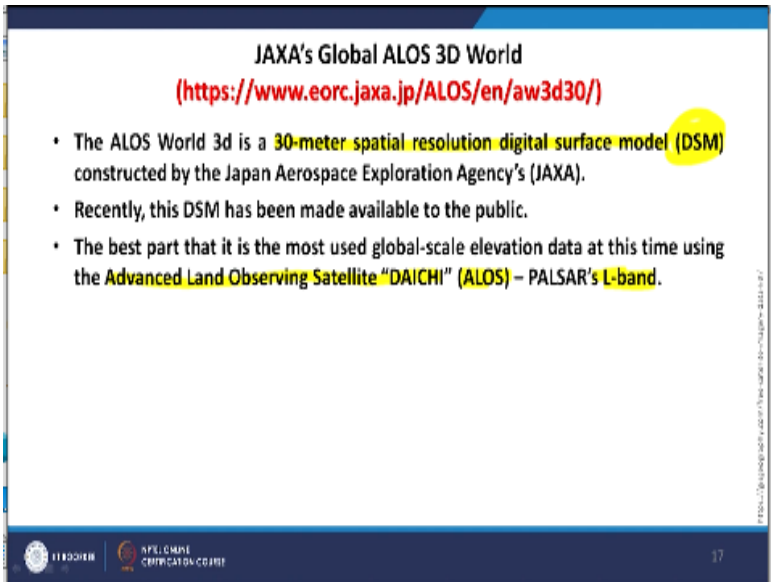

Now this is Japanese agency that is JAXA's Global ALOS 3D world and they say 30 meter spatial resolution digital surface model or you know because the technique has been different so there instead of calling digital elevation model and they would like to call as digital surface model and that means that objects like vegetation and other things are not included and may one may find this at this resolution a very accurate digital elevation model from a ALOS, satellite.

And this DSM has been made available to the public 30 meter which is quite good is a global scale digital elevation model and this time using the Advanced Land Observing Satellite that is DAICHI or also called ALOS PULSAR's L band that is microwave data that is wide it have

been possible to go for DSM digital surface model if we go for stereo pairs like Cartosat then you can produce the digital elevation model but when we go for radar data then it is possible to get the digital surface model rather than digital elevation model.

So this is this can be and many application one can find DSM is much more accurate than a simple DM the JAXA's or mosaics are excellent development for global elevation models this is how it will look ALOS 2 ALOS.

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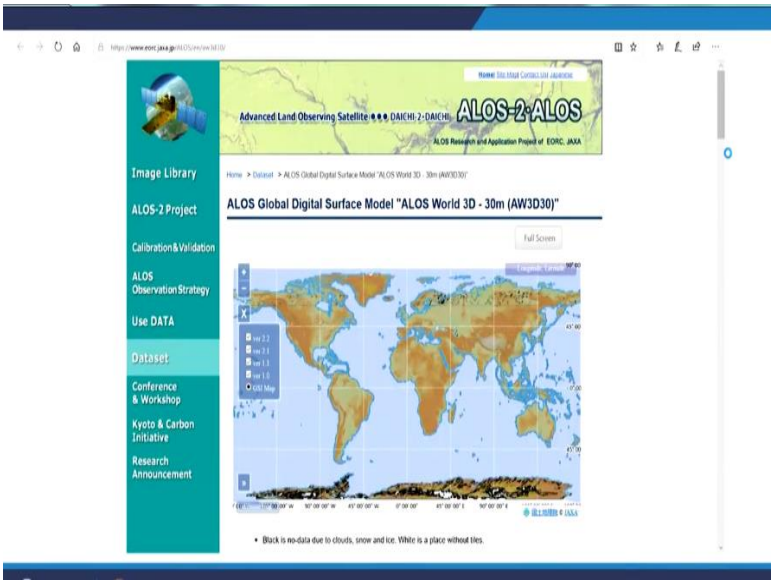

And global digital surface model DSM and 3d world and that is a 30 meter resolution, so again similar way almost the search part in most of these portals are almost same. You need to have a corner latitude longitude coordinates and rest let us say that you can manage very well. So it is not very difficult to search for the data if you are having already area of study in form of polygons most of these portals will also allow you to add your polygons and based on that polygon the search can be made.

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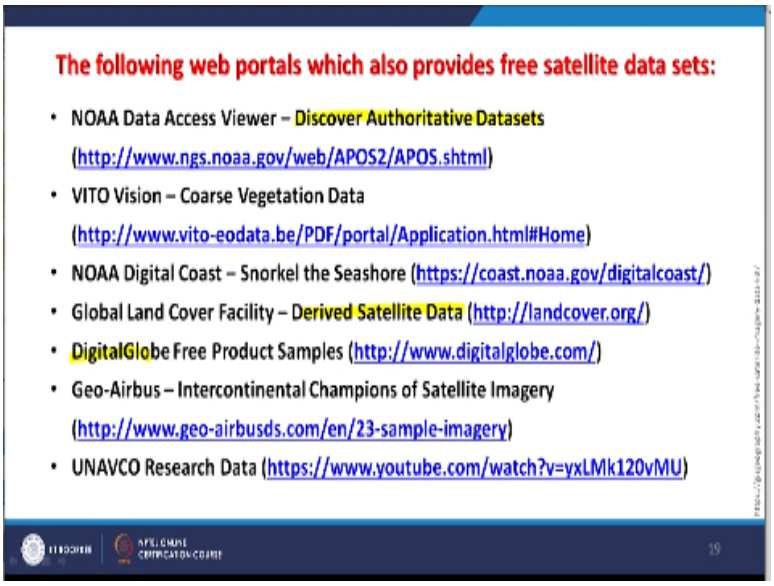

There are some other web portals which one can go explore and can get the data which you might be looking like NOAA dataset access viewer that is discover authoritative datasets and this is the address then VITO Vision Coarse Vegetation Data if somebody is working on vegetation change NDVI and other things so relatively coarse resolution spatial resolution data might be available then NOAA digital coast. If somebody is working on coastal area that data can also be available global land cover facilities that is derived satellite data that is also available.

And then digital globe free product samples are also sometimes say this digital globe will provide very high resolution satellite images very high resolution might be you know 60 centimeter or 1 meter but only sample data are throughout but if for certain purpose. If sample data is sufficient you can still download then there is Geo Airbus intercontinental champions of satellite imagery so there are various other portals are also there apart from a NASA, USGS, ESA in Bhuvan there are other portals from where you can download the data. So happy downloading data