Remote Sensing and GIS for Rural Development
Professor. Pennan Chinnasamy
Centre for Technology Alternatives for Rural Areas (CTARA),
Indian Institute of Technology, Bombay
Week 3
Lecture 04
Intro to Remote Sensing Data for Rural Development NASA datasets for water

Hello, everyone. Welcome to the NPTEL course on remote sensing and GIS for rural development. This is week 3, lecture 4. In this week, we have been looking at the Indian data archives that we can use for 3 specific indicators, or data for rural development, which is water availability, soil health, soil data, and climate data. We notice that there is less data stored on a single platform for climate. And thereby, we will be using a different open source data archive which is led by NASA. We will go through the steps of setting it up and how to find remote sensing data for rural development.

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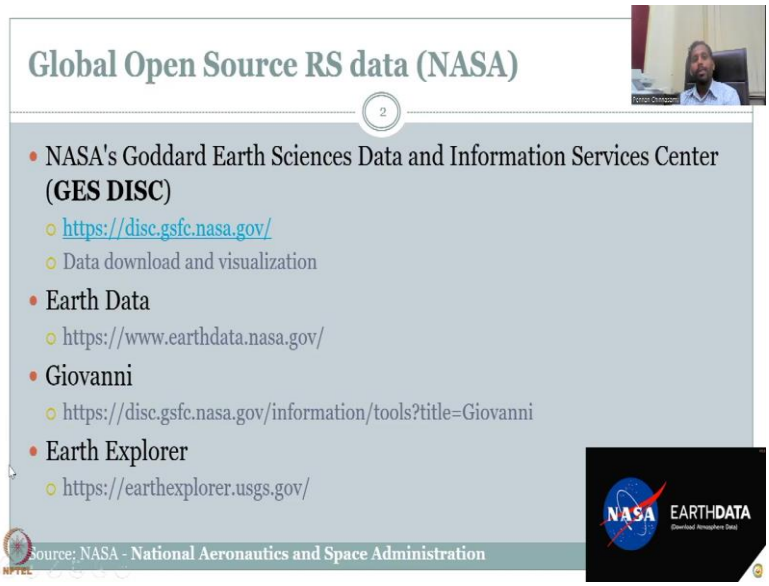

First NASA stands for because everyone is very famous, this logo you would have seen on the earth and NASA going around. It is the space agency of US and it stands for National Aeronautics and Space Administration. We need to be careful about using this widely in terms of what is the data for and reading about the data before explicitly using which is the meta data.

I have already mentioned that reading the meta data is very, very important. And is as important as using the data because if you do not know about the data, how do you use the data? So, here are also the different ways to get the meta data. Let us look at some data archives. NASA has multiple data archives. And why did we come here because we could not

get directly the rainfall, evapotranspiration, soil depth, moisture, snow cover all these data. So, we are here to extract those data for the rural development exercises.

There are again tutorials on how to download the data, please search for it. But before downloading, you should know how to search data, how do you understand the data etc. Let us walk through today we will look at NASA Goddard Earth Science Data and Information Service Center, which is in short call GES DISC and this is a link for it. When I did my PhD, the link was different. So, it does get updated. So, make sure that you have always search for GES DISC, it will come for GLDIS data, it will come.

This website is widely used because ISRO's data website mostly for Indian use. But then, globally, if you look at globally, which data set is used more, or the Data Archive that is used more, it will be the NASA. And this is based on publications and research profiles, portfolios, etc. Proposals. On this website, it is also possible to download the data similar to the Indian system. And you will see a more robust visualization tool. So, basically, you will visualize the data on the website dashboard. And then if you want you download it. Sometimes this is not available in other data archives.

To run such a system to run such a database. There is a requirement of high performance computing and infrastructures in the background. And that is what NASA has. being a developed nation, the space agency, NASA has a lot of budget to cater to the public's data requirements. And it is driven by public taxpayers money, mostly the US taxpayers money, so you do not have to pay anything to download the data. Our acknowledgments are greatly appreciated. So, if you write your report, thesis or a paper, please do acknowledge that data was provided by NASA's Data Archive.

So, NASA has multiple data archives, not only GES DISC that is what I use widely, but there is also something called Earth data. And there is also called Giovanni. And multiple more will come, but I will just stop here. And it is everything has different interfaces, it will be the same data, for example, and I am using Landsat, land use land cover data. If you go to each of these 3 links, and search for that particular data, you will get the same data, there is no difference. But the way of accessing the data, the way of visualizing the data is different.

So, here comes a good opportunity to test these different websites. We will start with one and I am sure that there is enough of information that we can take from GIS, GES DISC web page, it also acts like a dashboard because you are able to click and move sliders and those kinds of things. So, let us move ahead and one more is Earth Explorer which I have used also,

you could see that all of that as dot gov so it is the government of US dot gov, dot gov, dot gov. In front of that the domain or where the data is stored, can be analyzed. So, here is NASA, here is earth data dot Nasa gsfc Nasa Giovanni and Earth explorers is USGS US Geological Survey, because most of these land use, land cover, water is geology-based survey, geology-based science, so it is stored there also.

All the data has its own metadata, so it is not duplicating the data in terms of efforts is just one server has the data and it gives to all of us, for example, USGS does not launch satellites, NASA does it. And he does not maintain the Data Archive, database, etcetera. All of this is done by NASA. So, here we should be careful that it is not both NASA and USGS working on it, it is mostly NASA maybe USGS pays for part of it.

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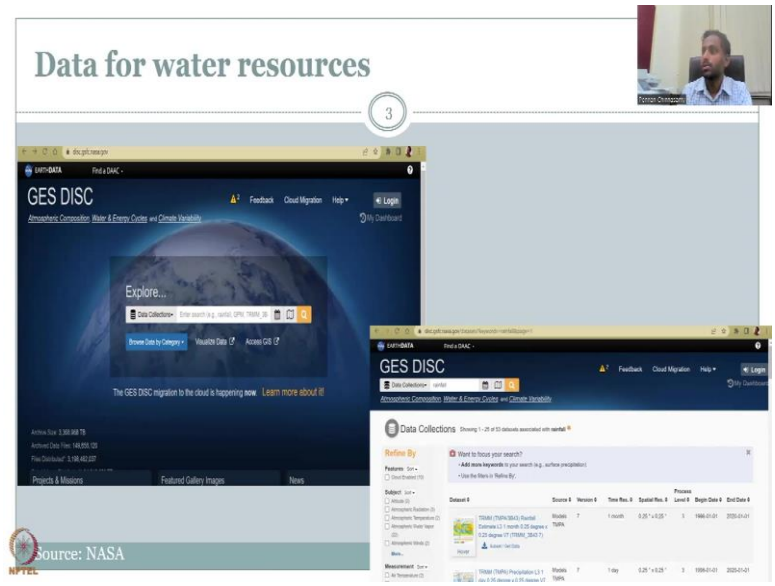

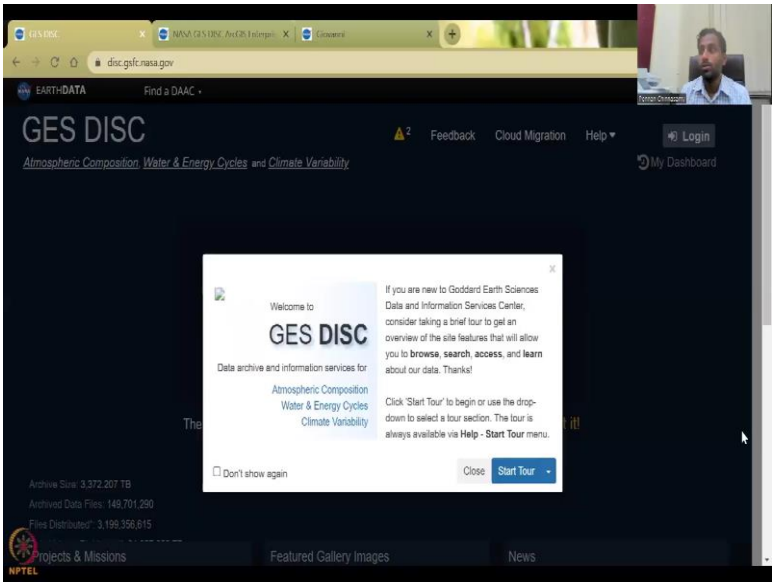

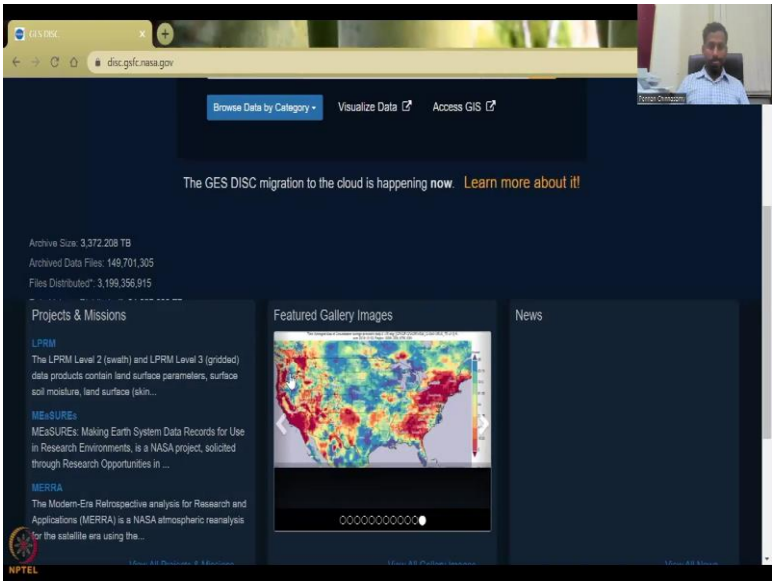
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Visualize Data
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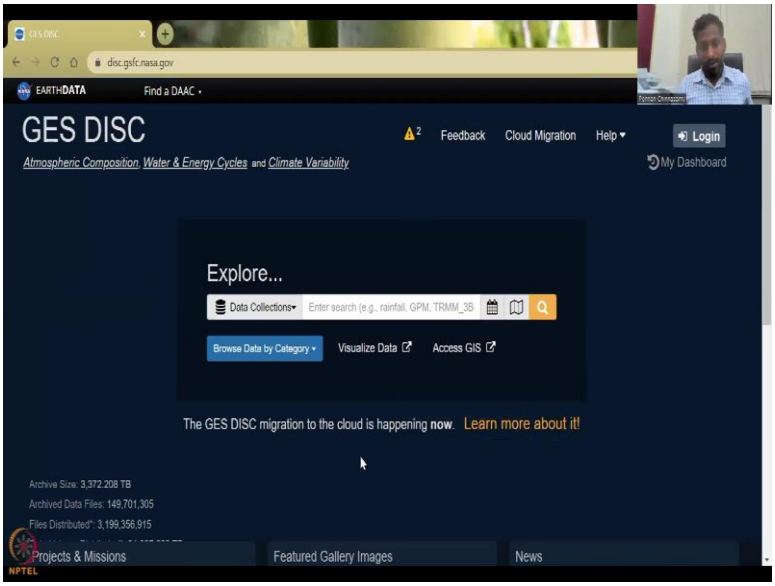
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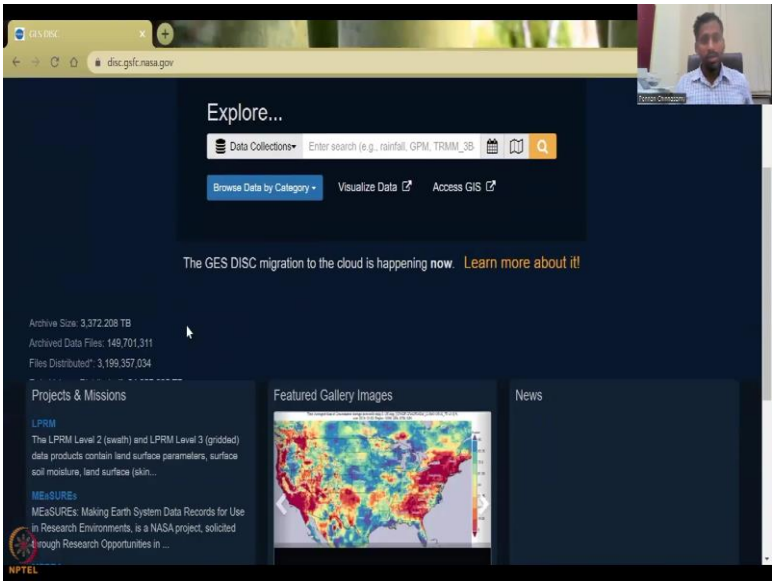
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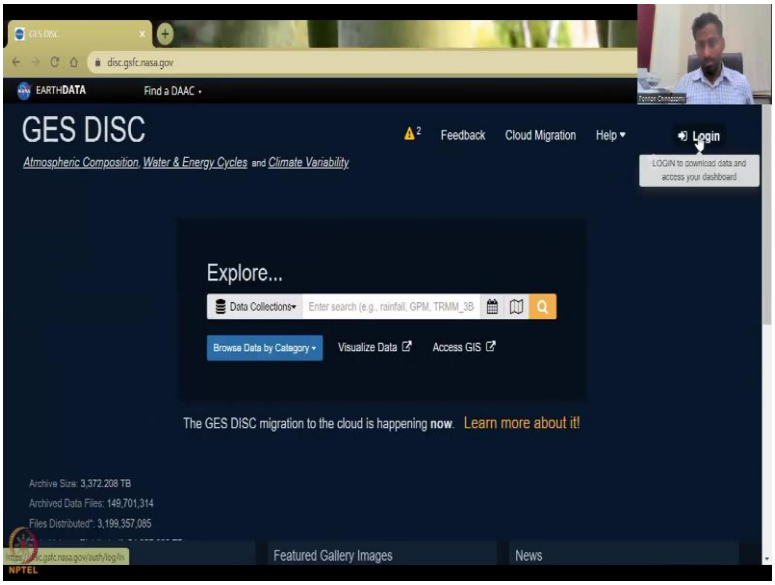
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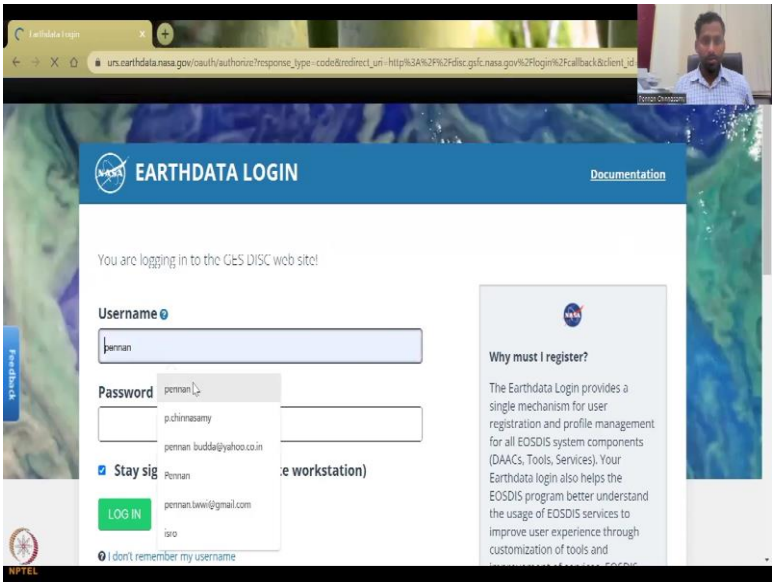
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EARTHDATA LOGIN
Documentation
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Username
pennan
Password
pennan
p.chinnasamy
pennan budda@yahoo.co.in
Pennan
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workstation)
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I don't remember my username
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The Earthdata Login provides a single mechanism for user registration and profile management for all EOSDIS system components (DAACs, Tools, Services). Your Earthdata login also helps the EOSDIS program better understand the usage of EOSDIS services to improve user experience through customization of tools and
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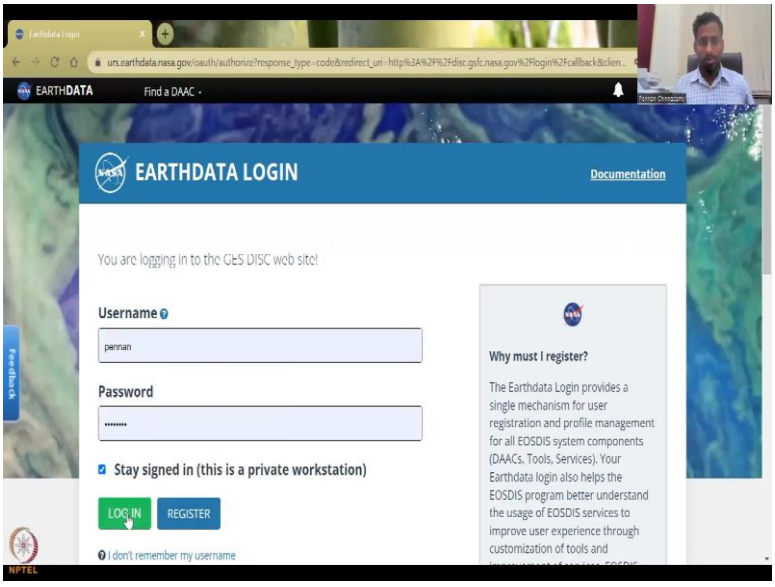
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pennan
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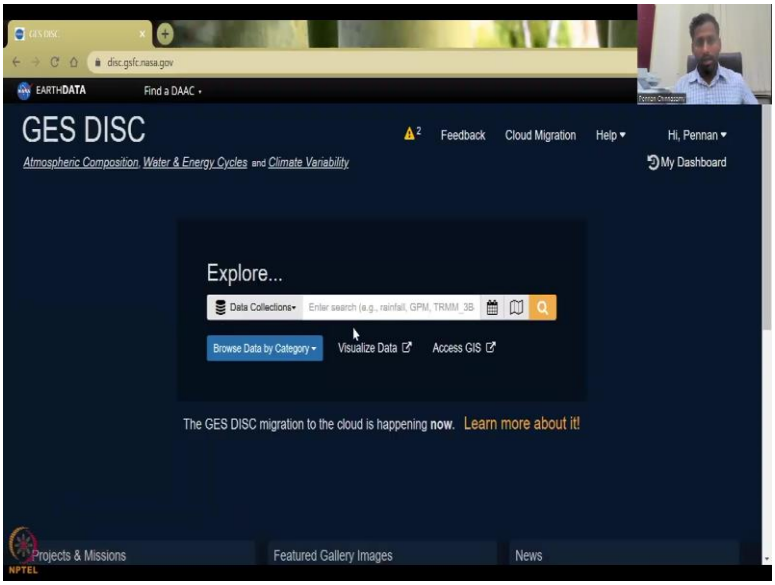
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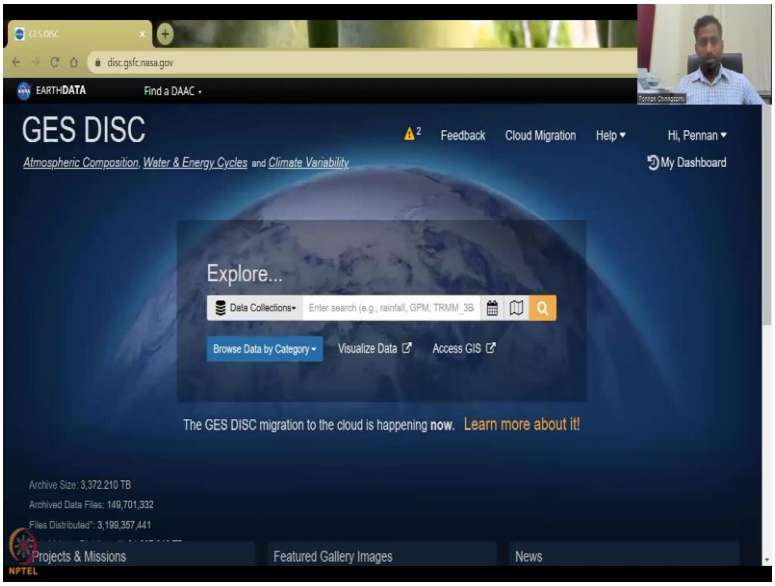
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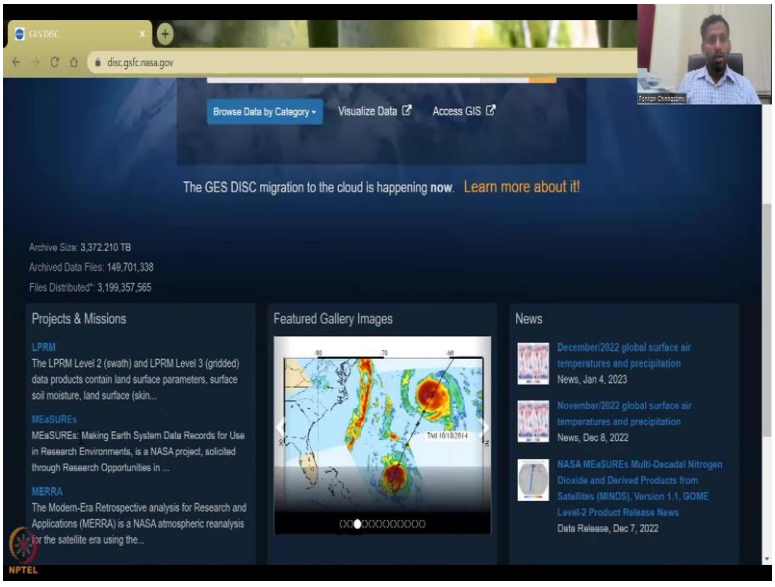
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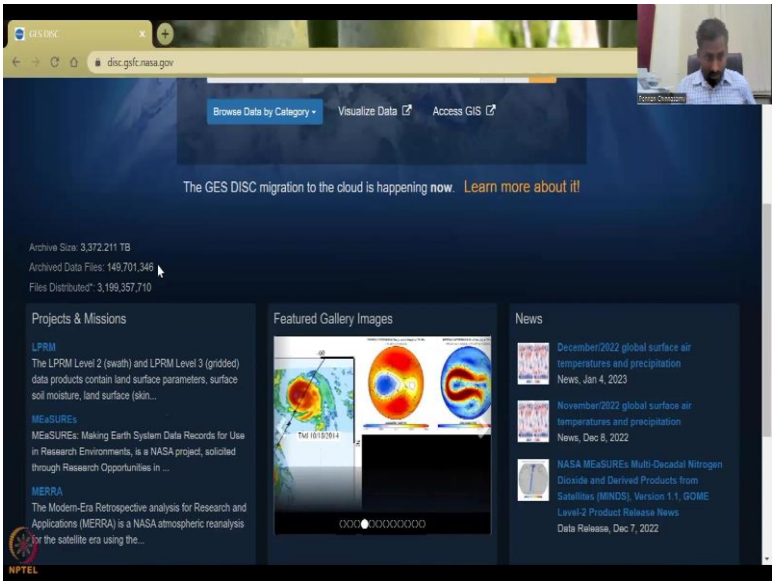
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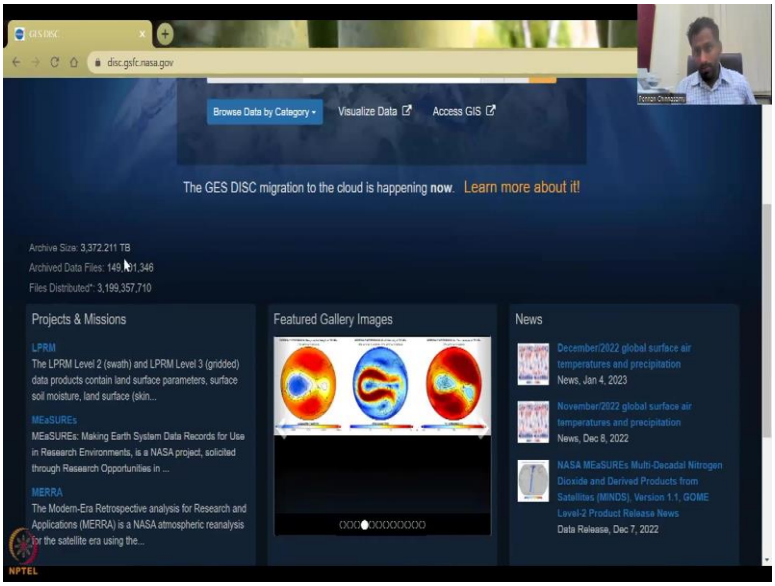
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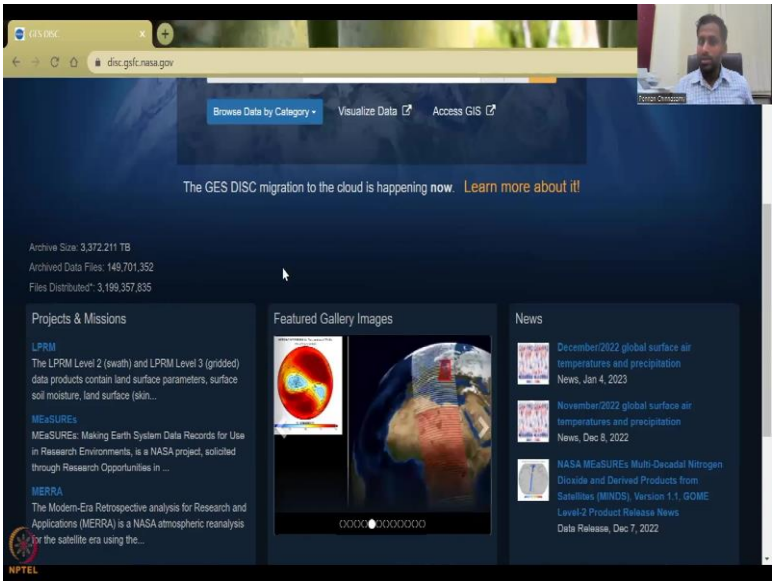
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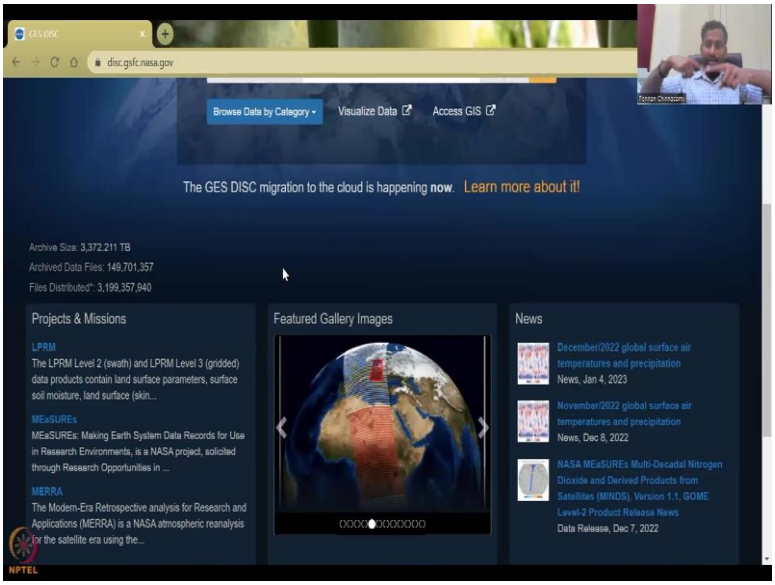
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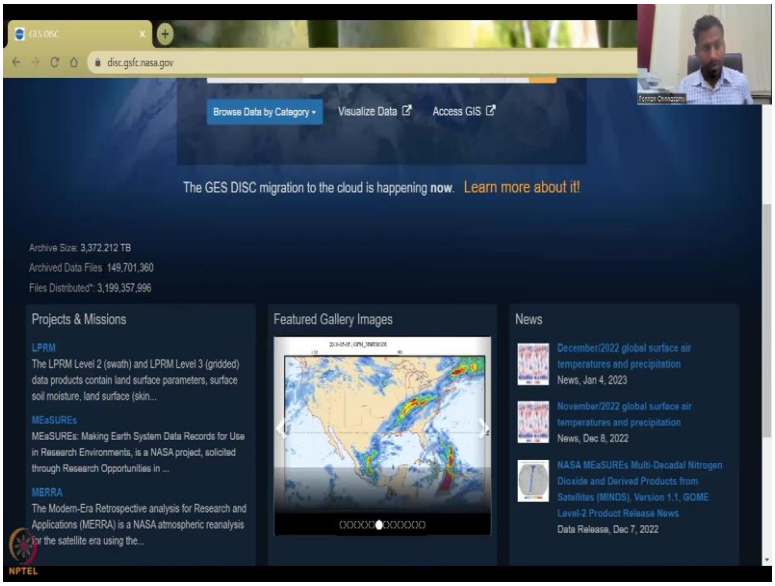
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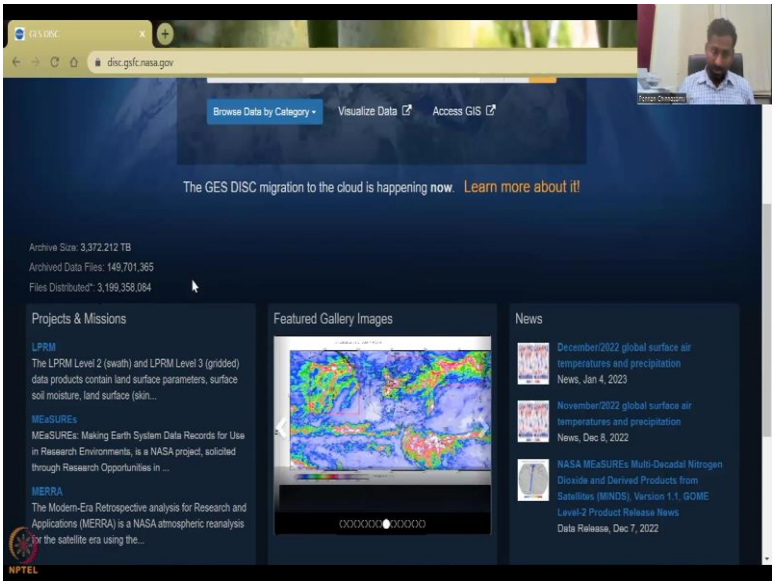
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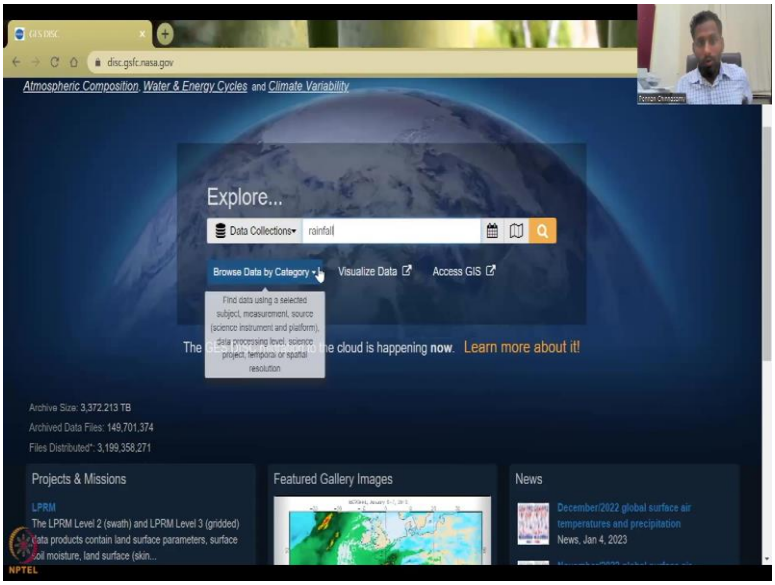
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rainfall
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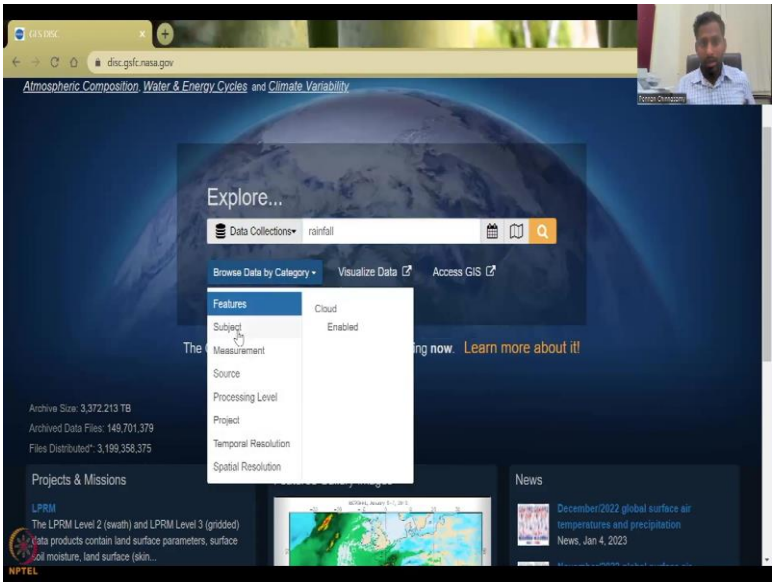
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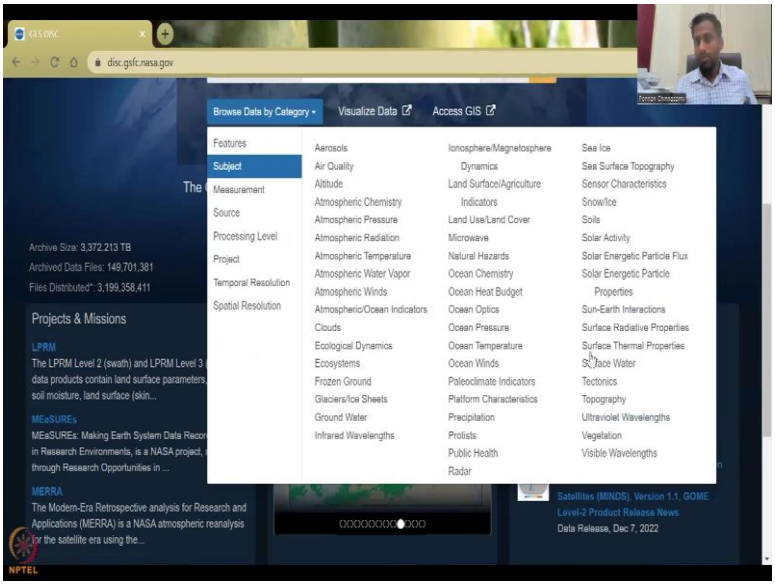
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Browse Data by Category
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Features
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Project
Temporal Resolution
Spatial Resolution
Aerosols
Air Quality
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Atmospheric Chemistry
Atmospheric Pressure
Atmospheric Radiation
Atmospheric Temperature
Atmospheric Water Vapor
Atmospheric Winds
Atmospheric/Ocean Indicators
Clouds
Ecological Dynamics
Ecosystems
Frozen Ground
Glaciers/Ice Sheets
Ground Water
Infrared Wavelengths
Ionosphere/Magnetosphere Dynamics
Land Surface/Agriculture Indicators
Land Use/Land Cover
Microwave
Natural Hazards
Ocean Chemistry
Ocean Heat Budget
Ocean Optics
Ocean Pressure
Ocean Temperature
Ocean Winds
Paleoclimate Indicators
Platform Characteristics
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Public Health
Radar
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Sensor Characteristics
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Solar Activity
Solar Energetic Particle Flux
Solar Energetic Particle Properties
Sun-Earth Interactions
Surface Radiative Properties
Surface Thermal Properties
Surface Water
Tectonics
Topography
Ultraviolet Wavelengths
Vegetation
Visible Wavelengths
Archive Size: 3,372.213 TB
Archived Data Files: 149,701,381
Files Distributed*: 3,199,358,411
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Satellites (MINDS), Version 1.1, GOME Level-2 Product Release News
Data Release, Dec 7, 2022
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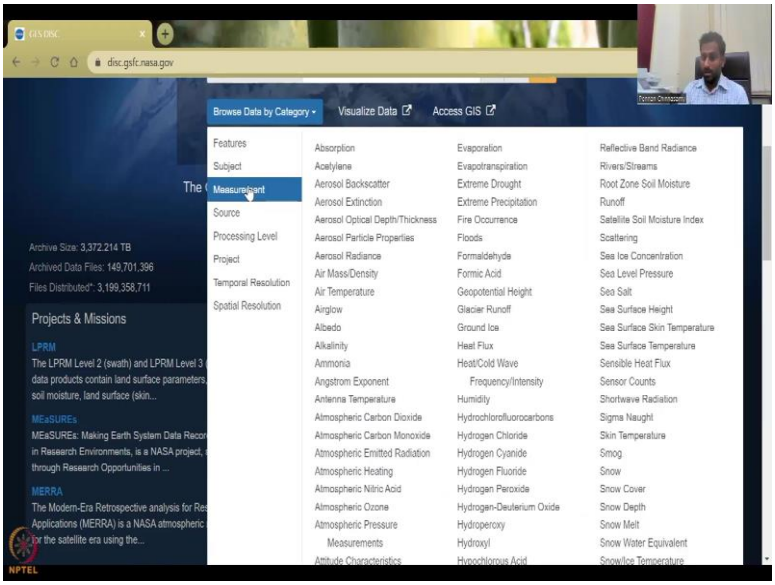
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Spatial Resolution
Absorption
Acetylene
Aerosol Backscatter
Aerosol Extinction
Aerosol Optical Depth/Thickness
Aerosol Particle Properties
Aerosol Radiance
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Airglow
Albedo
Alkalinity
Ammonia
Angstrom Exponent
Antenna Temperature
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Hydrochlorofluorocarbons
Hydrogen Chloride
Hydrogen Cyanide
Hydrogen Fluoride
Hydrogen Peroxide
Hydrogen-Deuterium Oxide
Hydroperoxy
Hydroxyl
Hypochlorous Acid
Reflective Band Radiance
Rivers/Streams
Root Zone Soil Moisture
Runoff
Satellite Soil Moisture Index
Scattering
Sea Ice Concentration
Sea Level Pressure
Sea Salt
Sea Surface Height
Sea Surface Skin Temperature
Sea Surface Temperature
Sensible Heat Flux
Sensor Counts
Shortwave Radiation
Sigma Naught
Skin Temperature
Smog
Snow
Snow Cover
Snow Depth
Snow Melt
Snow Water Equivalent
Snow/Ice Temperature
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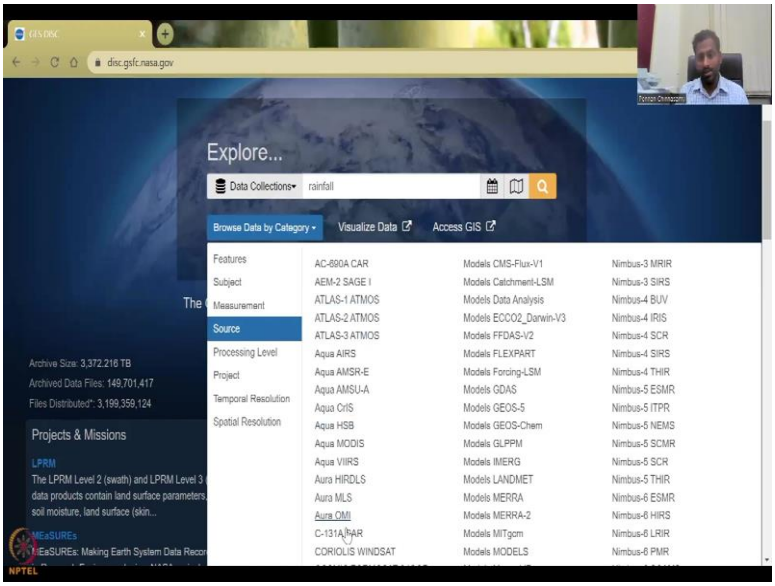
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Explore...
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ATLAS-2 ATMOS
ATLAS-3 ATMOS
Aqua AIRS
Aqua AMSR-E
Aqua AMSU-A
Aqua CrIS
Aqua HSB
Aqua MODIS
Aqua VIIRS
Aura HIRDLS
Aura MLS
Aura OMI
C-131A CAR
CORIOLIS WINDSAT
Models CMS-Flux-V1
Models Catchment-LSM
Models Data Analysis
Models ECCO2_Darwin-V3
Models FFDAS-V2
Models FLEXPART
Models Forcing-LSM
Models GDAS
Models GEOS-5
Models GEOS-Chem
Models GLPPM
Models IMERG
Models LANDMET
Models MERRA
Models MERRA-2
Models MITgcm
Models MODELS
Nimbus-3 MRIR
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Nimbus-4 BUV
Nimbus-4 IRIS
Nimbus-4 SCR
Nimbus-4 SIRS
Nimbus-4 THIR
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Nimbus-5 SCR
Nimbus-5 THIR
Nimbus-6 ESMR
Nimbus-6 HIRS
Nimbus-6 LRIR
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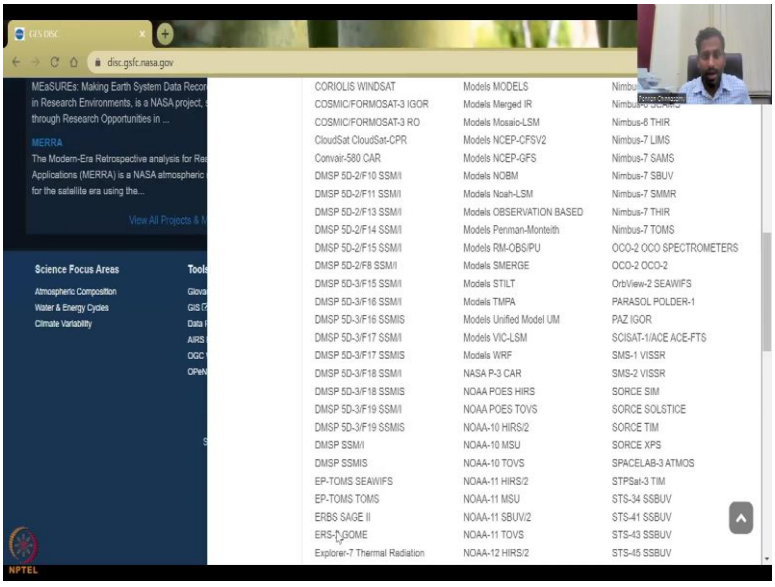
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CORIOLIS WINDSAT
COSMIC/FORMOSAT-3 IGOR
COSMIC/FORMOSAT-3 RO
CloudSat CloudSat-CPR
Convair-580 CAR
DMSP 5D-2/F10 SSM/I
DMSP 5D-2/F11 SSM/I
DMSP 5D-2/F13 SSM/I
DMSP 5D-2/F14 SSM/I
DMSP 5D-2/F15 SSM/I
DMSP 5D-2/F8 SSM/I
DMSP 5D-3/F15 SSM/I
DMSP 5D-3/F16 SSM/I
DMSP 5D-3/F16 SSMIS
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ERS-1 GOME
Explorer-7 Thermal Radiation
Models MODELS
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Models NCEP-CFSV2
Models NCEP-GFS
Models NOBM
Models Noah-LSM
Models OBSERVATION BASED
Models Penman-Monteith
Models RM-OBS/PU
Models SMERGE
Models STILT
Models TMPA
Models Unified Model UM
Models VIC-LSM
Models WRF
NASA P-3 CAR
NOAA POES HIRS
NOAA POES TOVS
NOAA-10 HIRS/2
NOAA-10 MSU
NOAA-10 TOVS
NOAA-11 HIRS/2
NOAA-11 MSU
NOAA-11 SBUV/2
NOAA-11 TOVS
NOAA-12 HIRS/2
Nimbus-6 THIR
Nimbus-7 LIMS
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Nimbus-7 SBUV
Nimbus-7 SMMR
Nimbus-7 THIR
Nimbus-7 TOMS
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OCO-2 OCO-2
OrbView-2 SEAWIFS
PARASOL POLDER-1
PAZ IGOR
SCISAT-1/ACE ACE-FTS
SMS-1 VISSR
SMS-2 VISSR
SORCE SIM
SORCE SOLSTICE
SORCE TIM
SORCE XPS
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STPSat-3 TIM
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STS-45 SSBUV
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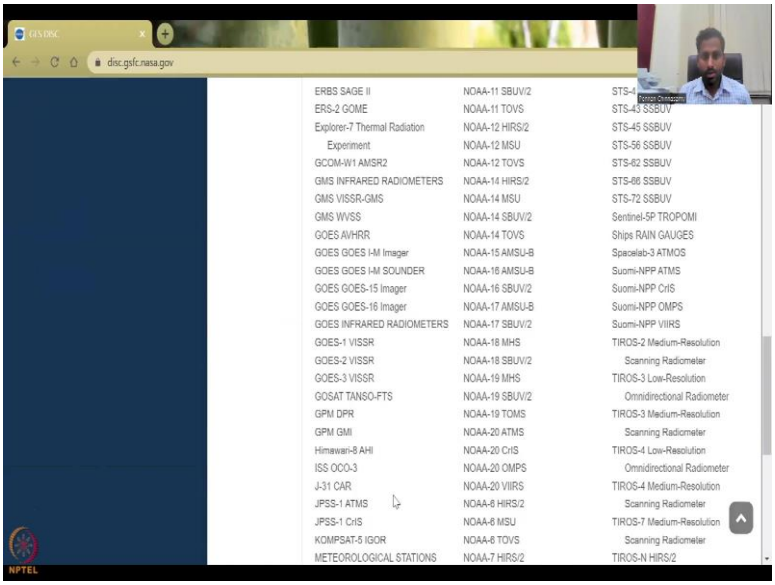
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GMS VISSR-GMS
GMS WVSS
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GOES GOES I-M Imager
GOES GOES I-M SOUNDER
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GOES INFRARED RADIOMETERS
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TIROS-2 Medium-Resolution Scanning Radiometer
TIROS-3 Low-Resolution Omnidirectional Radiometer
TIROS-3 Medium-Resolution Scanning Radiometer
TIROS-4 Low-Resolution Omnidirectional Radiometer
TIROS-4 Medium-Resolution Scanning Radiometer
TIROS-7 Medium-Resolution Scanning Radiometer
TIROS-N HIRS/2
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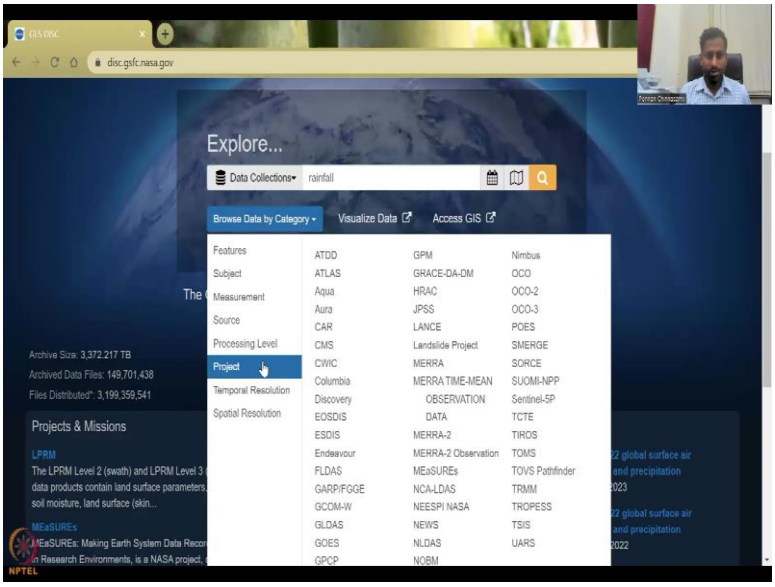
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Explore...
Data Collections
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Aura
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Columbia
Discovery
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ESDIS
Endeavour
FLDAS
GARP/FGGE
GCOM-W
GLDAS
GOES
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GPM
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Landslide Project
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TRMM
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Archived Data Files: 149,701,438
Files Distributed*: 3,199,359,541
Projects & Missions
LPRM
The LPRM Level 2 (swath) and LPRM Level 3
data products contain land surface parameters,
soil moisture, land surface (skin...
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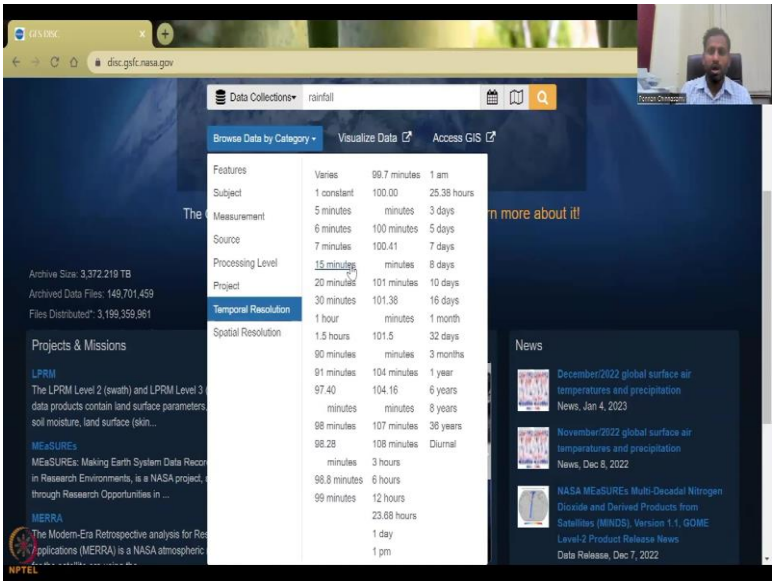
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Data Collections
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7 days
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10 days
16 days
1 month
32 days
3 months
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Archive Size: 3,372.219 TB
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Projects & Missions
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data products contain land surface parameters,
soil moisture, land surface (skin...
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NASA MEaSUREs Multi-Decadal Nitrogen Dioxide and Derived Products from Satellites (MINDS), Version 1.1, GOME Level-2 Product Release News
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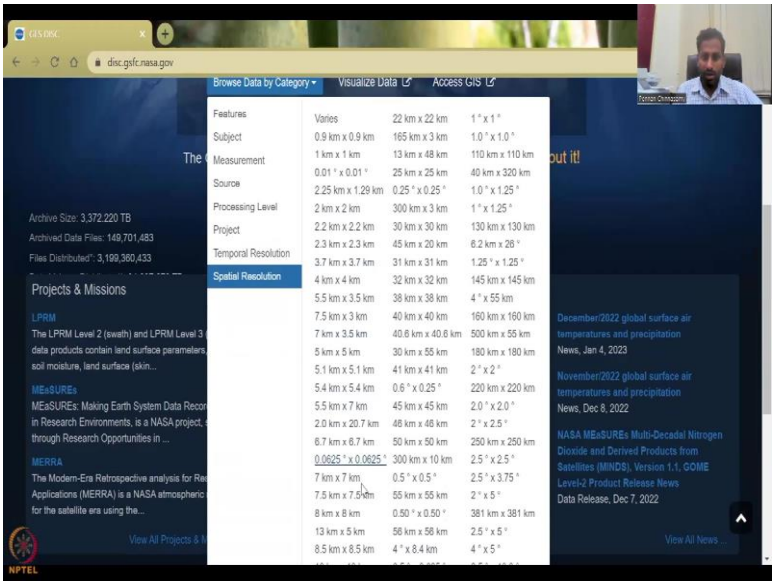
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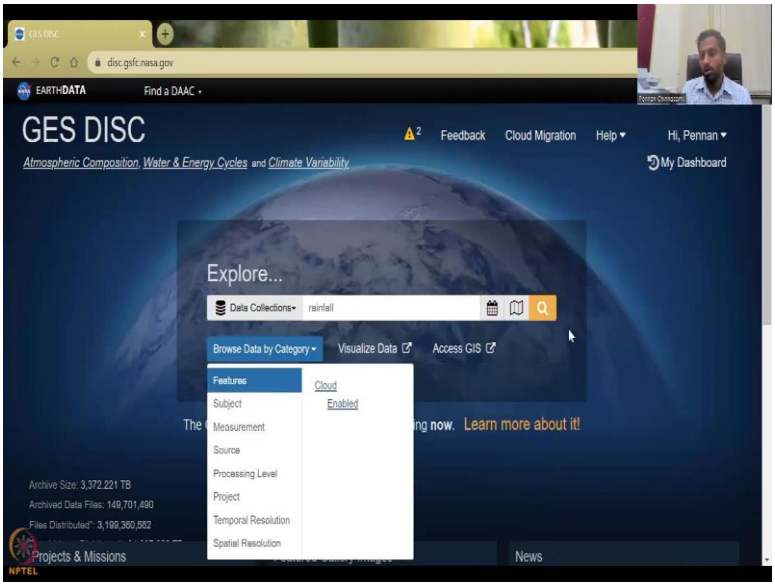
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Atmospheric Composition, Water & Energy Cycles and Climate Variability
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Learn more about it!
Archive Size: 3,372.221 TB
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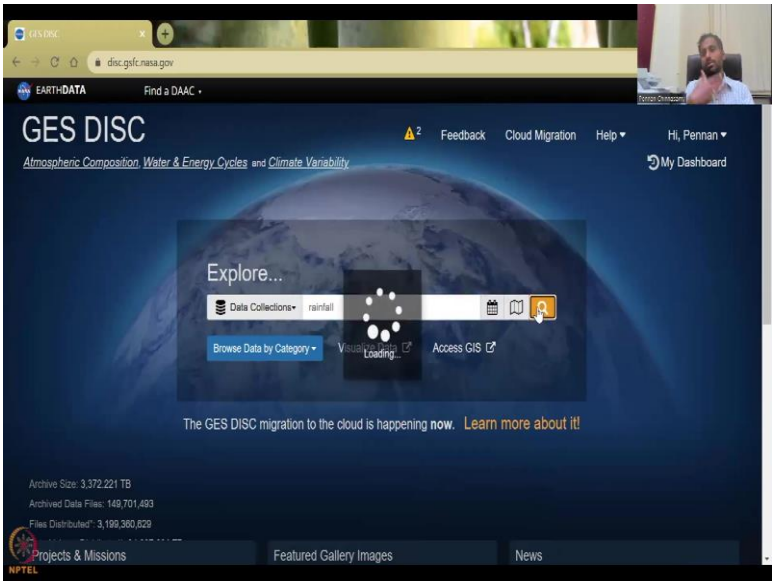
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The GES DISC migration to the cloud is happening now. Learn more about it!
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Archived Data Files: 149,701,493
Files Distributed*: 3,199,360,629
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So, as I said, we will look into the data for water resources and climate, climate I will cover in the next class but water resources because we will see more and more water data that is coming out. When you open GES DISC, you will come up to this kind of a page. In this page, you will see a search box so within a search, there is a search box and here it gives example it says rainfall GPM TRMM data.

So, you can actually search for a parameter if you go back to week 2 lectures, we have said that for the water sector water focus in rural development, we need to understand the rainfall discharge soil moisture storage, evapotranspiration, root water holding capacity all these things unless we have all the data it is difficult to quantify the end product which is storage or what is the change in water storage which is going to be used for the future development scenarios.

So, in that case, we have a parameter like evapotranspiration rainfall, soil moisture you can put that here in that search box or you can put the satellite name Landsat. Some of the Indian satellites are also kept here and you will get a page like this, that shows the different data this is just rainfall you can see that I have searched for rainfall as a parameter and global so I will go through what these are in the live experiment.

So, the first box you see is like a calendar that gives you the number of dates the days range in which you want to search the data and then the paper like thing you see is a map where in the world you want to have it so if you do not give these dates all the data will come up. So, we do not want that but we will be careful in selecting India's Park and you will be amazed and interested to see that you will have better resolution data available for free in this portal. It also holds Sentinel, which is the European Space data. It also some of the Indian database, but mostly it is NASA's database. So, without further ado, let us search for that link.

So, we will be opening the web page for GES DISC, it is opening up, I hope you can see it. So, when you click GES DISC, that link that I have shown in the slide, this page opens up and this is the initial part, it says do want to start the tour, would you like us to take a tour, so I would highly recommend new students who are using it to start the tour. Since it is kind of not part of the course, I will just close it. And I will give you the recommendations on how to use the data dashboard.

Here what you see is the preliminary things, you can also have a login without login, you cannot download the data. So, I am just going to log in and I have already the login details setup. So, you could see that my username and password also comes up. And I have logged

in, it goes back to the front page, where I initially was so hi Pennan and it has my dashboard, you can have your own dashboard. Again, there are multiple videos to do it. But let us not get distracted with that there is no there is a lot of things that you can spend on this this can itself be a full 2 to 3 lectures weeks, but I am just going to spend 2 lectures on it.

A lot of reading a lot of papers archives that have been put, here is the archive size. So, you could see that it is growing, so 3000 terabytes of data is there. And you could see that now it is 0.211, 0.21 is MBs and GBs etc. you will see that slowly it gets increase why is that? Is that in real time data is downloaded from the satellite, it gets updated through the algorithms and being pushed into the system. Now you see it has increased. Archive data files how many files are there again this also has been increased the files distributed has been increased.

So, these keep on ticking you have 365 slowly before we even click within a minute it will show an increase, good. So, 370, so now what I am going to do is I am going to click a parameter rainfall you can do here like browse by category subject you have multiple subjects, if you want surface water for this rural development, we have surface water, surface air temperature, Earth interactions, rainfall, precipitation rainfall, land use, land cover, and then clouds groundwater and then glaciers ice sheets ecosystems, dynamics, public health, all these things or you can go as a measurement. So, as I said rainfall is one thing that we need to look at, it could be under precipitation, r rainfall as r or precipitation.

So, preservation amount, precipitation rate, etcetera. We can also take the vegetation height, vegetation index, here, which vegetation cover land, use land cover, the water vapor, water flux, all these things. Evaporation evapotranspiration is also part. The source, you can go from satellites, these are all satellites look at how many satellites are there and sensors. So, sometimes you will see for example, aqua, Aqua has AIRS AMSR-E, Aqua MODIS, so, all these are satellites and payloads, they have given different, different units. Yes, and then you do have some of the data products from different, different countries.

Then processing level, high processing level, the projects, some of the projects are kept as Aqua for water TRMM for rainfall. And then GLDs Land driven models, grace is a program so grace DH and groundwater etc. Temporal resolution, you can keep it as constant like soil moisture, soil type is a constant, but then you can look at how small you can get to per day, 6 years once data or these things is temporal resolution.

So, you can even get 5 minutes data 6 minutes data. These are mostly for cloud and movement of clouds to study the cyclones and those kinds of things. Spatial resolution is

given as degrees or kilometers, I have said already 1 degree 1 by 1 degree resolution is about 100 kilometers by 100 kilometer square, so the pixel size is 100 by 100 kilometers, you will see the units change between kilometers and degrees, that is fine, the conversion, you can easily do it. So, you can have as small as 0.9 kilometers, or even lesser 2 kilometers you have sub meter level, also you have 10 meters, 20 meters, those kinds of things.

Features, enable cloud cover, enable or not, so we will just click this rainfall, and then click, just let it let it run this, this first part will take some time because it is going to go through all the datasets, and then pull out where it finds rainfall. I already had it ready, but I had to restart it, let it run, let it run.

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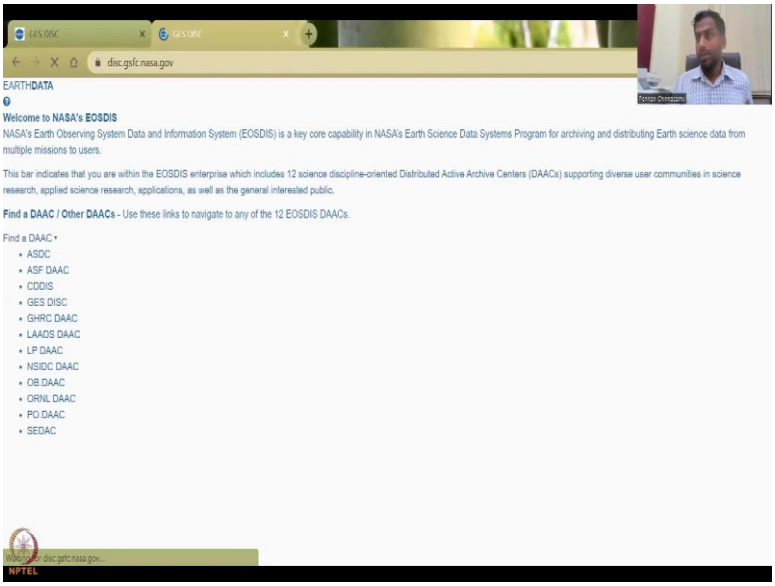

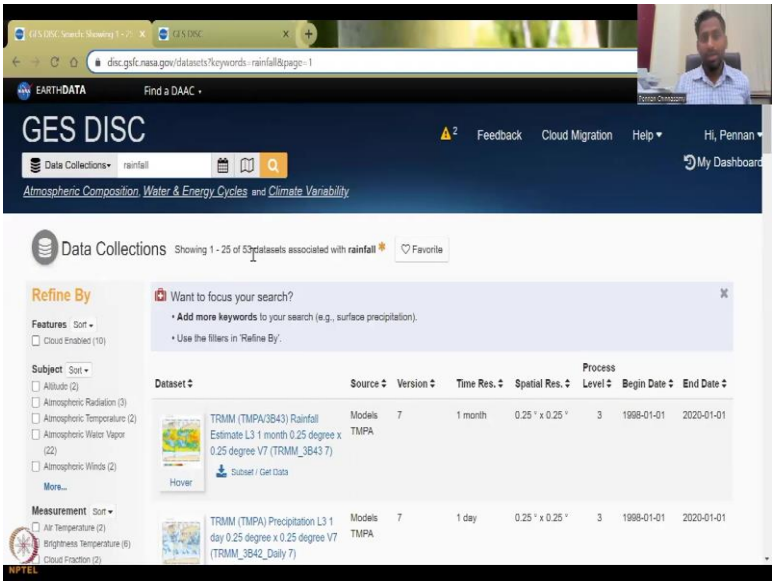

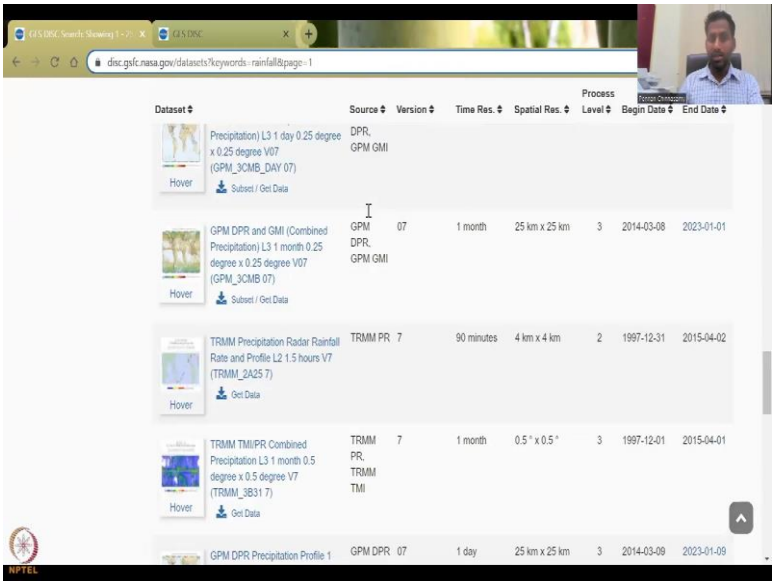
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Precipitation) L3 1 day 0.25 degree x 0.25 degree V07 (GPM_3CMB_DAY 07)
DPR, GPM GMI
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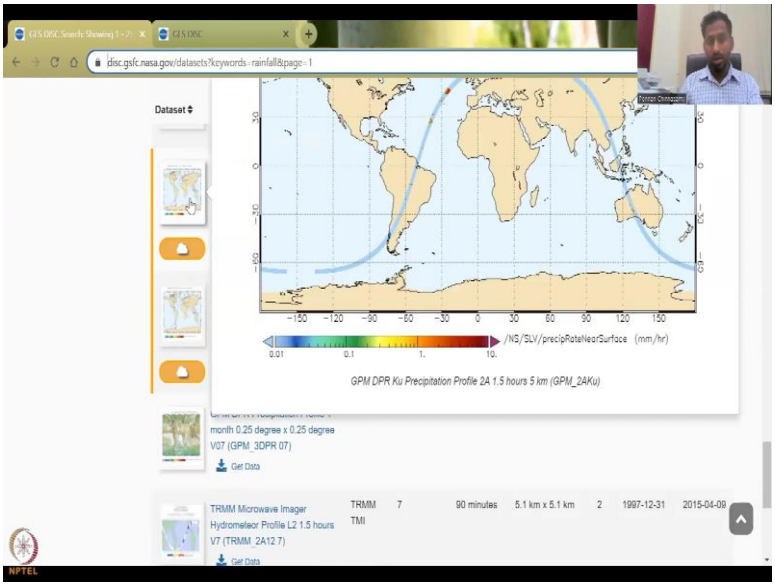
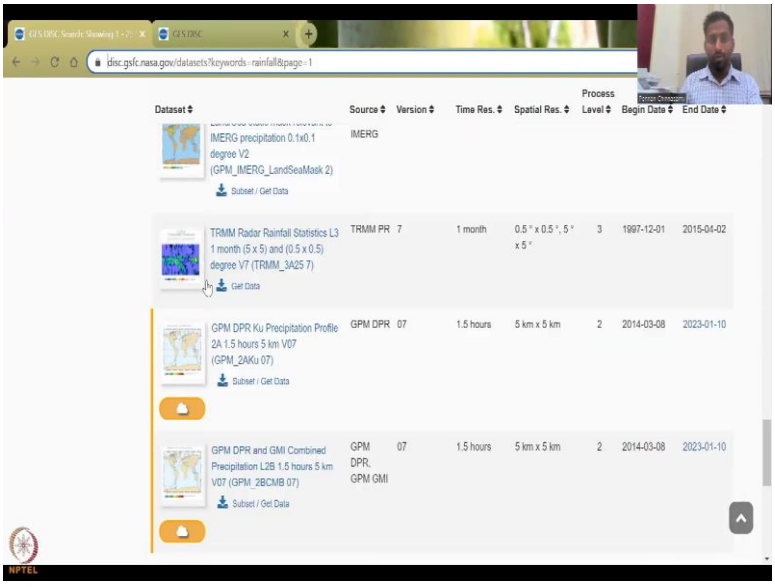
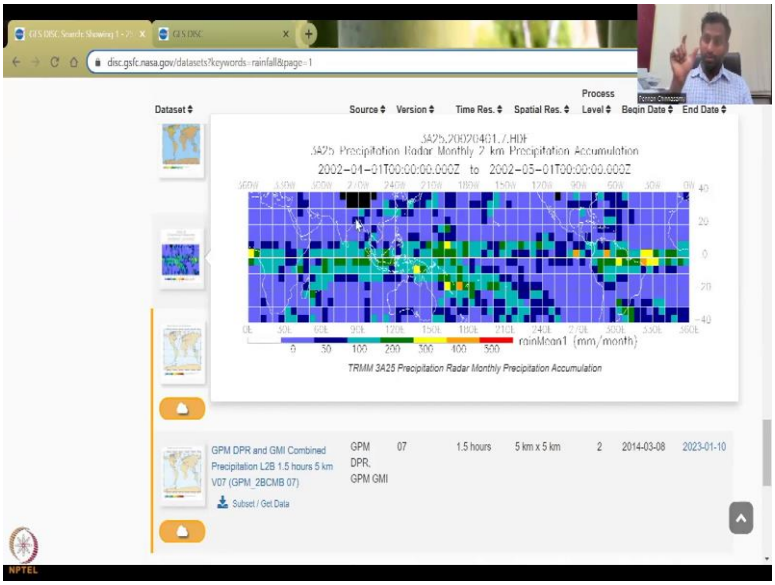
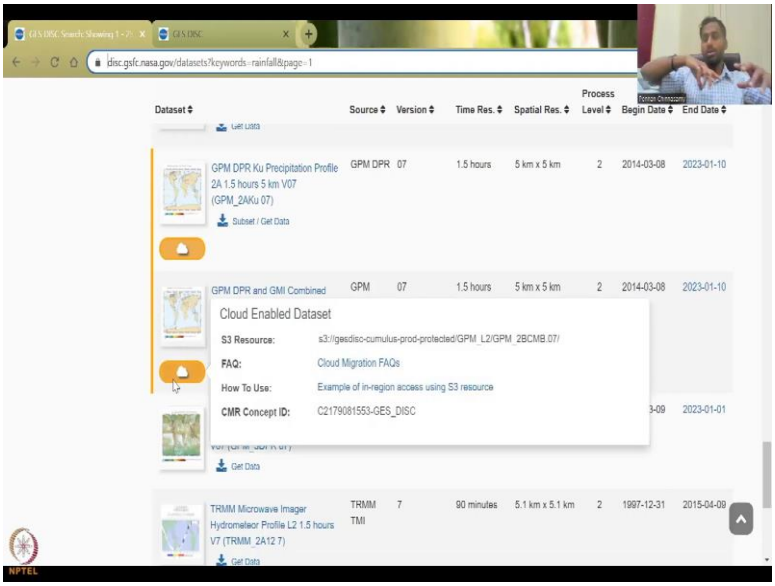
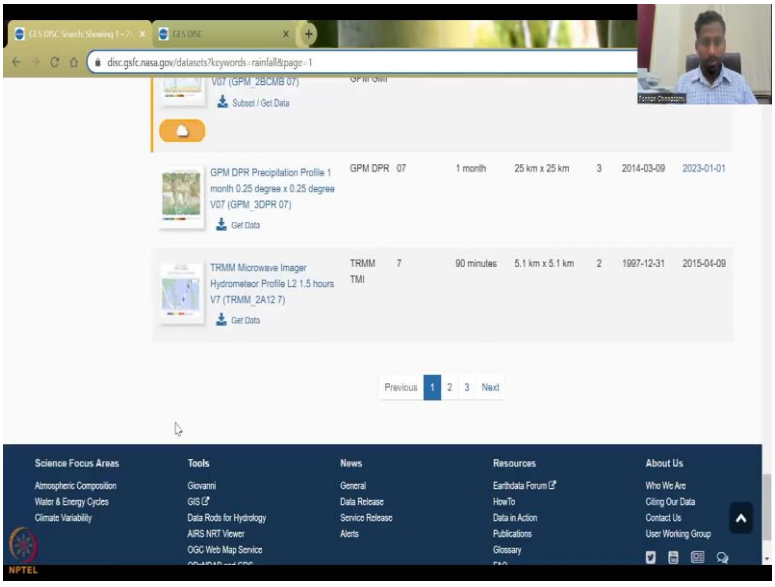
2014-03-08
2023-01-01
TRMM Precipitation Radar Rainfall Rate and Profile L2 1.5 hours V7 (TRMM_2A25 7)
TRMM PR
7
90 minutes
4 km x 4 km
2
1997-12-31
2015-04-02
Get Data
TRMM TMI/PR Combined Precipitation L3 1 month 0.5 degree x 0.5 degree V7 (TRMM_3B31 7)
TRMM PR, TRMM TMI
1 month
0.5 ° x 0.5 °
3
1997-12-01
2015-04-01
GPM DPR Precipitation Profile 1
GPM DPR
07
1 day
25 km x 25 km
3
2014-03-09
2023-01-09
NPTEL

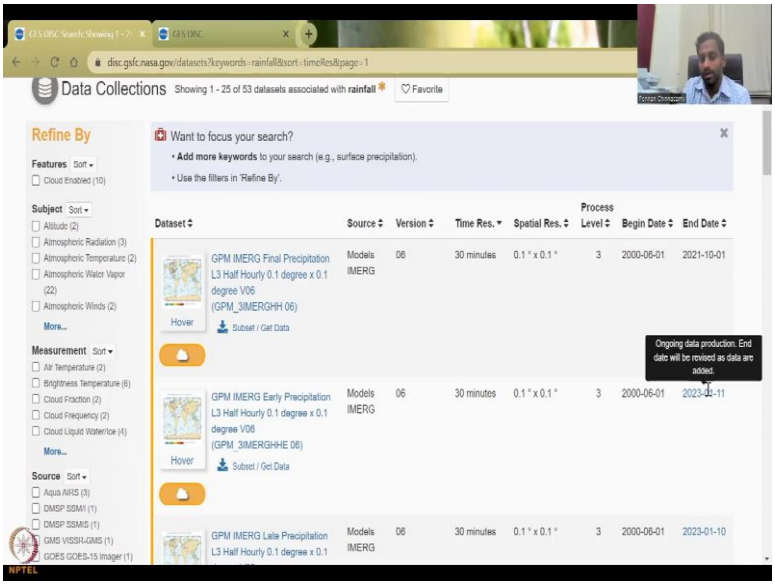

disc.gsfc.nasa.gov/datasets?keywords=rainfall&page=1
Dataset
/NS/SLV/precipRateNearSurface (mm/hr)
GPM DPR Ku Precipitation Profile 2A 1.5 hours 5 km (GPM_2AKu)
month 0.25 degree x 0.25 degree V07 (GPM_3DPR 07)
Get Data
TRMM Microwave Imager Hydrometeor Profile L2 1.5 hours V7 (TRMM_2A12 7)
TRMM
7
90 minutes
5.1 km x 5.1 km
2
1997-12-31
2015-04-09
TMI
NPTEL

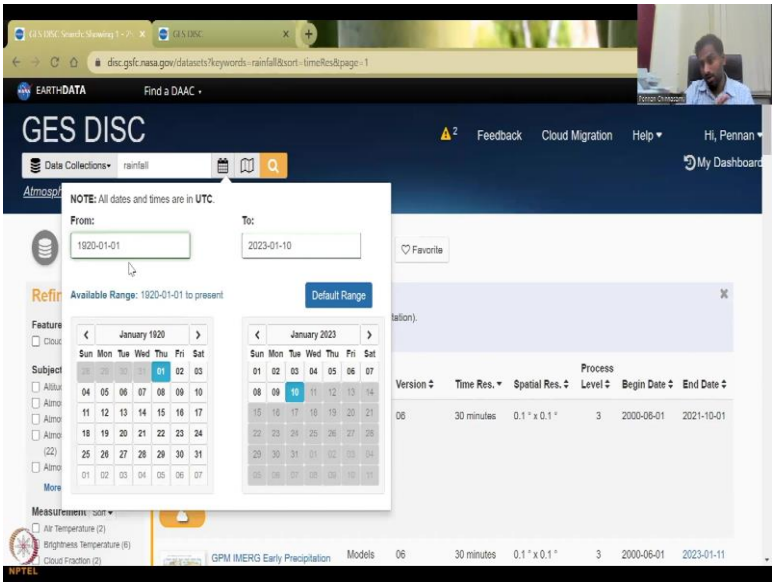

disc.gsfc.nasa.gov/datasets?keywords=rainfall&page=1
Dataset
Source
Version
Time Res.
Spatial Res.
Process Level
Begin Date
End Date
IMERG precipitation 0.1x0.1 degree V2 (GPM_IMERG_LandSeaMask 2)
IMERG
Subset / Get Data
TRMM Radar Rainfall Statistics L3 1 month (5 x 5) and (0.5 x 0.5) degree V7 (TRMM_3A25 7)
TRMM PR
7
1 month
0.5 ° x 0.5 °, 5 ° x 5 °
3
1997-12-01
2015-04-02
Get Data
GPM DPR Ku Precipitation Profile 2A 1.5 hours 5 km V07 (GPM_2AKu 07)
GPM DPR
07
1.5 hours
5 km x 5 km
2
2014-03-08
2023-01-10
GPM DPR and GMI Combined Precipitation L2B 1.5 hours 5 km V07 (GPM_2BCMB 07)
GPM DPR, GPM GMI
NPTEL

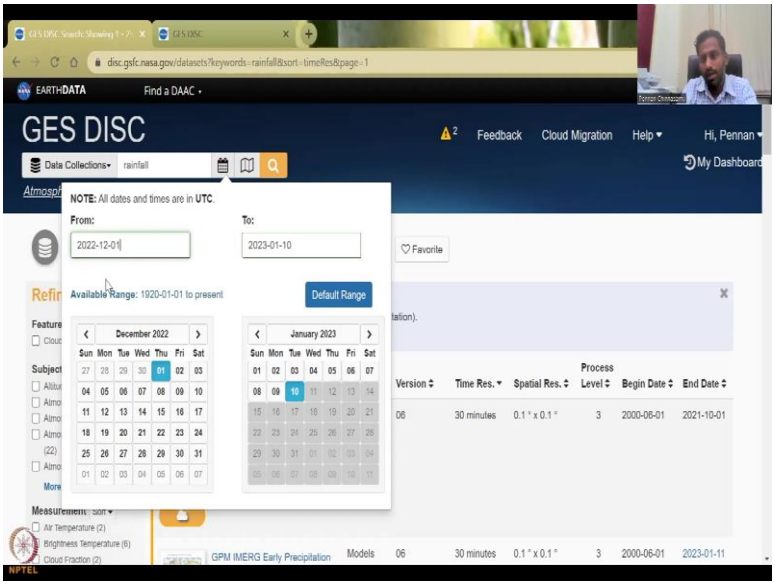

disc.gsfc.nasa.gov/datasets?keywords=rainfall&page=1
Dataset
Source
Version
Time Res.
Spatial Res.
Process Level
Begin Date
End Date
3A25.20020401.7.HDF
3A25 Precipitation Radar Monthly 2 km Precipitation Accumulation
2002-04-01T00:00:00.000Z to 2002-05-01T00:00:00.000Z
rainMean1 (mm/month)
TRMM 3A25 Precipitation Radar Monthly Precipitation Accumulation
GPM DPR and GMI Combined Precipitation L2B 1.5 hours 5 km V07 (GPM_2BCMB 07)
GPM DPR, GPM GMI
07
1.5 hours
5 km x 5 km
2
2014-03-08
2023-01-10
Subset / Get Data
NPTEL

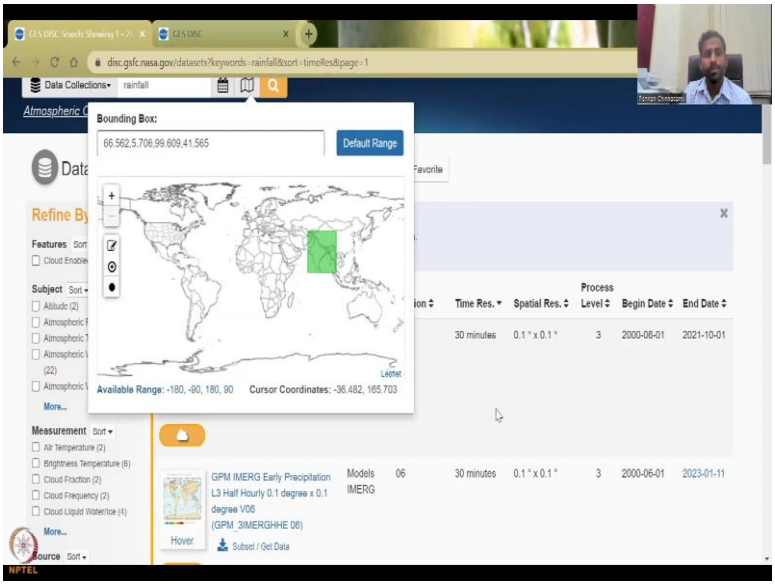

disc.gsfc.nasa.gov/datasets?keywords=rainfall&page=1
Dataset
Source
Version
Time Res.
Spatial Res.
Process Level
Begin Date
End Date
GPM DPR Ku Precipitation Profile 2A 1.5 hours 5 km V07 (GPM_2AKu 07)
GPM DPR
07
1.5 hours
5 km x 5 km
2
2014-03-08
2023-01-10
Subset / Get Data
GPM DPR and GMI Combined
GPM
07
1.5 hours
5 km x 5 km
2
2014-03-08
2023-01-10
Cloud Enabled Dataset
S3 Resource:
s3://gesdisc-cumulus-prod-protected/GPM_L2/GPM_2BCMB.07/
FAQ:
Cloud Migration FAQs
How To Use:
Example of in-region access using S3 resource
CMR Concept ID:
C2179081553-GES_DISC
2023-01-01
Get Data
TRMM Microwave Imager Hydrometeor Profile L2 1.5 hours V7 (TRMM_2A12 7)
TRMM
TMI
7
90 minutes
5.1 km x 5.1 km
2
1997-12-31
2015-04-09
Get Data
NPTEL

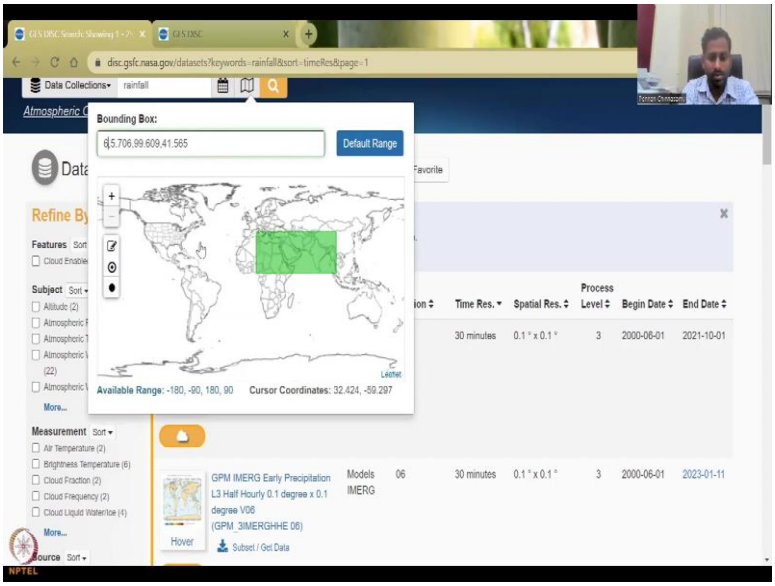

disc.gsfc.nasa.gov/datasets?keywords=rainfall&page=1
V07 (GPM_2BCMB 07)
Subset / Get Data
GPM DPR Precipitation Profile 1 month 0.25 degree x 0.25 degree V07 (GPM_3DPR 07)
GPM DPR
07
1 month
25 km x 25 km
3
2014-03-09
2023-01-01
Get Data
TRMM Microwave Imager Hydrometeor Profile L2 1.5 hours V7 (TRMM_2A12 7)
TRMM
TMI
7
90 minutes
5.1 km x 5.1 km
2
1997-12-31
2015-04-09
Get Data
Previous
1
2
3
Next
Science Focus Areas
Atmospheric Composition
Water & Energy Cycles
Climate Variability
Tools
Giovanni
GIS
Data Rods for Hydrology
AIRS NRT Viewer
OGC Web Map Service
News
General
Data Release
Service Release
Alerts
Resources
Earthdata Forum
HowTo
Data in Action
Publications
Glossary
About Us
Who We Are
Citing Our Data
Contact Us
User Working Group
NPTEL

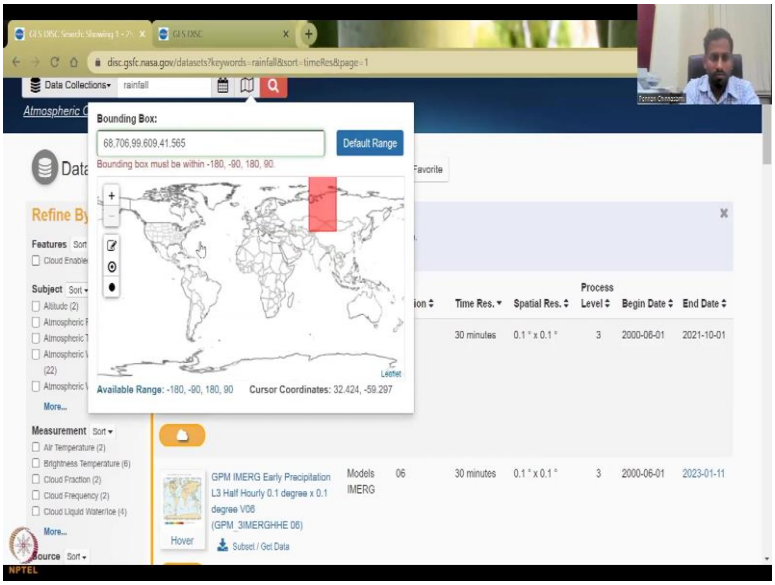

Data Collections
Showing 1 - 25 of 53 datasets associated with rainfall
Favorite
Refine By
Want to focus your search?
• Add more keywords to your search (e.g., surface precipitation).
• Use the filters in 'Refine By'.
Dataset
Source
Version
Time Res.
Spatial Res.
Process Level
Begin Date
End Date
GPM IMERG Final Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHH 06)
Models IMERG
06
30 minutes
0.1 ° x 0.1 °
3
2000-06-01
2021-10-01
Hover
Subset / Get Data
Ongoing data production. End date will be revised as data are added.
GPM IMERG Early Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHE 06)
2023-01-11
GPM IMERG Late Precipitation L3 Half Hourly 0.1 degree x 0.1
2023-01-10
NPTEL

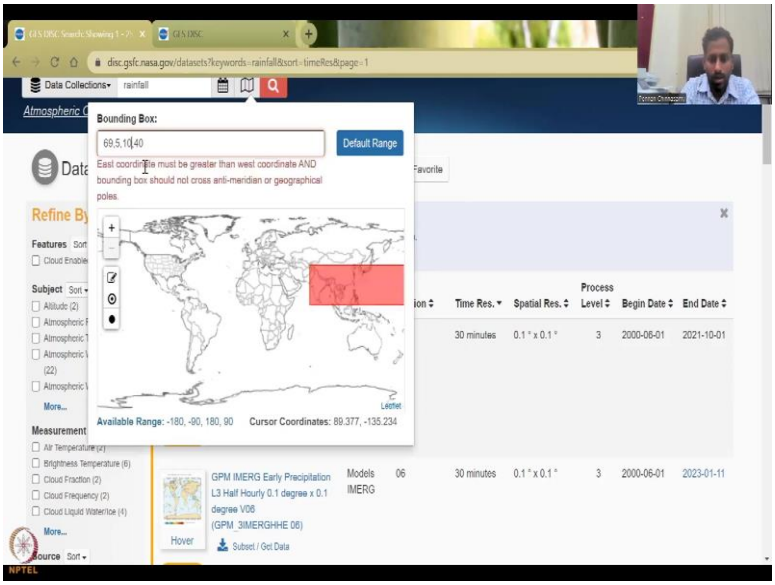

EARTHDATA
Find a DAAC
GES DISC
Feedback
Cloud Migration
Help
Hi, Pennan
My Dashboard
Data Collections
rainfall
NOTE: All dates and times are in UTC.
From:
1920-01-01
To:
2023-01-10
Available Range: 1920-01-01 to present
Default Range
January 1920
January 2023
Favorite
NPTEL

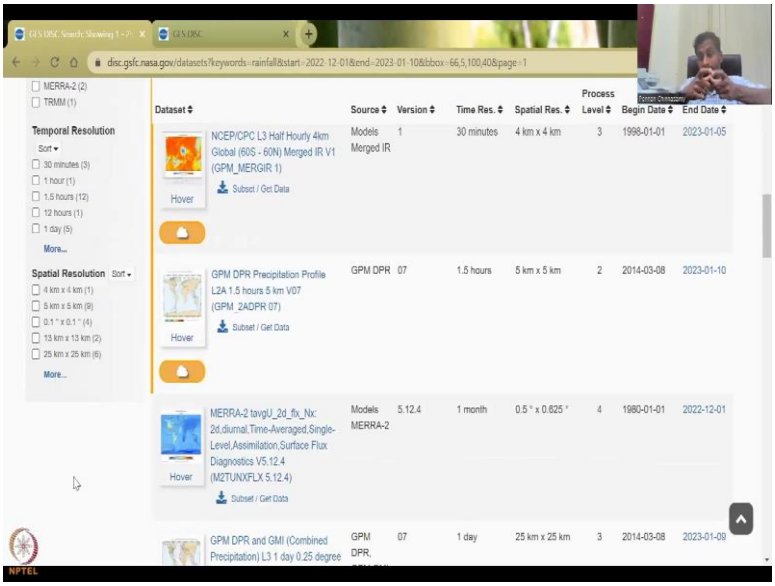

EARTHDATA
Find a DAAC
GES DISC
Feedback
Cloud Migration
Help
Hi, Pennan
My Dashboard
Data Collections
rainfall
NOTE: All dates and times are in UTC.
From:
2022-12-01
To:
2023-01-10
Available Range: 1920-01-01 to present
Default Range
December 2022
January 2023
Favorite
NPTEL

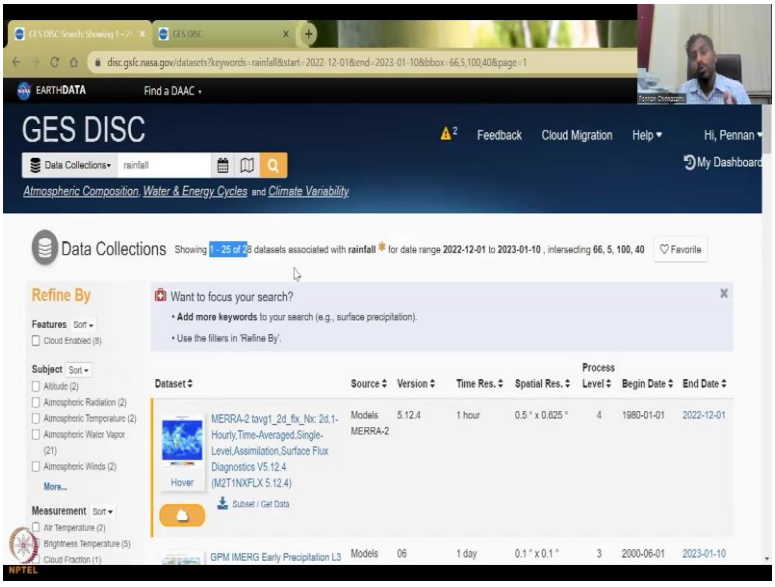

disc.gsfc.nasa.gov/datasets?keywords=rainfall&sort=timeRes&page=1
Data Collections
rainfall
Bounding Box:
66.562,5.706,99.609,41.565
Default Range
Available Range: -180, -90, 180, 90
Cursor Coordinates: -36.482, 165.703
Leaflet
Refine By
Features
Subject
Measurement
Air Temperature (2)
Brightness Temperature (6)
Cloud Fraction (2)
Cloud Frequency (2)
Cloud Liquid Water/Ice (4)
More...
Time Res.
Spatial Res.
Process Level
Begin Date
End Date
30 minutes
0.1 ° x 0.1 °
3
2000-06-01
2021-10-01
GPM IMERG Early Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHE 06)
Models
IMERG
06
30 minutes
0.1 ° x 0.1 °
3
2000-06-01
2023-01-11
Hover
Subset / Get Data
NPTEL

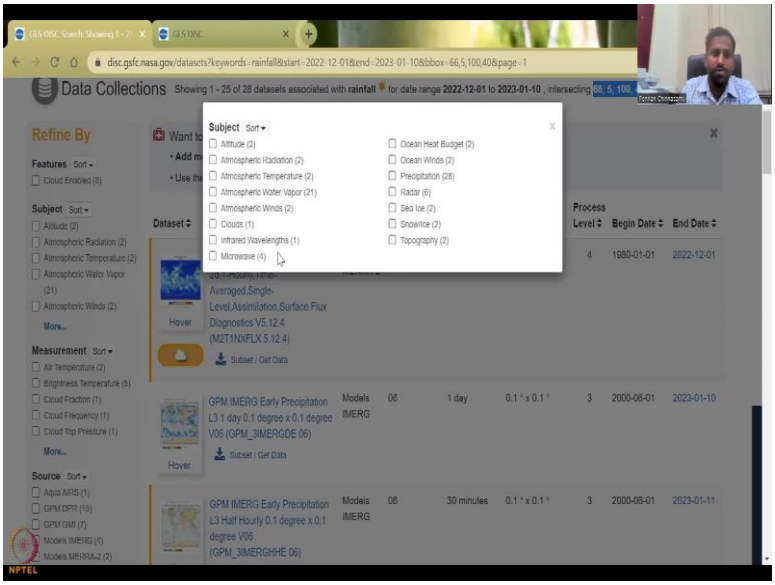

disc.gsfc.nasa.gov/datasets?keywords=rainfall&sort=timeRes&page=1
Data Collections
rainfall
Bounding Box:
6.706,99.609,41.565
Default Range
Available Range: -180, -90, 180, 90
Cursor Coordinates: 32.424, -59.297
Leaflet
Refine By
Features
Subject
Measurement
Air Temperature (2)
Brightness Temperature (6)
Cloud Fraction (2)
Cloud Frequency (2)
Cloud Liquid Water/Ice (4)
More...
Time Res.
Spatial Res.
Process Level
Begin Date
End Date
30 minutes
0.1 ° x 0.1 °
3
2000-06-01
2021-10-01
GPM IMERG Early Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHE 06)
Models
IMERG
06
30 minutes
0.1 ° x 0.1 °
3
2000-06-01
2023-01-11
Hover
Subset / Get Data
NPTEL

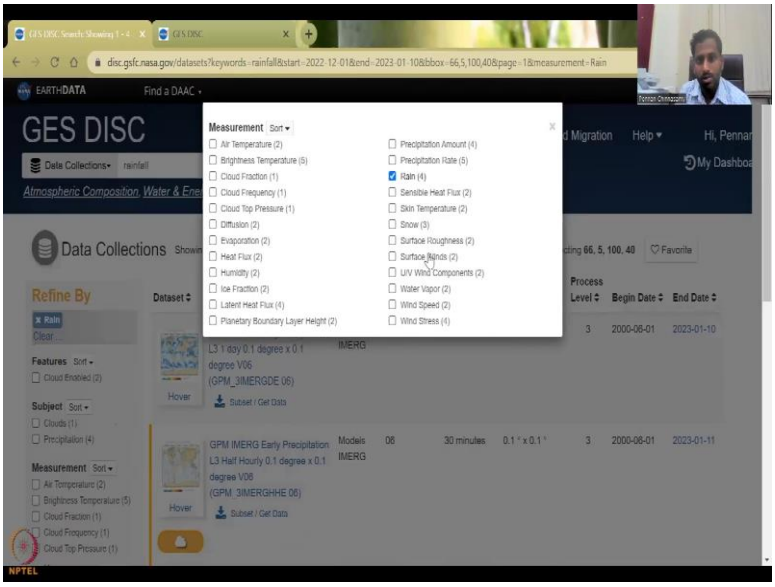

disc.gsfc.nasa.gov/datasets?keywords=rainfall&sort=timeRes&page=1
Data Collections
rainfall
Bounding Box:
68.706,99.609,41.565
Bounding box must be within -180, -90, 180, 90.
Default Range
Available Range: -180, -90, 180, 90
Cursor Coordinates: 32.424, -59.297
Leaflet
Refine By
Features
Subject
Measurement
Air Temperature (2)
Brightness Temperature (6)
Cloud Fraction (2)
Cloud Frequency (2)
Cloud Liquid Water/Ice (4)
More...
Time Res.
Spatial Res.
Process Level
Begin Date
End Date
30 minutes
0.1 ° x 0.1 °
3
2000-06-01
2021-10-01
GPM IMERG Early Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHE 06)
Models
IMERG
06
30 minutes
0.1 ° x 0.1 °
3
2000-06-01
2023-01-11
Hover
Subset / Get Data
NPTEL

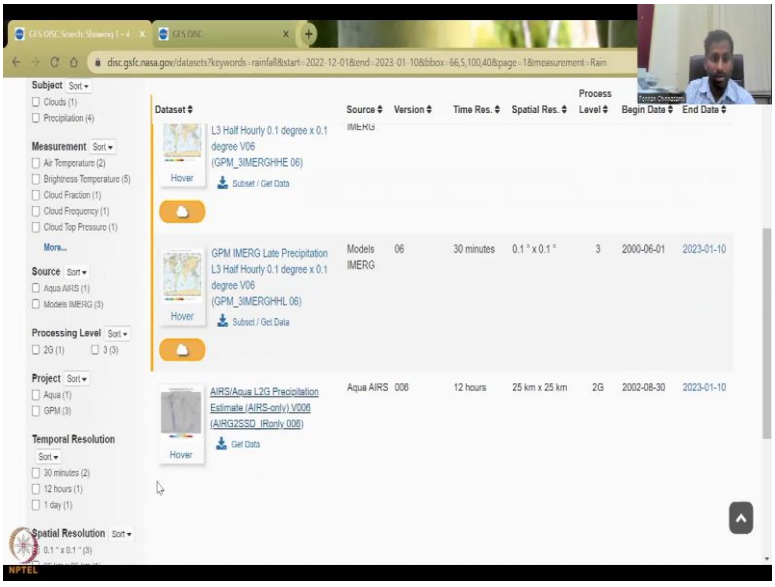

Bounding Box:
69,5,100,40
Default Range
East coordinate must be greater than west coordinate AND bounding box should not cross anti-meridian or geographical poles.
Available Range: -180, -90, 180, 90
Cursor Coordinates: 89.377, -135.234
Refine By
Features
Subject
Measurement
GPM IMERG Early Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHE 06)
Hover
Subset / Get Data

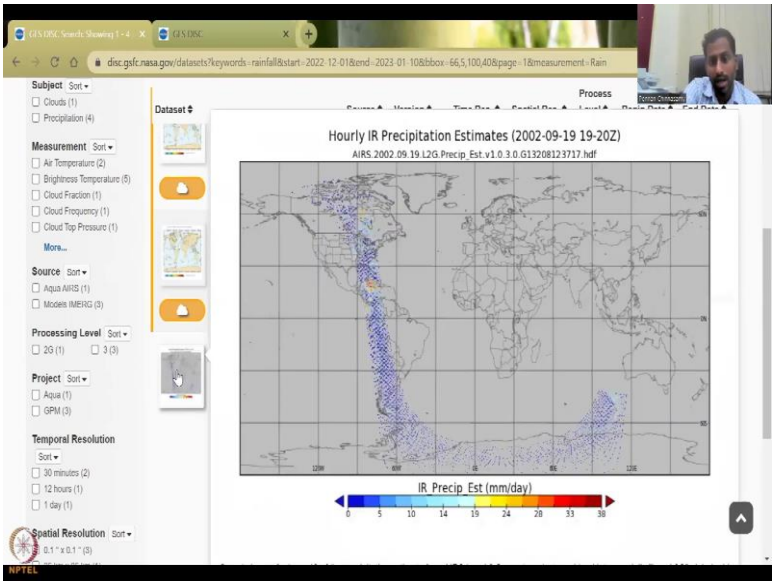

Temporal Resolution
Spatial Resolution
NCEP/CPC L3 Half Hourly 4km Global (60S - 60N) Merged IR V1 (GPM_MERGIR 1)
GPM DPR Precipitation Profile L2A 1.5 hours 5 km V07 (GPM_2ADPR 07)
MERRA-2 tavgU_2d_flx_Nx: 2d,diurnal,Time-Averaged,Single-Level,Assimilation,Surface Flux Diagnostics V5.12.4 (M2TUNXFLX 5.12.4)
GPM DPR and GMI (Combined Precipitation) L3 1 day 0.25 degree

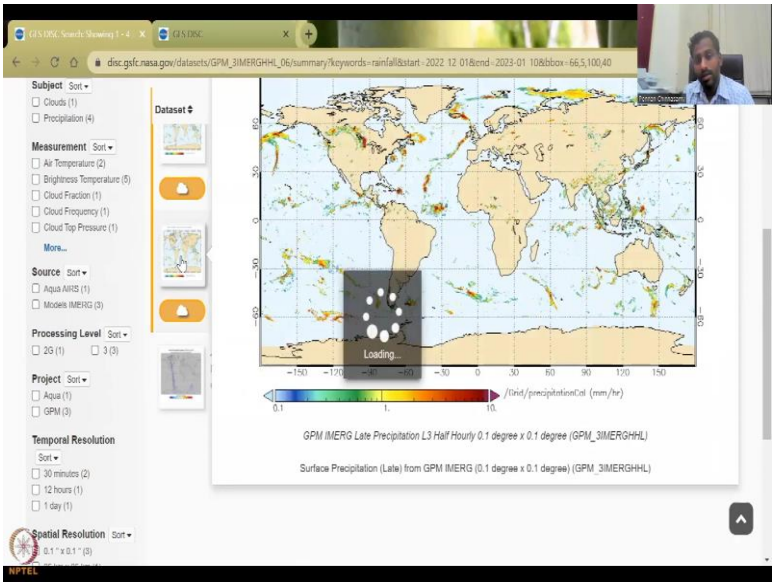

GES DISC
Feedback
Cloud Migration
Help
Hi, Pennan
My Dashboard
Atmospheric Composition, Water & Energy Cycles and Climate Variability
Data Collections
Refine By
Want to focus your search?
MERRA-2 tavg1_2d_flx_Nx: 2d,1-Hourly,Time-Averaged,Single-Level,Assimilation,Surface Flux Diagnostics V5.12.4 (M2T1NXFLX 5.12.4)
GPM IMERG Early Precipitation L3

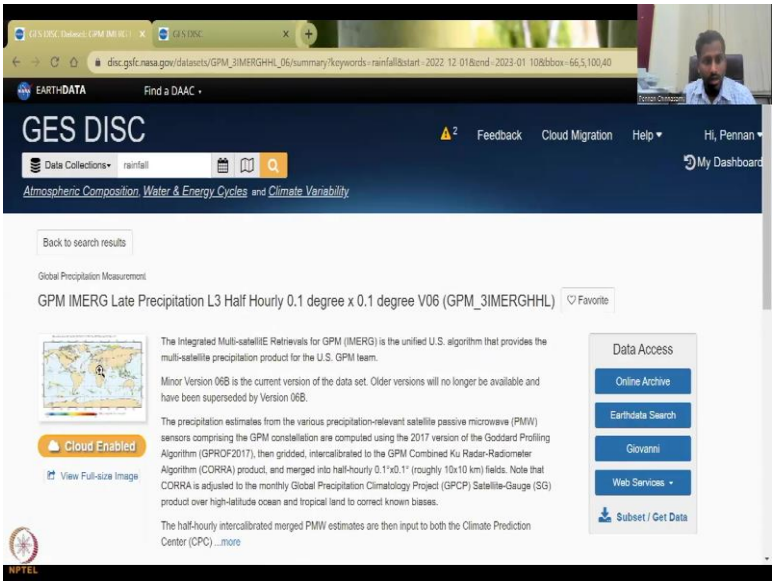

Data Collections
Showing 1 - 25 of 28 datasets associated with rainfall for date range 2022-12-01 to 2023-01-10
Refine By
Subject
Altitude (2)
Atmospheric Radiation (2)
Atmospheric Temperature (2)
Atmospheric Water Vapor (21)
Atmospheric Winds (2)
Clouds (1)
Infrared Wavelengths (1)
Microwave (4)
Ocean Heat Budget (2)
Ocean Winds (2)
Precipitation (28)
Radar (6)
Sea Ice (2)
Snow/Ice (2)
Topography (2)
GPM IMERG Early Precipitation L3 1 day 0.1 degree x 0.1 degree V06 (GPM_3IMERGDE 06)
GPM IMERG Early Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHE 06)
NPTEL


GES DISC
Data Collections
Measurement
Air Temperature (2)
Brightness Temperature (5)
Cloud Fraction (1)
Cloud Frequency (1)
Cloud Top Pressure (1)
Diffusion (2)
Evaporation (2)
Heat Flux (2)
Humidity (2)
Ice Fraction (2)
Latent Heat Flux (4)
Planetary Boundary Layer Height (2)
Precipitation Amount (4)
Precipitation Rate (5)
Rain (4)
Sensible Heat Flux (2)
Skin Temperature (2)
Snow (3)
Surface Roughness (2)
Surface Winds (2)
U/V Wind Components (2)
Water Vapor (2)
Wind Speed (2)
Wind Stress (4)
NPTEL


Subject
Clouds (1)
Precipitation (4)
Measurement
Source
Processing Level
Project
Temporal Resolution
Spatial Resolution
L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHE 06)
GPM IMERG Late Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHL 06)
AIRS/Aqua L2G Precipitation Estimate (AIRS-only) V006 (AIRG2SSD_IRonly 006)
NPTEL


disc.gsfc.nasa.gov/datasets?keywords=rainfall&start=2022-12-01&end=2023-01-10&bbox=66,5,100,40&page=1&measurement=Rain
Subject
Clouds (1)
Precipitation (4)
Measurement
Air Temperature (2)
Brightness Temperature (5)
Cloud Fraction (1)
Cloud Frequency (1)
Cloud Top Pressure (1)
More...
Source
Aqua AIRS (1)
Models IMERG (3)
Processing Level
2G (1)
3 (3)
Project
Aqua (1)
GPM (3)
Temporal Resolution
30 minutes (2)
12 hours (1)
1 day (1)
Spatial Resolution
0.1 ° x 0.1 ° (3)
Dataset
Process
Hourly IR Precipitation Estimates (2002-09-19 19-20Z)
AIRS.2002.09.19.L2G.Precip_Est.v1.0.3.0.G13208123717.hdf
IR_Precip_Est (mm/day)
0 5 10 14 19 24 28 33 38
NPTEL


disc.gsfc.nasa.gov/datasets/GPM_3IMERGHHL_06/summary?keywords=rainfall&start=2022-12-01&end=2023-01-10&bbox=66,5,100,40
Subject
Clouds (1)
Precipitation (4)
Measurement
Air Temperature (2)
Brightness Temperature (5)
Cloud Fraction (1)
Cloud Frequency (1)
Cloud Top Pressure (1)
More...
Source
Aqua AIRS (1)
Models IMERG (3)
Processing Level
2G (1)
3 (3)
Project
Aqua (1)
GPM (3)
Temporal Resolution
30 minutes (2)
12 hours (1)
1 day (1)
Spatial Resolution
0.1 ° x 0.1 ° (3)
Dataset
Loading...
/Grid/precipitationCal (mm/hr)
0.1 1. 10.
GPM IMERG Late Precipitation L3 Half Hourly 0.1 degree x 0.1 degree (GPM_3IMERGHHL)
Surface Precipitation (Late) from GPM IMERG (0.1 degree x 0.1 degree) (GPM_3IMERGHHL)
NPTEL


disc.gsfc.nasa.gov/datasets/GPM_3IMERGHHL_06/summary?keywords=rainfall&start=2022-12-01&end=2023-01-10&bbox=66,5,100,40
EARTHDATA
Find a DAAC
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Hi, Pennan
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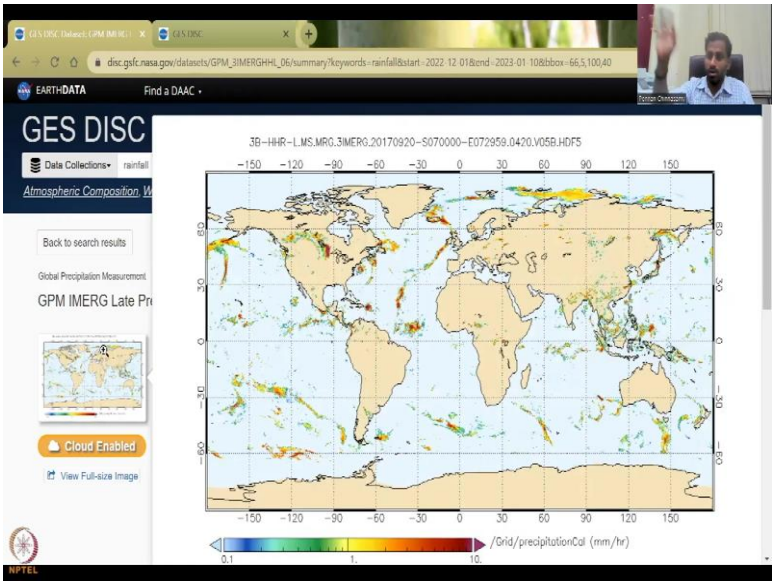
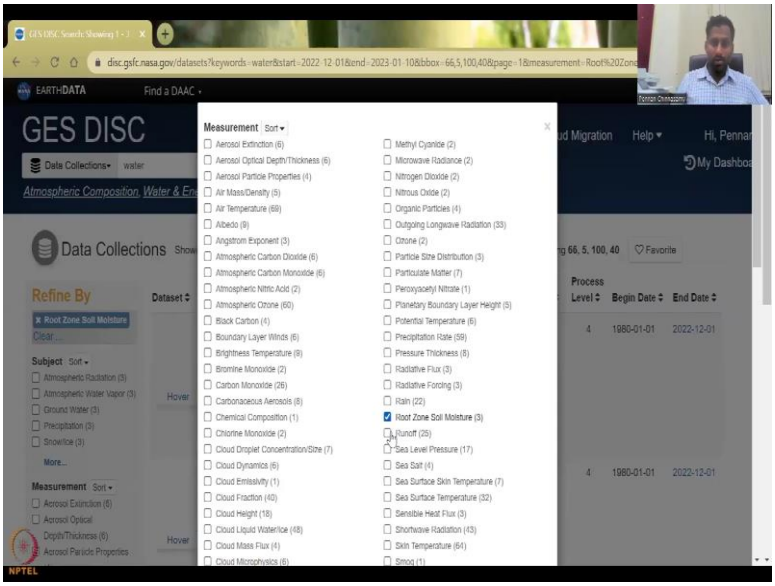
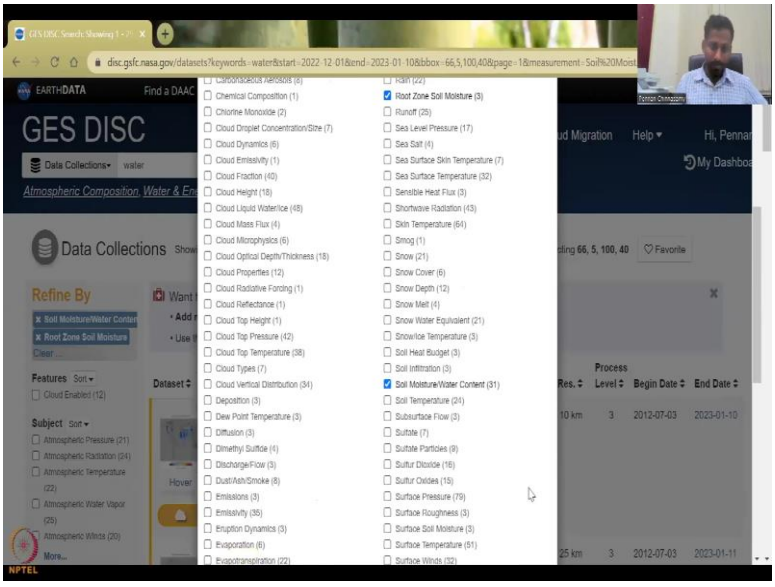
Data Collections
rainfall
Atmospheric Composition, Water & Energy Cycles and Climate Variability
Back to search results
Global Precipitation Measurement
GPM IMERG Late Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06 (GPM_3IMERGHHL)
Favorite
Cloud Enabled
View Full-size Image
The Integrated Multi-satellitE Retrievals for GPM (IMERG) is the unified U.S. algorithm that provides the multi-satellite precipitation product for the U.S. GPM team.
Minor Version 06B is the current version of the data set. Older versions will no longer be available and have been superseded by Version 06B.
The precipitation estimates from the various precipitation-relevant satellite passive microwave (PMW) sensors comprising the GPM constellation are computed using the 2017 version of the Goddard Profiling Algorithm (GPROF2017), then gridded, intercalibrated to the GPM Combined Ku Radar-Radiometer Algorithm (CORRA) product, and merged into half-hourly 0.1°x0.1° (roughly 10x10 km) fields. Note that CORRA is adjusted to the monthly Global Precipitation Climatology Project (GPCP) Satellite-Gauge (SG) product over high-latitude ocean and tropical land to correct known biases.
The half-hourly intercalibrated merged PMW estimates are then input to both the Climate Prediction Center (CPC) ...more
Data Access
Online Archive
Earthdata Search
Giovanni
Web Services
Subset / Get Data
NPTEL


GES DISC
EARTHDATA
Find a DAAC
Data Collections
rainfall
Back to search results
Global Precipitation Measurement
GPM IMERG Late Pr
Cloud Enabled
View Full-size Image
3B-HHR-L.MS.MRG.3IMERG.20170920-S070000-E072959.0420.V05B.HDF5
/Grid/precipitationCal (mm/hr)
NPTEL


GES DISC
EARTHDATA
Find a DAAC
Data Collections
water
Refine By
Root Zone Soil Moisture
Measurement
Root Zone Soil Moisture (3)
Runoff (25)
Soil Moisture/Water Content (31)
NPTEL


GES DISC
EARTHDATA
Find a DAAC
Data Collections
water
Refine By
Soil Moisture/Water Content
Root Zone Soil Moisture
Features
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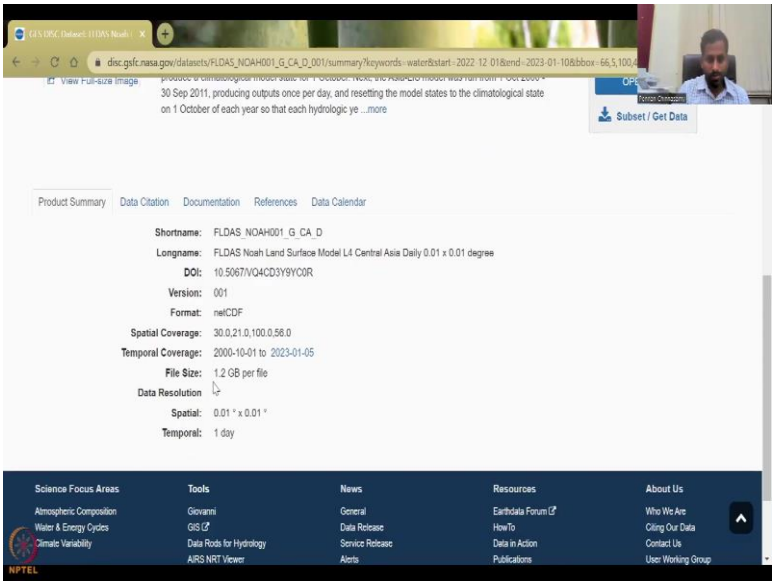
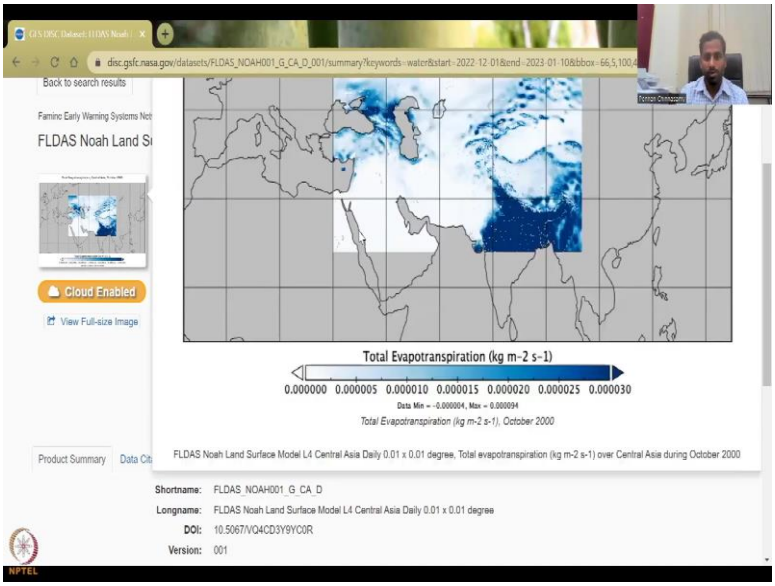
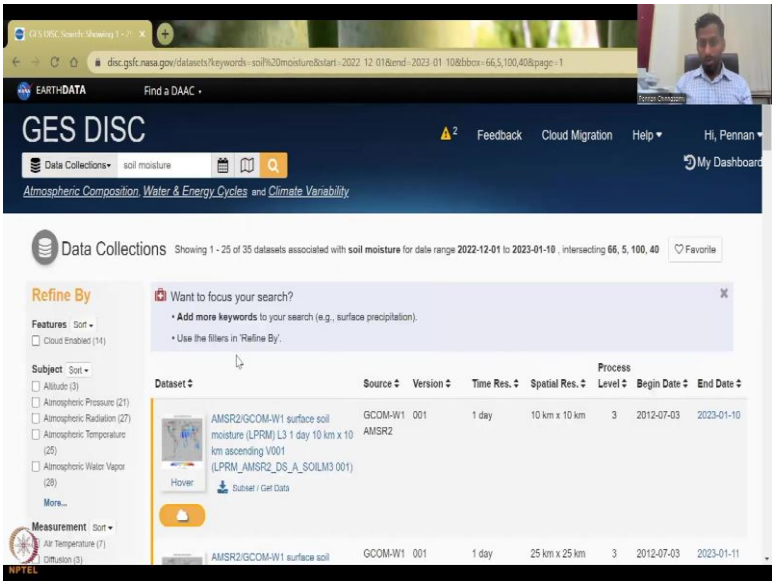
Root Zone Soil Moisture (3)
Runoff (25)
Soil Moisture/Water Content (31)
NPTEL


30 Sep 2011, producing outputs once per day, and resetting the model states to the climatological state on 1 October of each year so that each hydrologic ye ...more
Subset / Get Data
Product Summary
Data Citation
Documentation
References
Data Calendar
Shortname: FLDAS_NOAH001_G_CA_D
Longname: FLDAS Noah Land Surface Model L4 Central Asia Daily 0.01 x 0.01 degree
DOI: 10.5067/VQ4CD3Y9YC0R
Version: 001
Format: netCDF
Spatial Coverage: 30.0,21.0,100.0,56.0
Temporal Coverage: 2000-10-01 to 2023-01-05
File Size: 1.2 GB per file
Data Resolution
Spatial: 0.01 ° x 0.01 °
Temporal: 1 day
Science Focus Areas
Atmospheric Composition
Water & Energy Cycles
Climate Variability
Tools
Giovanni
GIS
Data Rods for Hydrology
AIRS NRT Viewer
News
General
Data Release
Service Release
Alerts
Resources
Earthdata Forum
HowTo
Data in Action
Publications
About Us
Who We Are
Citing Our Data
Contact Us
User Working Group


Back to search results
FLDAS Noah Land Su
Cloud Enabled
View Full-size Image
Total Evapotranspiration (kg m-2 s-1)
0.000000 0.000005 0.000010 0.000015 0.000020 0.000025 0.000030
Data Min = -0.000004, Max = 0.000094
Total Evapotranspiration (kg m-2 s-1), October 2000
FLDAS Noah Land Surface Model L4 Central Asia Daily 0.01 x 0.01 degree, Total evapotranspiration (kg m-2 s-1) over Central Asia during October 2000
Product Summary
Shortname: FLDAS_NOAH001_G_CA_D
Longname: FLDAS Noah Land Surface Model L4 Central Asia Daily 0.01 x 0.01 degree
DOI: 10.5067/VQ4CD3Y9YC0R
Version: 001


EARTHDATA
Find a DAAC
GES DISC
Feedback
Cloud Migration
Help
Hi, Pennan
My Dashboard
Data Collections
soil moisture
Atmospheric Composition, Water & Energy Cycles and Climate Variability
Data Collections Showing 1 - 25 of 35 datasets associated with soil moisture for date range 2022-12-01 to 2023-01-10 , intersecting 66, 5, 100, 40
Favorite
Refine By
Features
Cloud Enabled (14)
Subject
Altitude (3)
Atmospheric Pressure (21)
Atmospheric Radiation (27)
Atmospheric Temperature (25)
Atmospheric Water Vapor (28)
More...
Measurement
Air Temperature (7)
Diffusion (3)
Want to focus your search?
• Add more keywords to your search (e.g., surface precipitation).
• Use the filters in 'Refine By'.
Dataset
Source
Version
Time Res.
Spatial Res.
Process Level
Begin Date
End Date
AMSR2/GCOM-W1 surface soil moisture (LPRM) L3 1 day 10 km x 10 km ascending V001 (LPRM_AMSR2_DS_A_SOILM3 001)
GCOM-W1 AMSR2
001
1 day
10 km x 10 km
3
2012-07-03
2023-01-10
Hover
Subset / Get Data
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GCOM-W1
001
1 day
25 km x 25 km
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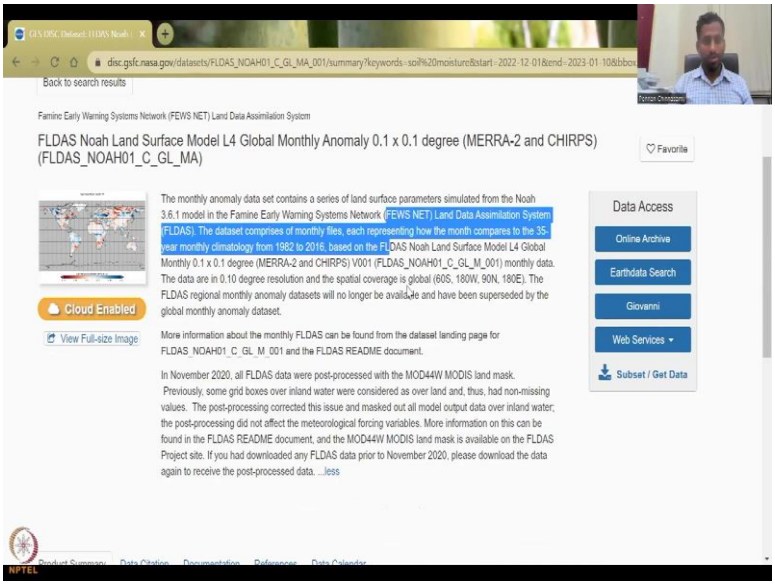
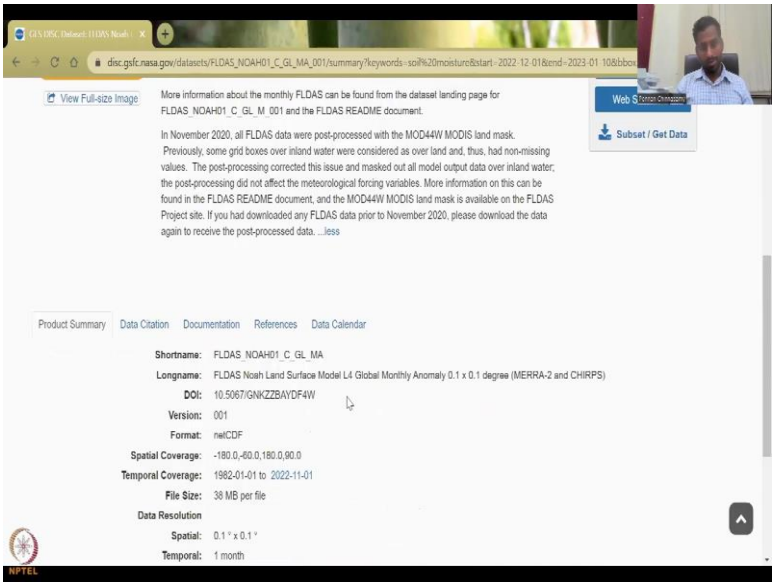
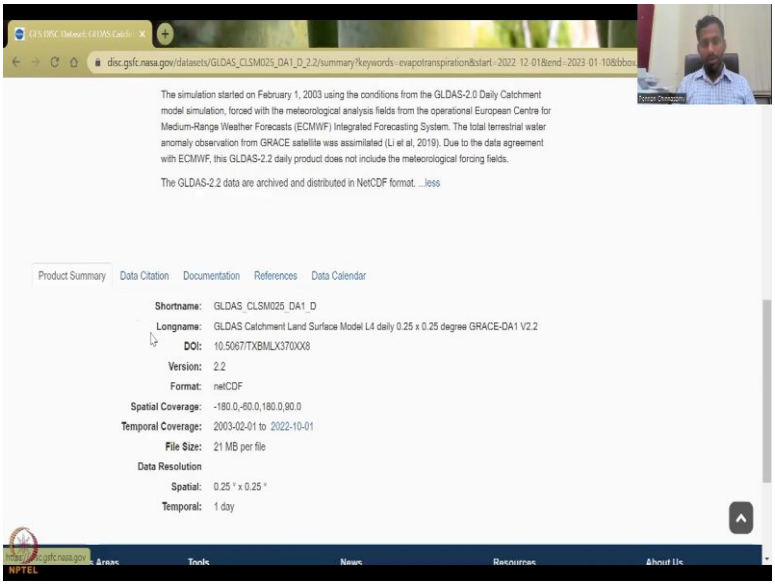
2012-07-03
2023-01-11


disc.gsfc.nasa.gov/datasets/FLDAS_NOAH01_C_GL_MA_001/summary?keywords=soil%20moisture&start=2022-12-01&end=2023-01-10&bbox
Back to search results
Famine Early Warning Systems Network (FEWS NET) Land Data Assimilation System
FLDAS Noah Land Surface Model L4 Global Monthly Anomaly 0.1 x 0.1 degree (MERRA-2 and CHIRPS) (FLDAS_NOAH01_C_GL_MA)
Favorite
The monthly anomaly data set contains a series of land surface parameters simulated from the Noah 3.6.1 model in the Famine Early Warning Systems Network (FEWS NET) Land Data Assimilation System (FLDAS). The dataset comprises of monthly files, each representing how the month compares to the 35-year monthly climatology from 1982 to 2016, based on the FLDAS Noah Land Surface Model L4 Global Monthly 0.1 x 0.1 degree (MERRA-2 and CHIRPS) V001 (FLDAS_NOAH01_C_GL_M_001) monthly data. The data are in 0.10 degree resolution and the spatial coverage is global (60S, 180W, 90N, 180E). The FLDAS regional monthly anomaly datasets will no longer be available and have been superseded by the global monthly anomaly dataset.
Cloud Enabled
View Full-size Image
More information about the monthly FLDAS can be found from the dataset landing page for FLDAS_NOAH01_C_GL_M_001 and the FLDAS README document.
In November 2020, all FLDAS data were post-processed with the MOD44W MODIS land mask. Previously, some grid boxes over inland water were considered as over land and, thus, had non-missing values. The post-processing corrected this issue and masked out all model output data over inland water; the post-processing did not affect the meteorological forcing variables. More information on this can be found in the FLDAS README document, and the MOD44W MODIS land mask is available on the FLDAS Project site. If you had downloaded any FLDAS data prior to November 2020, please download the data again to receive the post-processed data. ...less
Data Access
Online Archive
Earthdata Search
Giovanni
Web Services
Subset / Get Data
Product Summary
Data Citation
Documentation
References
Data Calendar
NPTEL


disc.gsfc.nasa.gov/datasets/FLDAS_NOAH01_C_GL_MA_001/summary?keywords=soil%20moisture&start=2022-12-01&end=2023-01-10&bbox
View Full-size Image
More information about the monthly FLDAS can be found from the dataset landing page for FLDAS_NOAH01_C_GL_M_001 and the FLDAS README document.
In November 2020, all FLDAS data were post-processed with the MOD44W MODIS land mask. Previously, some grid boxes over inland water were considered as over land and, thus, had non-missing values. The post-processing corrected this issue and masked out all model output data over inland water; the post-processing did not affect the meteorological forcing variables. More information on this can be found in the FLDAS README document, and the MOD44W MODIS land mask is available on the FLDAS Project site. If you had downloaded any FLDAS data prior to November 2020, please download the data again to receive the post-processed data. ...less
Subset / Get Data
Product Summary
Data Citation
Documentation
References
Data Calendar
Shortname: FLDAS_NOAH01_C_GL_MA
Longname: FLDAS Noah Land Surface Model L4 Global Monthly Anomaly 0.1 x 0.1 degree (MERRA-2 and CHIRPS)
DOI: 10.5067/GNKZZBAYDF4W
Version: 001
Format: netCDF
Spatial Coverage: -180.0,-60.0,180.0,90.0
Temporal Coverage: 1982-01-01 to 2022-11-01
File Size: 38 MB per file
Data Resolution
Spatial: 0.1 ° x 0.1 °
Temporal: 1 month
NPTEL


disc.gsfc.nasa.gov/datasets/GLDAS_CLSM025_DA1_D_2.2/summary?keywords=evapotranspiration&start=2022-12-01&end=2023-01-10&bbox
The simulation started on February 1, 2003 using the conditions from the GLDAS-2.0 Daily Catchment model simulation, forced with the meteorological analysis fields from the operational European Centre for Medium-Range Weather Forecasts (ECMWF) Integrated Forecasting System. The total terrestrial water anomaly observation from GRACE satellite was assimilated (Li et al, 2019). Due to the data agreement with ECMWF, this GLDAS-2.2 daily product does not include the meteorological forcing fields.
The GLDAS-2.2 data are archived and distributed in NetCDF format. ...less
Product Summary
Data Citation
Documentation
References
Data Calendar
Shortname: GLDAS_CLSM025_DA1_D
Longname: GLDAS Catchment Land Surface Model L4 daily 0.25 x 0.25 degree GRACE-DA1 V2.2
DOI: 10.5067/TXBMLX370XX8
Version: 2.2
Format: netCDF
Spatial Coverage: -180.0,-60.0,180.0,90.0
Temporal Coverage: 2003-02-01 to 2022-10-01
File Size: 21 MB per file
Data Resolution
Spatial: 0.25 ° x 0.25 °
Temporal: 1 day
Tools
News
Resources
About Us
NPTEL

But in the meantime, I am also going to show you the other data searching tools inside GES DISC. So, it has come. So, it has 1 to 53 datasets associated with rainfall, you can store it as your favorite in your dashboard. And it says if you want more focus, you can say surface precipitation, infiltration those things because it is too much. 53 data sets you are not going to look at and then see.

It says hovering, so you do not have to download it, you can just click on this and then see not even click this hover, move your mouse on top of it and then you will see how the precipitation moves globally, look at the size of the pixel. It is all big, it is needed for high, like so ocean currents, Cyclone formations for that you do not get sub meter or sub kilometer resolution, you need bigger resolution.

So, this is interesting, all the data has come, you can sort it by source, you can sort it by the version all the time and reservation. For example, if you are a farmer, you need at least once a week, once a day is okay. It is too much data, but once a week is also fine. So, you can click on this resolution up or down to shift it to 30 minutes, which is very, very small resolution very, very high resolution in terms of minutes and in the spatial resolution, etc. The most important thing here is also to see the data is still current.

If you see here, it has started in 2000 and 2021 it stopped. What does that mean? It means that the data, the satellite was processing the data, collecting the data, etc. But it has a lifetime, most probably 20 years, 15 years after that they decommission it, they do not use the data because a lot of instruments in the satellite may drift, friction, low losses might be high. So, it is better to use it as much as you would use it in the earth. So, normally a lifetime is 10 years, 5 years, but then they prolong it as and when the data is coming. But after that, after particular time, they decommission it.

Because think about it, all the satellites use solar panels for powering them. And most of the electronics and everything get deformed. So, suddenly, one day it does not make up. So, they are prepared, they are prepared, and they will send the follow up mission. But still, like for example, Grace was there. While the grace was collecting data, they sent that grace follow on mission. So, another mission of satellite which overlaps or replaces the current satellite.

So, here you could see all the data. So, we are interested mostly in the 2023, you can see on the 11 it is already 10th today, so which means in some countries, it is the 11^{th}, 10^{th} night here in India. So, maybe Australia time is 11, so it has the date for that particular part, and other things. So, 20 years of data is 23 years of data still going on. So, now I am going to kind of

condense the data because the global and sometimes the global data is not good enough for all applications, you need to focus it on a particular area.

So, let us take us data range I am going to take from 1920 data. So, these are kind of hindcast you have forecast data and hindcast which means they know the satellite, they add some other data to predict rainfall. Now, they use the same algorithm to go back. So, I think 1960s 1950s the satellite was launched 1 or 2 starting and that stuff, so let us say 1990 higher number of satellites came up, the technology was good, but they use that data. And now we are like 30 years of data using the 30 years of data and algorithm, they could go back.

So, that is what they have done in some instances, do not think that 1920 there was a satellites to collect data, so you can click on it, or just do this. Make sure you do not change the difference and normally, it is year, month, and then date, so I am going to use December, up to date, and then it says available date, or you can choose from here also, that is fine. And then you click this again, so, the data has been set, you can refine it, but more importantly, when you click the map, the entire globe will come up. And we are not going to download the entire globe, why, because when we download the data and use it for India, it is not as usable, you need to cut all the other regions and then use only for India.

So, these are the bounding box, you can actually bound a box or you can draw a box, I think drawing might be easier. So, I am just going to draw the box those who are having difficulties drawing the box, you can go as 68, 6 8 comma 5 is okay you can put a 5 you can put 100 and 40 and then you can see that beautifully the India box has come up, you can also adjust this to 69 just to have more on the side 103 let us say 100 and 66 is good, now, you covered Gujrat also. So, 66 5 100 and 40 that gives you the box, again, the boundaries are not as correct as the Indian government organizations boundary, but they have different different boundaries.

So, do not worry about the international borders here that is purely the data provider and they have their own default for example, the boundaries may not correlate with Indian boundaries, but when you download the data, the boundaries will not be there, it will be a box. So, this box is what the data that you will be downloading. So, I am just going to click on that, the box is ok for me, and then click back the map and then search.

So, when you search now is going to be refined, you may not get all the 53 provided the data range, yes the data so, for example, the first one will go off there is no data for 2023 2022 so that will be thrown out. So, now you could truncate what data you want. So, while that is being loading, I also want to bring your focus to these left panel. So, I have already talked

about the spatial resolution, which is the pixel size it has downloaded now, you can see that now out of 53 only 28 are within the range of this and intersecting your box. So, that is good, we just keep it that you can mark it as favorite and then you can come here and then do multiple other measurements.

So, I have put rainfall remember so now you can click here you can see what other things that you can monitor. So, precipitation is 28 you can also get snow ice, topography, etc. This is the subject if you want to do the measurement, what type of measurements can you take. If you just type water then you will take a lot of other measurements also like soil moisture, rainfall is also water. So, you just say rain or precipitation. Let us say rain, let us just look at the 4 data and now only 4 data sets are there.

So, you see that model IMERG is their Aqua AIRS is there which is very very new, just today's data also you can get. You can hover and you can see that the rainfall data the IR precipitation estimate millimeters per day is given in blue, red and change. There is also the precipitation, you can see that in India it is it is raining in some regions. So, you will see that particular location having rainfall. It is not allowing me to use my mouse. But you can see it on the screen where the northern part some slight rainfall is there and the rate is given on the bottom millimeters per hour.

So, you could see that and then you can see the full size image also here. You could see the 3 hours aggregated and the bounding boxes for this diagram. So, you can see here like India, so as I said, there is no boundaries. So, do not worry about the wrong boundaries, boundaries will not come into the picture, when they draw it, I think gets squished. So, It is not actual boundaries for any country, not only for India, so do not worry about the boundaries here, but it is mostly the continents, you will see.

So, you could then do a lot of data access, and how to download the data, every single equation, every single tab will give you the steps, and it all changes. So, for that aspect, I will not be covering it, but here I have given you the link and how to take data from this website. So, with the same bounding box, I am just going to put water and the same time so let us see water we will pull up. So, now just putting water you can see that 354 datasets are there for the data range and for the intersecting box, we will go to the measurement.

As I said just water it goes everywhere. So, root zone, soil moisture is very important for me, I will click root zone and then you can also have soil temperature, soil moisture, water content, and then click somewhere else. Now it has come down from 354 to 31 and you could

quickly look at the units. So, the spatial is pretty big. Remember in the Indian soil database it was 25 by 25 kilometers kind of similar here you have 0.1 0.1 but 10 kilometers by 10 kilometers is still good. So, there it was 25 kilometers 0.025 I think, 0.25 degrees, but now it is 0.01 which is 10 kilometer by 10 kilometer grid, which is approximately 3 times smaller than the Indian data base, which is much, much higher resolution and you can use these.

The other thing it gives you is the different depths. So, you can see here, soil resolution the timeline, do you want hourly, every hour, it takes the measurement 3 hours and then the project which project you want to use that also you can look at. I am just going to take the root zone soil moisture out. And I am going to click this one, the first one FLDAS. So, what it says is it gives you 3 data sources, so spatial coverage is there for the entire globe. But mostly, there are 3 different layers, it gives 0 to 10, 10 to 50, 50 to 100 like that, the depth, at which it takes. 3 to 4 cycles it gives you and that is important to understand the soil moisture at different depths.

So, maybe from the top, you will see soil moisture, but it is not good enough. Why because maybe the farmer applied soil, water, but it just stays on the top of the soil, it does not go down. So, you need to look at how much water has penetrated and gone for which you have a different dataset. So, someone might ask, this is a satellite it is way up in the space, how can it measure this water? So these are active satellites which use pulses, so there is a satellite it sends a pulse it goes into the depth of the soil and then gets reflected back. And that is why only some areas is been covered.

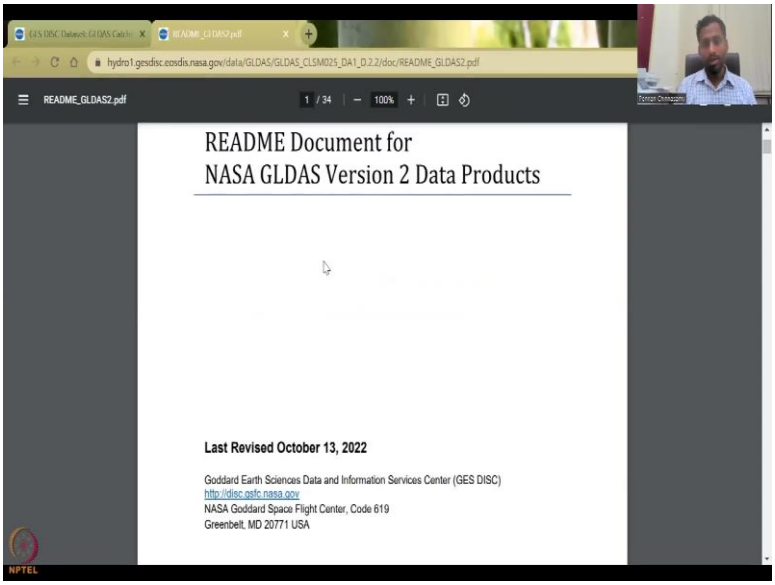
So, for example look here, it is not the entire India being covered only half of India has been covered this is the evapotranspiration, but there are other data that you can take. So, radar data is more accurate for soil moisture, and then you have 35 data sets as per the divisions and stuff. So, there is groundwater, Noah LSM per month time series. So, you have details of how the data is driven and how they have been processing the data what degree resolution and all those things. Good. So, this is how you find data, and then downloading the data accessing the data.

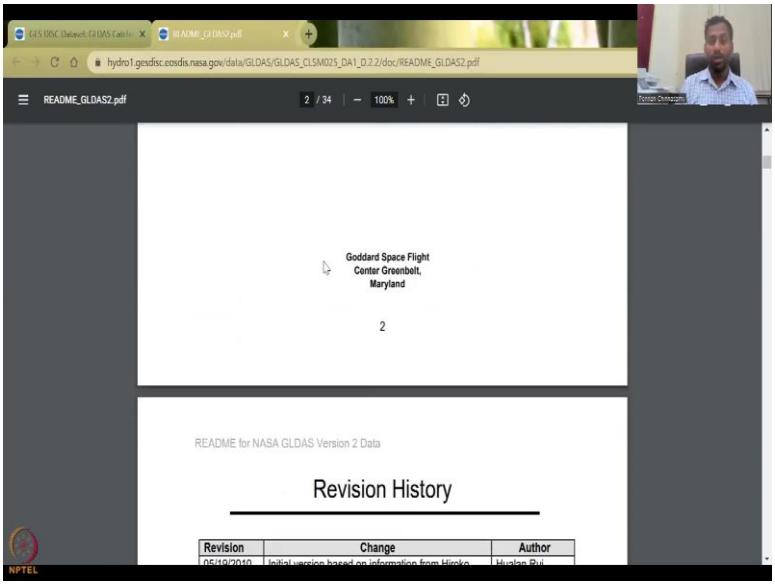
There are multiple multiple tutorials for this, like videos that you can watch. But the point is understanding the data is available for documenting the water is very important. The last one is evapotranspiration. For the same time series for the same time box, the map of India, I am searching and you can see that resolution of 10 kilometers is there and then you can also do

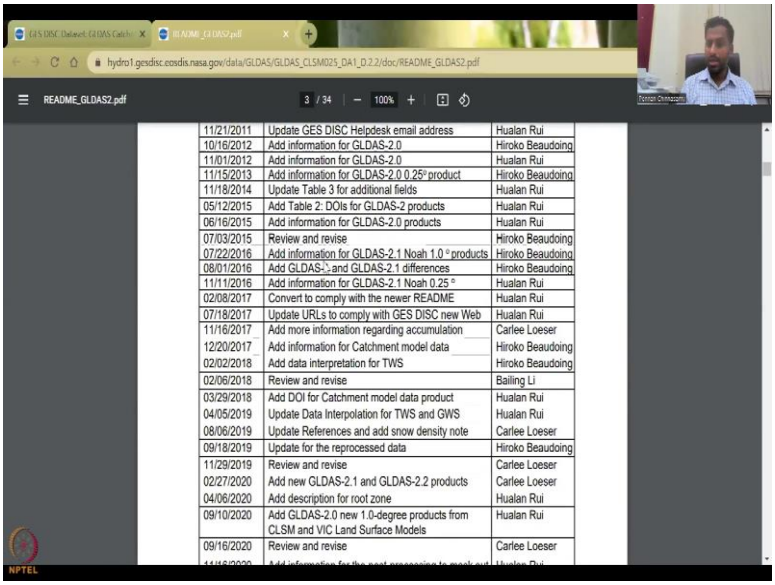
25 kilometers. So, with this, I will just take one more minute to show you that there are multiple data sets. And you could come here down to see the data citation.

As I said, when you use the data, it is good to cite those who have worked on the data because they are giving the data for free. For example, Rodell team has given hydrologist chief hydrologist, NASA, who works very much in Indian water resources and stuff, you will see that you could use this paper for citations. And then you have documentation the meta data.

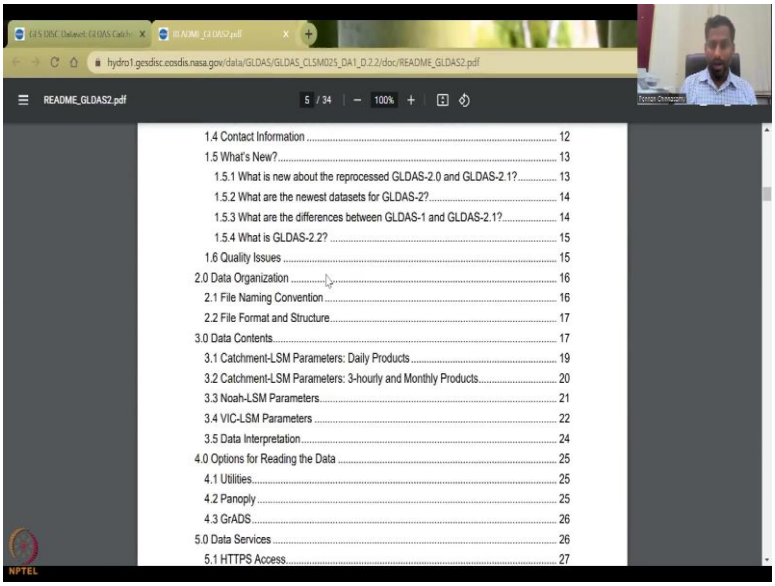
(Refer Slide Time: 31:40)







11/21/2011	Update GES DISC Helpdesk email address	Hualan Rui
10/16/2012	Add information for GLDAS-2.0	Hiroko Beaudoing
11/01/2012	Add information for GLDAS-2.0	Hualan Rui
11/15/2013	Add information for GLDAS-2.0 0.25° product	Hiroko Beaudoing
11/18/2014	Update Table 3 for additional fields	Hualan Rui
05/12/2015	Add Table 2: DOIs for GLDAS-2 products	Hualan Rui
06/16/2015	Add information for GLDAS-2.0 products	Hualan Rui
07/03/2015	Review and revise	Hiroko Beaudoing
07/22/2016	Add information for GLDAS-2.1 Noah 1.0 ° products	Hiroko Beaudoing
08/01/2016	Add GLDAS-2 and GLDAS-2.1 differences	Hiroko Beaudoing
11/11/2016	Add information for GLDAS-2.1 Noah 0.25 °	Hualan Rui
02/08/2017	Convert to comply with the newer README	Hualan Rui
07/18/2017	Update URLs to comply with GES DISC new Web	Hualan Rui
11/16/2017	Add more information regarding accumulation	Carlee Loeser
12/20/2017	Add information for Catchment model data	Hiroko Beaudoing
02/02/2018	Add data interpretation for TWS	Hiroko Beaudoing
02/06/2018	Review and revise	Bailing Li
03/29/2018	Add DOI for Catchment model data product	Hualan Rui
04/05/2019	Update Data Interpolation for TWS and GWS	Hualan Rui
08/06/2019	Update References and add snow density note	Carlee Loeser
09/18/2019	Update for the reprocessed data	Hiroko Beaudoing
11/29/2019	Review and revise	Carlee Loeser
02/27/2020	Add new GLDAS-2.1 and GLDAS-2.2 products	Carlee Loeser
04/06/2020	Add description for root zone	Hualan Rui
09/10/2020	Add GLDAS-2.0 new 1.0-degree products from CLSM and VIC Land Surface Models	Hualan Rui
09/16/2020	Review and revise	Carlee Loeser



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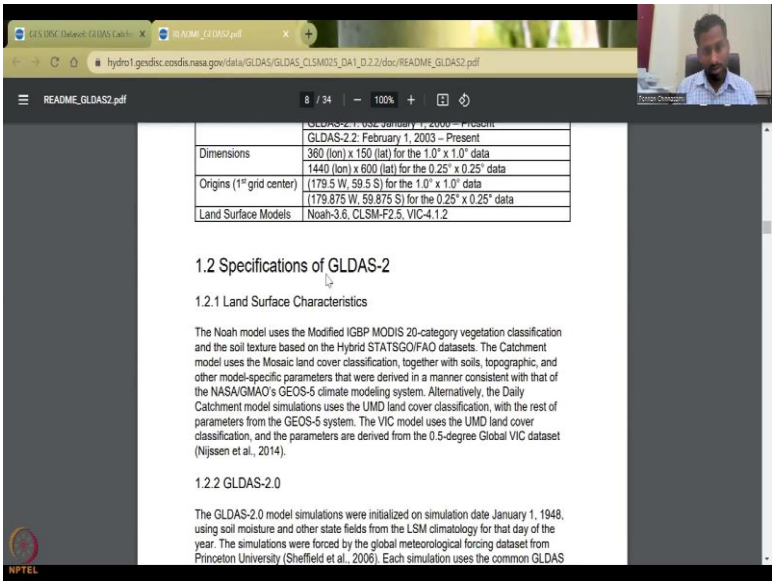


	GLDAS-2.2: February 1, 2003 – Present
Dimensions	360 (lon) x 150 (lat) for the 1.0° x 1.0° data
	1440 (lon) x 600 (lat) for the 0.25° x 0.25° data
Origins (1st grid center)	(179.5 W, 59.5 S) for the 1.0° x 1.0° data
	(179.875 W, 59.875 S) for the 0.25° x 0.25° data
Land Surface Models	Noah-3.6, CLSM-F2.5, VIC-4.1.2

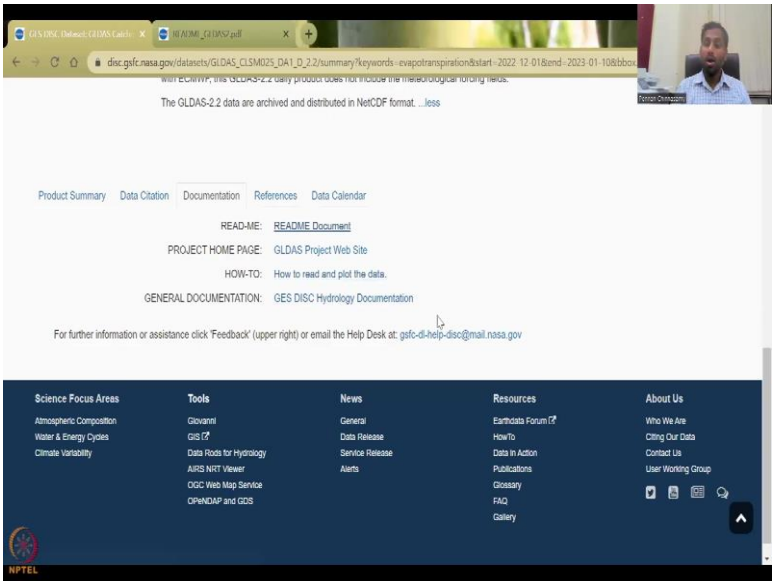
1.2 Specifications of GLDAS-2

1.2.1 Land Surface Characteristics

The Noah model uses the Modified IGBP MODIS 20-category vegetation classification and the soil texture based on the Hybrid STATSGO/FAO datasets. The Catchment model uses the Mosaic land cover classification, together with soils, topographic, and other model-specific parameters that were derived in a manner consistent with that of the NASA/GMAO's GEOS-5 climate modeling system. Alternatively, the Daily Catchment model simulations uses the UMD land cover classification, with the rest of parameters from the GEOS-5 system. The VIC model uses the UMD land cover classification, and the parameters are derived from the 0.5-degree Global VIC dataset (Nijssen et al., 2014).

1.2.2 GLDAS-2.0

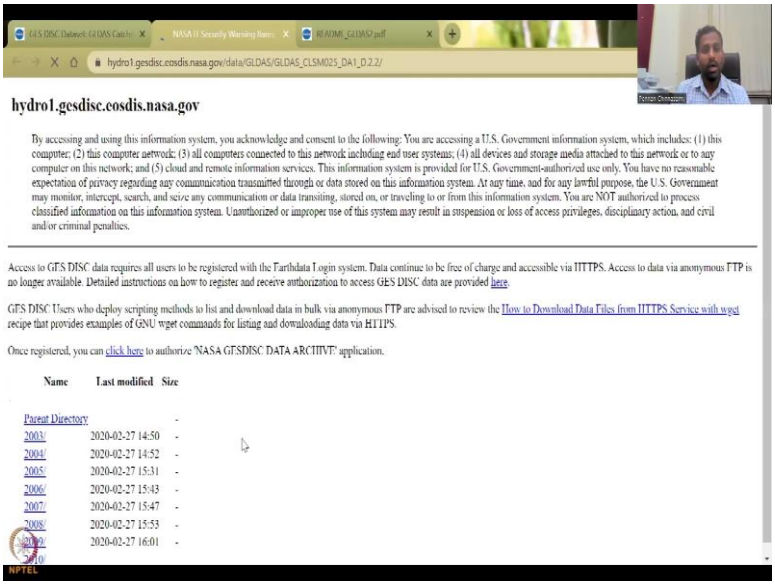
The GLDAS-2.0 model simulations were initialized on simulation date January 1, 1948, using soil moisture and other state fields from the LSM climatology for that day of the year. The simulations were forced by the global meteorological forcing dataset from Princeton University (Sheffield et al., 2006). Each simulation uses the common GLDAS

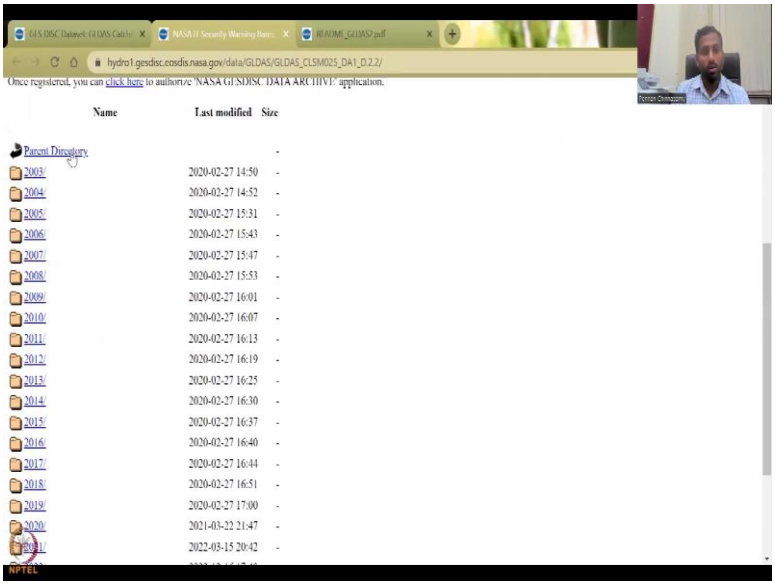


So, you have a readme file, you can click, it opens up a notepad, a PDF document where it tells you how the data was reviewed, the same metadata, like how you access the data, what kind of processes were done, what is the resolution, all these things, how to read the plot, all these things, all these do get changed.

So, please understand that even though the data exist, the data format changes because they are keeping on adding the data in the database. They change the data formats. This is needed because too much data comes in. And with advances in storing the data format, they will change the data format. So, now it is net CDF, in my time, it was just individual images, etcetera.

(Refer Slide Time: 32:23)

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Once registered, you can click here to authorize 'NASA GESDISC DATA ARCHIVE' application.
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Size
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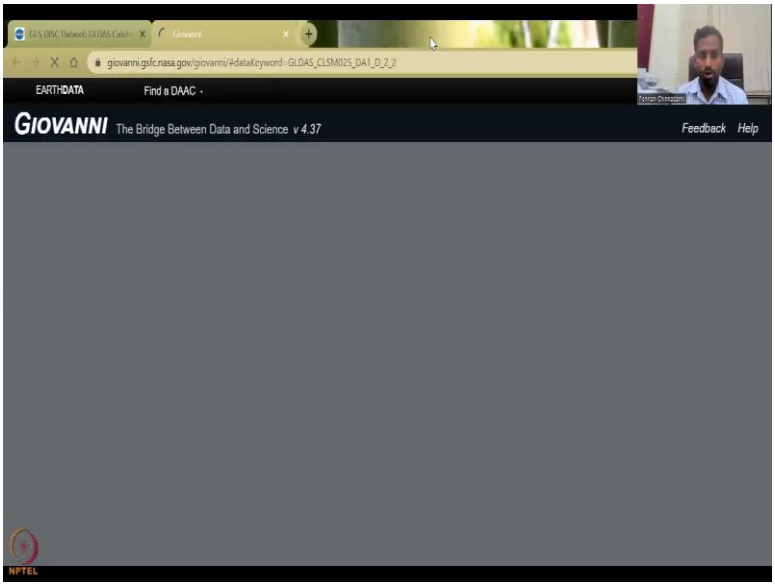
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Find a DAAC
GIOVANNI
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Feedback
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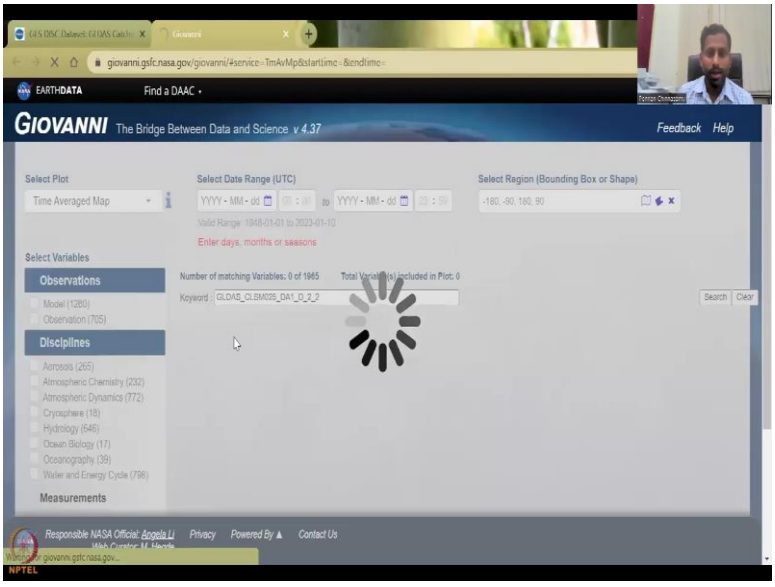
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Find a DAAC
GIOVANNI
The Bridge Between Data and Science v 4.37
Feedback
Help
Select Plot
Time Averaged Map
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YYYY - MM - dd
to
YYYY - MM - dd
Valid Range: 1948-01-01 to 2023-01-10
Enter days, months or seasons
Select Region (Bounding Box or Shape)
-180, -90, 180, 90
Select Variables
Observations
Model (1280)
Observation (705)
Disciplines
Aerosols (265)
Atmospheric Chemistry (232)
Atmospheric Dynamics (772)
Cryosphere (18)
Hydrology (646)
Ocean Biology (17)
Oceanography (39)
Water and Energy Cycle (798)
Measurements
Number of matching Variables: 0 of 1965
Total Variable(s) included in Plot: 0
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Search
Clear
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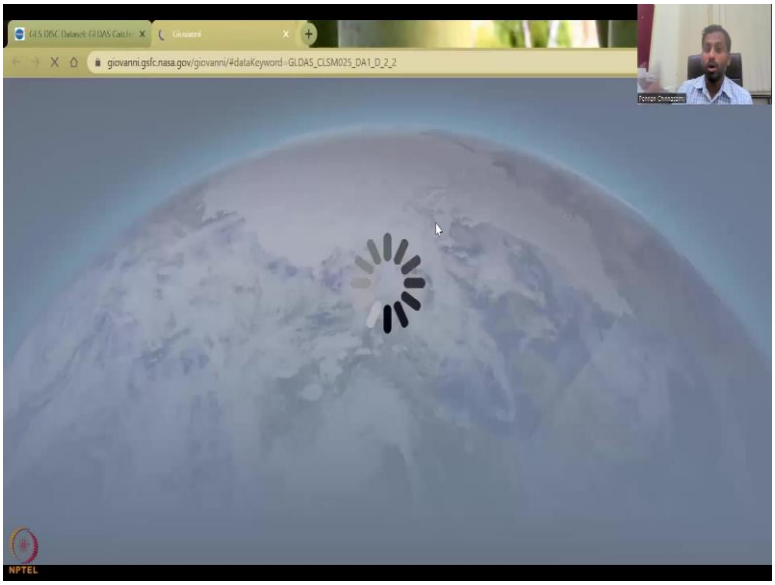
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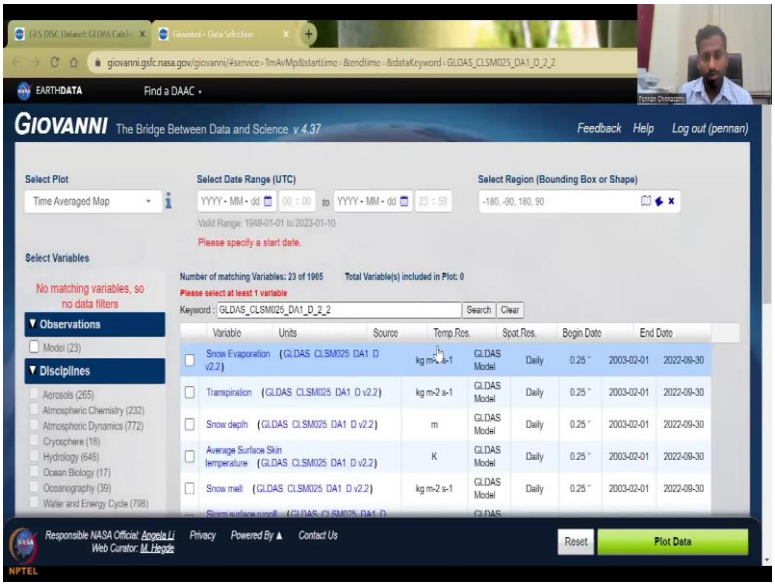
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Select Variables
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Disciplines
Aerosols (265)
Atmospheric Chemistry (232)
Atmospheric Dynamics (772)
Cryosphere (18)
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Ocean Biology (17)
Oceanography (39)
Water and Energy Cycle (798)
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Clear
Variable
Units
Source
Temp.Res.
Spat.Res.
Begin Date
End Date
Snow Evaporation (GLDAS CLSM025 DA1 D v2.2)
Transpiration (GLDAS CLSM025 DA1 D v2.2)
Snow depth (GLDAS CLSM025 DA1 D v2.2)
Average Surface Skin Temperature (GLDAS CLSM025 DA1 D v2.2)
Snow melt (GLDAS CLSM025 DA1 D v2.2)
GLDAS Model
Daily
0.25 °
2003-02-01
2022-09-30
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Web Curator: M. Hegde
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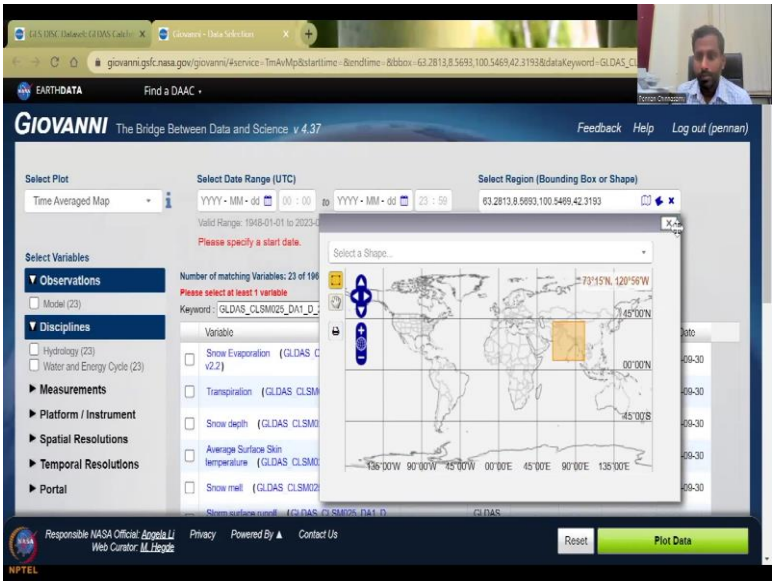
NPTEL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63.2813,8.5693,100.5469,42.3193
Select a Shape...
Select Variables
Observations
Model (23)
Disciplines
Hydrology (23)
Water and Energy Cycle (23)
Measurements
Platform / Instrument
Spatial Resolutions
Temporal Resolutions
Portal
Please specify a start date.
Please select at least 1 variable
Variable
Snow Evaporation
Transpiration
Snow depth
Average Surface Skin Temperature
Snow melt
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Web Curator: M. Hegde
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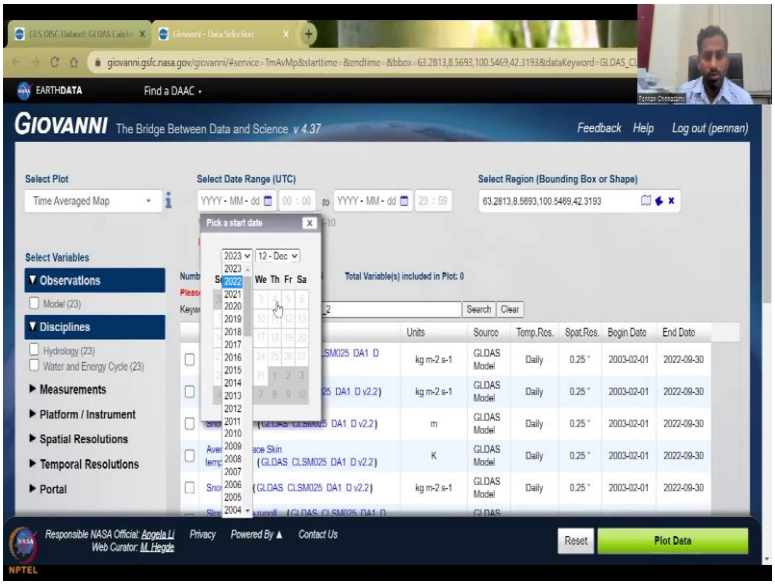
NPTEL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Measurements
Platform / Instrument
Spatial Resolutions
Temporal Resolutions
Portal
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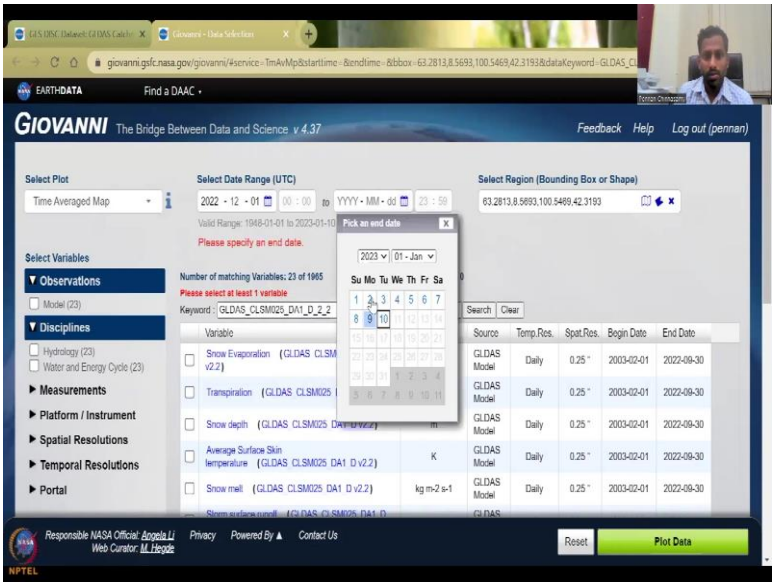
Plot Data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Measurements
Platform / Instrument
Spatial Resolutions
Temporal Resolutions
Portal
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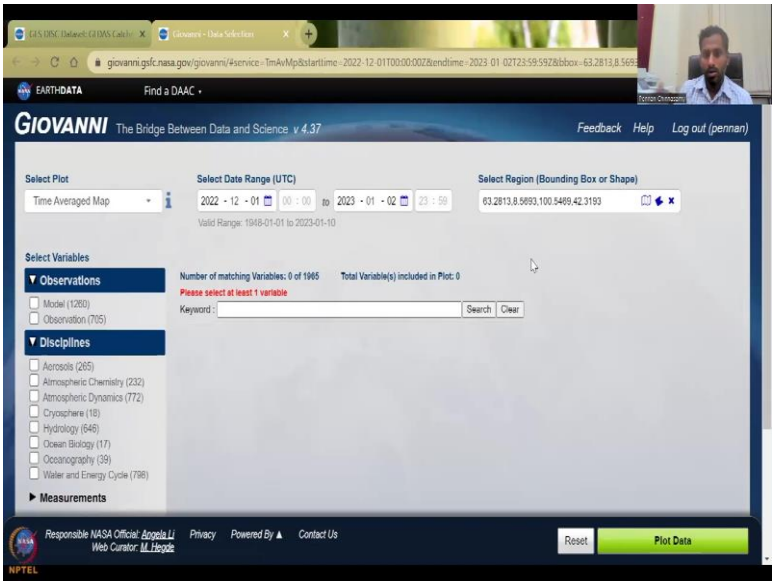
Plot Data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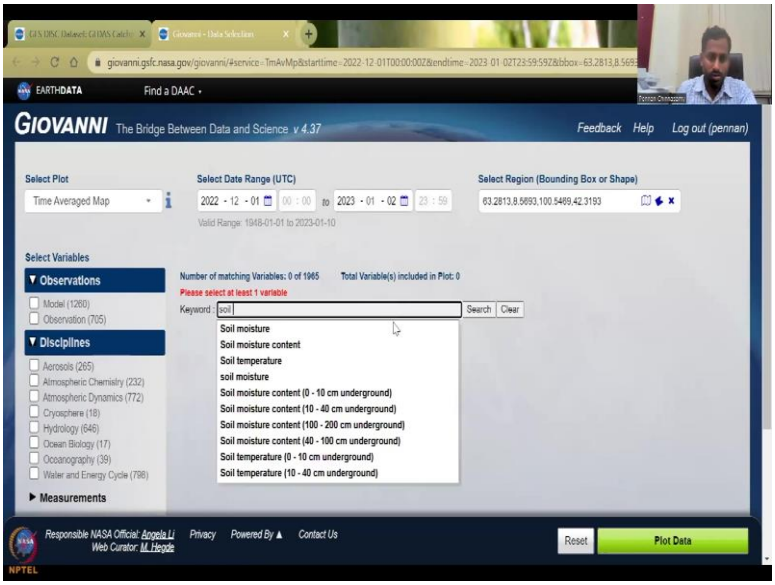
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Disciplines
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Atmospheric Chemistry (232)
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Oceanography (39)
Water and Energy Cycle (798)
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Clear
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Soil moisture content
Soil temperature
soil moisture
Soil moisture content (0 - 10 cm underground)
Soil moisture content (10 - 40 cm underground)
Soil moisture content (100 - 200 cm underground)
Soil moisture content (40 - 100 cm underground)
Soil temperature (0 - 10 cm underground)
Soil temperature (10 - 40 cm underground)
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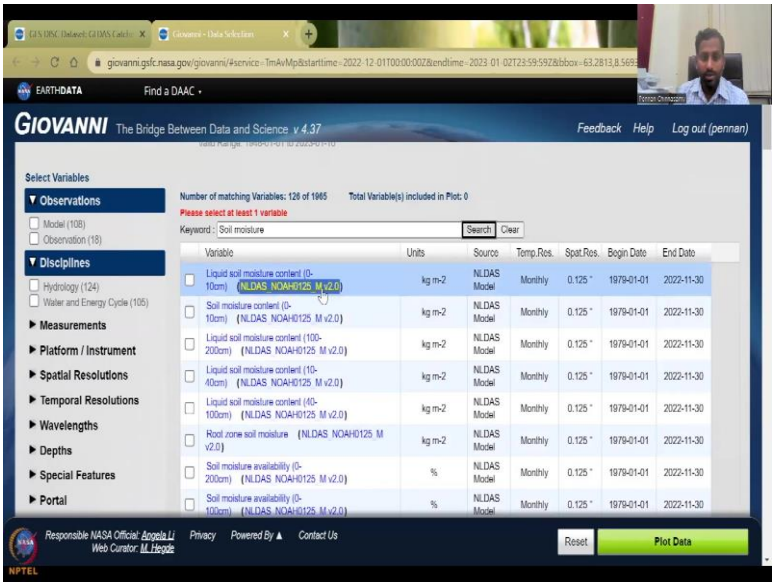
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Model (108)
Observation (18)
Disciplines
Hydrology (124)
Water and Energy Cycle (105)
Measurements
Platform / Instrument
Spatial Resolutions
Temporal Resolutions
Wavelengths
Depths
Special Features
Portal
Number of matching Variables: 126 of 1965
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Please select at least 1 variable
Keyword : Soil moisture
Search
Clear
Variable
Units
Source
Temp.Res.
Spat.Res.
Begin Date
End Date
Liquid soil moisture content (0-10cm) (NLDAS_NOAH0125_M v2.0)
kg m-2
NLDAS Model
Monthly
0.125 °
1979-01-01
2022-11-30
Soil moisture content (0-10cm) (NLDAS_NOAH0125_M v2.0)
Liquid soil moisture content (100-200cm) (NLDAS_NOAH0125_M v2.0)
Liquid soil moisture content (10-40cm) (NLDAS_NOAH0125_M v2.0)
Liquid soil moisture content (40-100cm) (NLDAS_NOAH0125_M v2.0)
Root zone soil moisture (NLDAS_NOAH0125_M v2.0)
Soil moisture availability (0-200cm) (NLDAS_NOAH0125_M v2.0)
%
Soil moisture availability (0-100cm) (NLDAS_NOAH0125_M v2.0)
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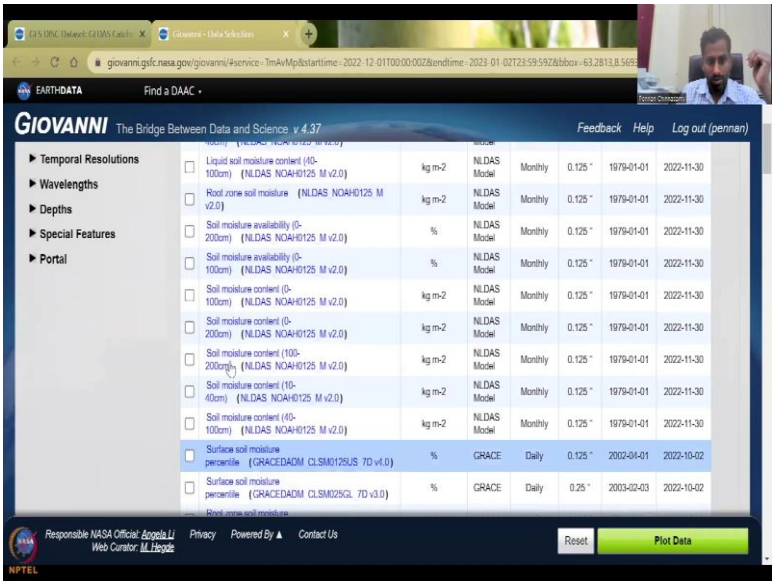
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Temporal Resolutions
Wavelengths
Depths
Special Features
Portal
Liquid soil moisture content (40-100cm) (NLDAS_NOAH0125_M v2.0)
Root zone soil moisture (NLDAS_NOAH0125_M v2.0)
Soil moisture availability (0-200cm) (NLDAS_NOAH0125_M v2.0)
Soil moisture availability (0-100cm) (NLDAS_NOAH0125_M v2.0)
Soil moisture content (0-100cm) (NLDAS_NOAH0125_M v2.0)
Soil moisture content (0-200cm) (NLDAS_NOAH0125_M v2.0)
Soil moisture content (100-200cm) (NLDAS_NOAH0125_M v2.0)
Soil moisture content (10-40cm) (NLDAS_NOAH0125_M v2.0)
Soil moisture content (40-100cm) (NLDAS_NOAH0125_M v2.0)
Surface soil moisture percentile (GRACEDADM_CLSM0125US_7D v1.0)
%
GRACE
Daily
0.125 °
2002-04-01
2022-10-02
Surface soil moisture percentile (GRACEDADM_CLSM025GL_7D v3.0)
0.25 °
2003-02-03
2022-10-02
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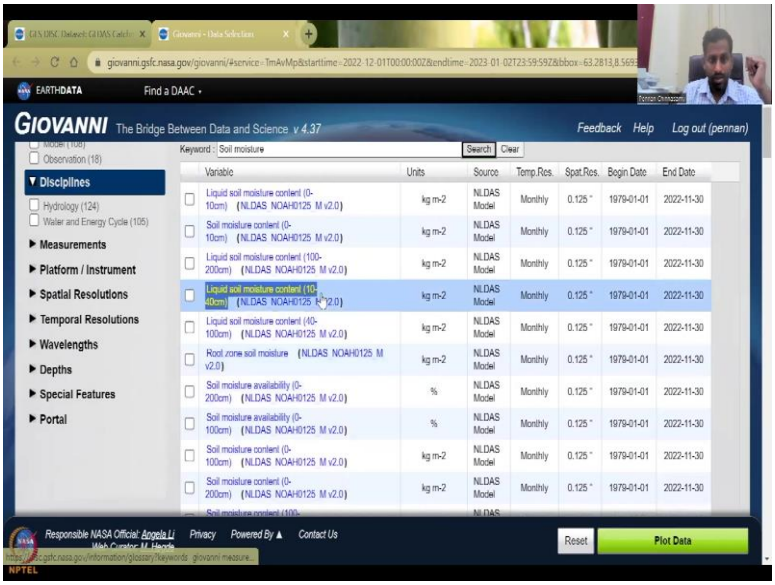
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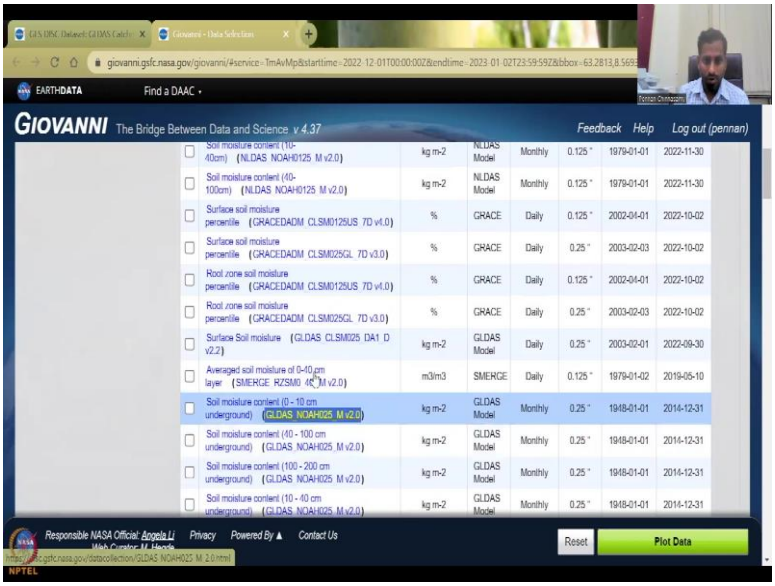
Feedback Help Log out (pennan)
Find a DAAC
Keyword : Soil moisture
Search Clear
Variable Units Source Temp.Res. Spat.Res. Begin Date End Date
Disciplines
Measurements
Platform / Instrument
Spatial Resolutions
Temporal Resolutions
Wavelengths
Depths
Special Features
Portal
Reset
Plot Data


GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Find a DAAC
Soil moisture content (10-40cm) (NLDAS NOAH0125 M v2.0)
Soil moisture content (40-100cm) (NLDAS NOAH0125 M v2.0)
Surface soil moisture percentile (GRACEDADM CLSM0125US 7D v4.0)
Surface soil moisture percentile (GRACEDADM CLSM025GL 7D v3.0)
Root zone soil moisture percentile (GRACEDADM CLSM0125US 7D v4.0)
Root zone soil moisture percentile (GRACEDADM CLSM025GL 7D v3.0)
Surface Soil moisture (GLDAS CLSM025 DA1 D v2.2)
Soil moisture content (0 - 10 cm underground) (GLDAS NOAH025 M v2.0)
Soil moisture content (40 - 100 cm underground) (GLDAS NOAH025 M v2.0)
Soil moisture content (100 - 200 cm underground) (GLDAS NOAH025 M v2.0)
Soil moisture content (10 - 40 cm underground) (GLDAS NOAH025 M v2.0)
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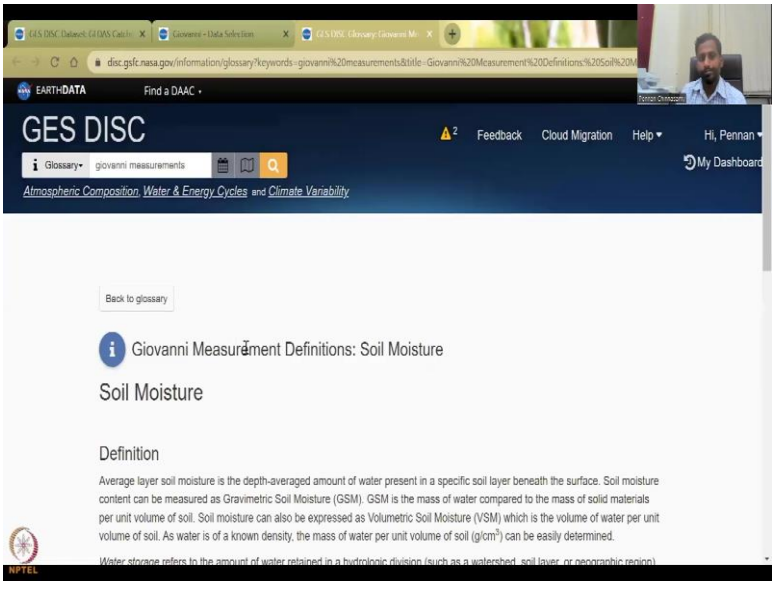
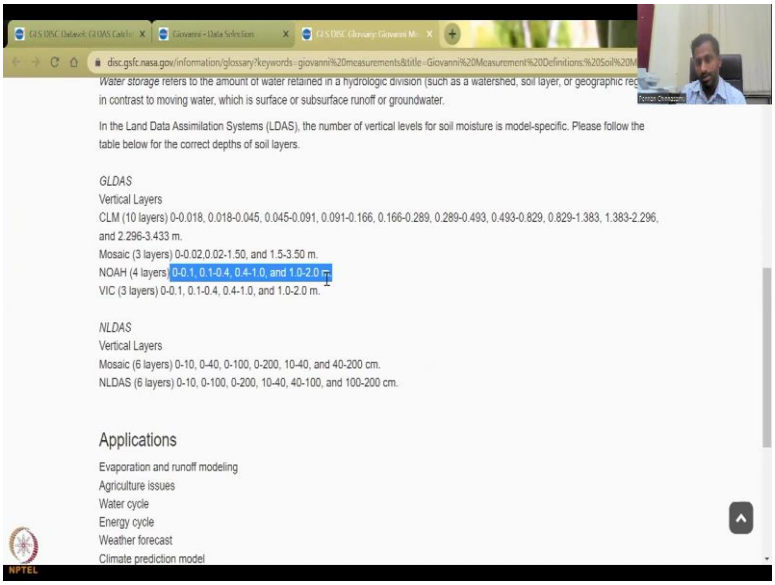
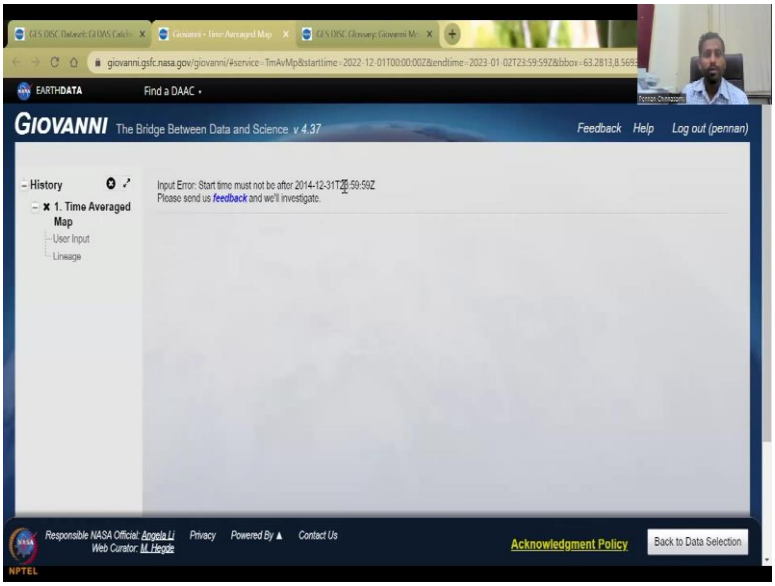

GES DISC
Feedback Cloud Migration Help Hi, Pennan
My Dashboard
Glossary
giovanni measurements
Atmospheric Composition, Water & Energy Cycles and Climate Variability
Back to glossary
Giovanni Measurement Definitions: Soil Moisture
Soil Moisture
Definition
Average layer soil moisture is the depth-averaged amount of water present in a specific soil layer beneath the surface. Soil moisture content can be measured as Gravimetric Soil Moisture (GSM). GSM is the mass of water compared to the mass of solid materials per unit volume of soil. Soil moisture can also be expressed as Volumetric Soil Moisture (VSM) which is the volume of water per unit volume of soil. As water is of a known density, the mass of water per unit volume of soil (g/cm3) can be easily determined.
Water storage refers to the amount of water retained in a hydrologic division (such as a watershed, soil layer, or geographic region)


Water storage refers to the amount of water retained in a hydrologic division (such as a watershed, soil layer, or geographic rec
in contrast to moving water, which is surface or subsurface runoff or groundwater.
In the Land Data Assimilation Systems (LDAS), the number of vertical levels for soil moisture is model-specific. Please follow the table below for the correct depths of soil layers.
GLDAS
Vertical Layers
CLM (10 layers) 0-0.018, 0.018-0.045, 0.045-0.091, 0.091-0.166, 0.166-0.289, 0.289-0.493, 0.493-0.829, 0.829-1.383, 1.383-2.296, and 2.296-3.433 m.
Mosaic (3 layers) 0-0.02,0.02-1.50, and 1.5-3.50 m.
NOAH (4 layers) 0-0.1, 0.1-0.4, 0.4-1.0, and 1.0-2.0 m.
VIC (3 layers) 0-0.1, 0.1-0.4, 0.4-1.0, and 1.0-2.0 m.
NLDAS
Vertical Layers
Mosaic (6 layers) 0-10, 0-40, 0-100, 0-200, 10-40, and 40-200 cm.
NLDAS (6 layers) 0-10, 0-100, 0-200, 10-40, 40-100, and 100-200 cm.
Applications
Evaporation and runoff modeling
Agriculture issues
Water cycle
Energy cycle
Weather forecast
Climate prediction model
NPTEL


EARTHDATA
Find a DAAC
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
History
1. Time Averaged Map
User Input
Lineage
Input Error: Start time must not be after 2014-12-31T23:59:59Z
Please send us feedback and we'll investigate.
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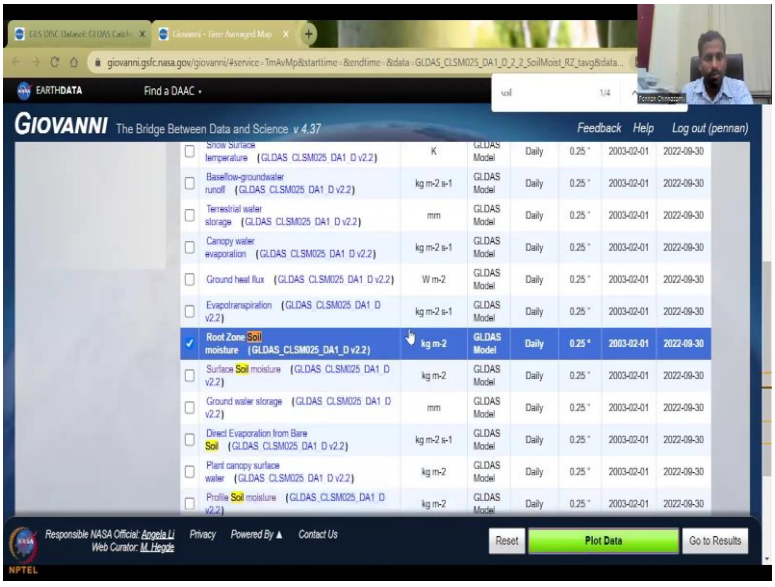
NPTEL


EARTHDATA
Find a DAAC
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Root Zone Soil moisture (GLDAS_CLSM025_DA1_D v2.2) kg m-2 GLDAS Model Daily 0.25 ° 2003-02-01 2022-09-30
Surface Soil moisture (GLDAS_CLSM025_DA1_D v2.2) kg m-2 GLDAS Model Daily 0.25 ° 2003-02-01 2022-09-30
Profile Soil moisture (GLDAS_CLSM025_DA1_D v2.2) kg m-2 GLDAS Model Daily 0.25 ° 2003-02-01 2022-09-30
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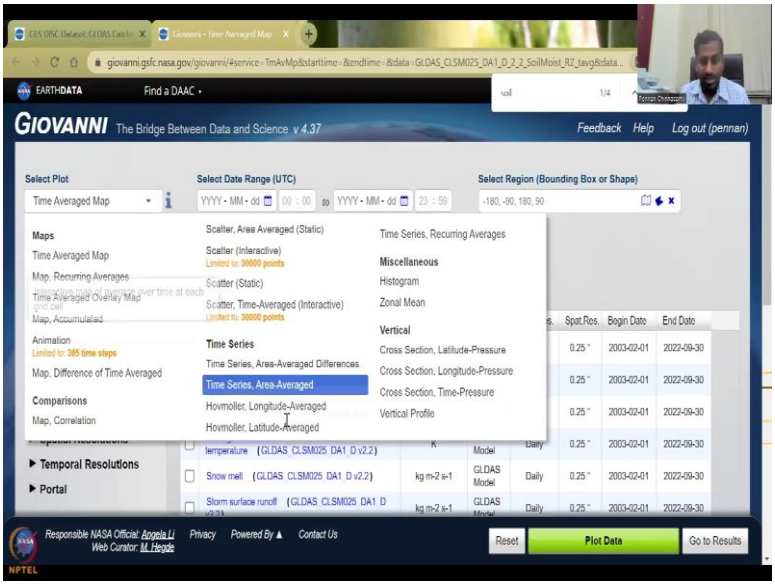
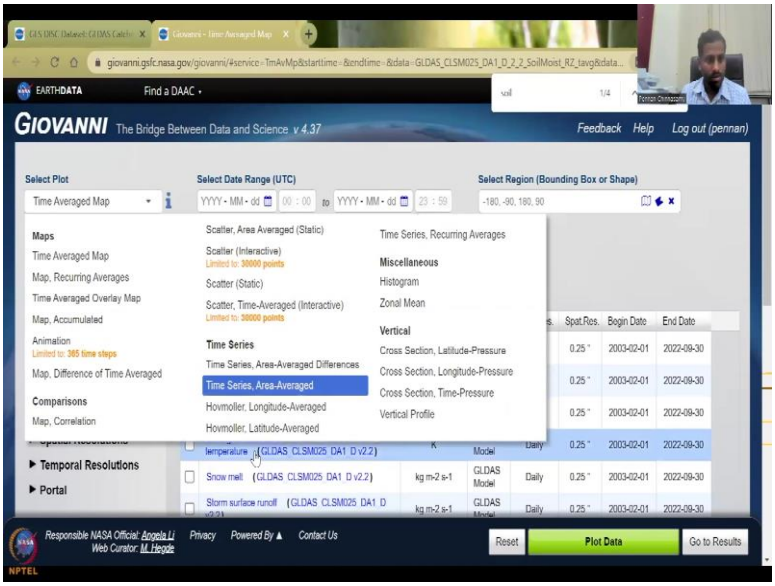
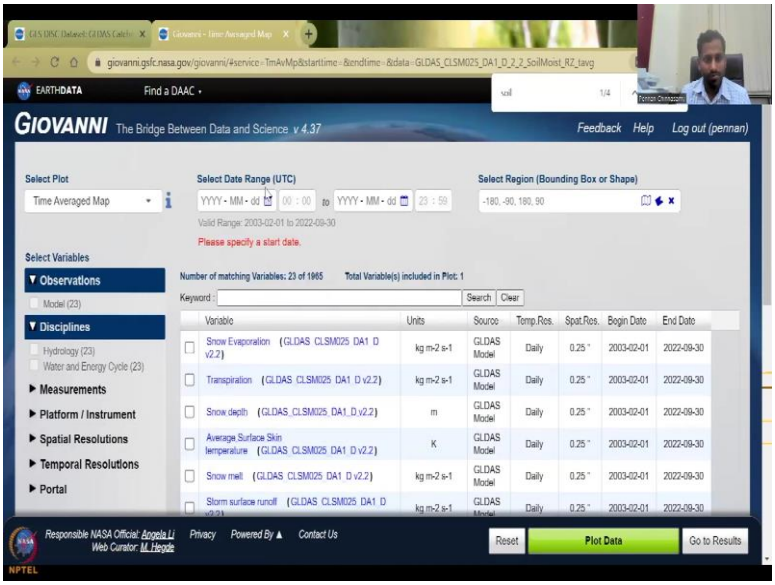
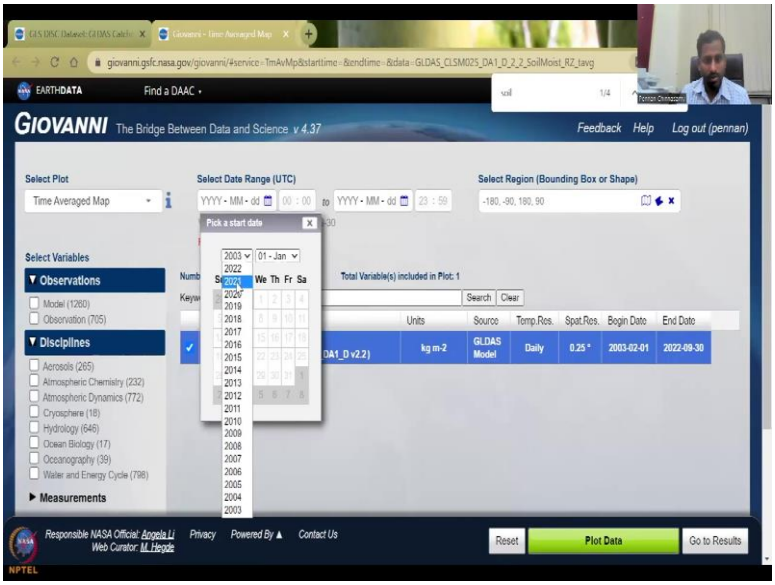
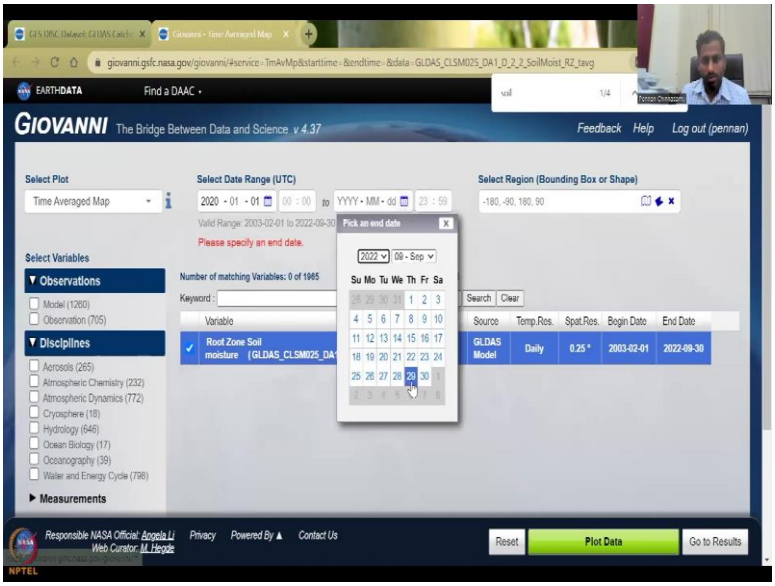
Plot Data
Go to Results
NPTEL

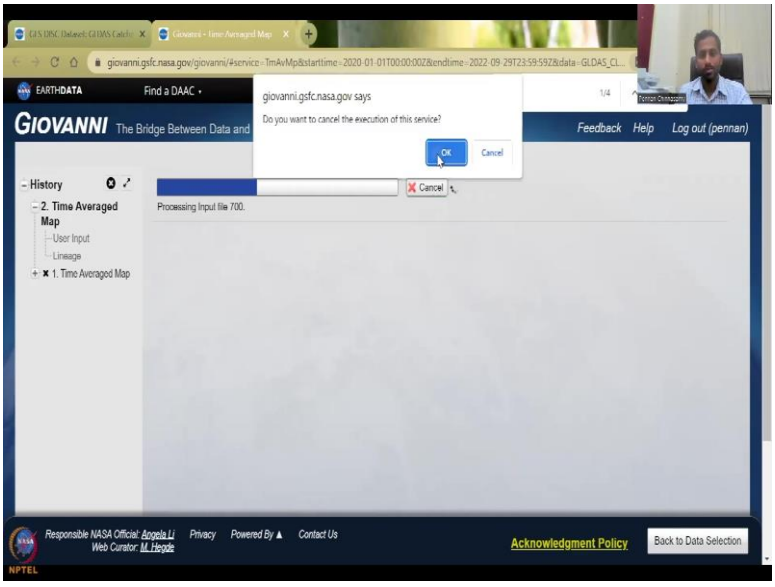

GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Select Plot
Time Averaged Map
Select Date Range (UTC)
Select Region (Bounding Box or Shape)
-180, -90, 180, 90
Maps
Time Averaged Map
Map, Recurring Averages
Time Averaged Overlay Map
Map, Accumulated
Animation
Map, Difference of Time Averaged
Comparisons
Map, Correlation
Scatter, Area Averaged (Static)
Scatter (Interactive)
Scatter (Static)
Scatter, Time-Averaged (Interactive)
Time Series
Time Series, Area-Averaged Differences
Time Series, Area-Averaged
Hovmoller, Longitude-Averaged
Hovmoller, Latitude-Averaged
Time Series, Recurring Averages
Miscellaneous
Histogram
Zonal Mean
Vertical
Cross Section, Latitude-Pressure
Cross Section, Longitude-Pressure
Cross Section, Time-Pressure
Vertical Profile
Temporal Resolutions
Portal
Reset
Plot Data
Go to Results

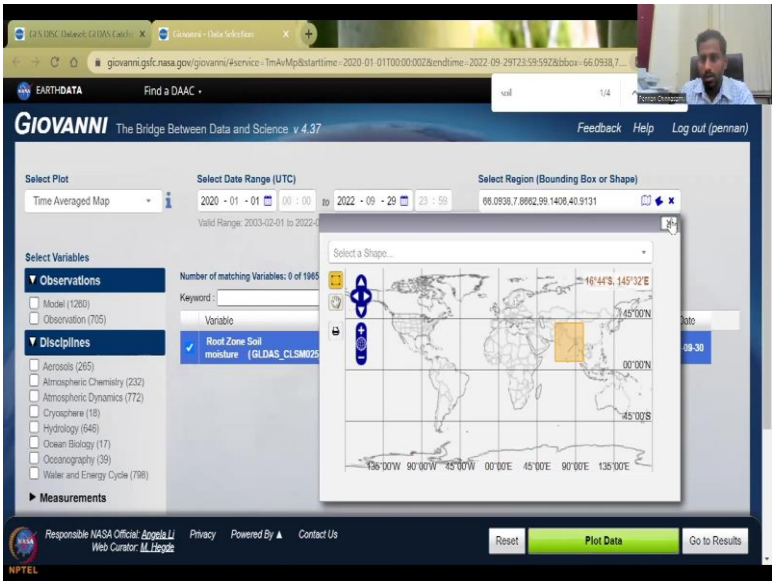

GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Select Plot
Time Averaged Map
Select Date Range (UTC)
Select Region (Bounding Box or Shape)
-180, -90, 180, 90
Maps
Time Averaged Map
Map, Recurring Averages
Time Averaged Overlay Map
Map, Accumulated
Animation
Map, Difference of Time Averaged
Comparisons
Map, Correlation
Scatter, Area Averaged (Static)
Scatter (Interactive)
Scatter (Static)
Scatter, Time-Averaged (Interactive)
Time Series
Time Series, Area-Averaged Differences
Time Series, Area-Averaged
Hovmoller, Longitude-Averaged
Hovmoller, Latitude-Averaged
Time Series, Recurring Averages
Miscellaneous
Histogram
Zonal Mean
Vertical
Cross Section, Latitude-Pressure
Cross Section, Longitude-Pressure
Cross Section, Time-Pressure
Vertical Profile
Temporal Resolutions
Portal
Reset
Plot Data
Go to Results


GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Select Plot
Time Averaged Map
Select Date Range (UTC)
Select Region (Bounding Box or Shape)
-180, -90, 180, 90
Valid Range: 2003-02-01 to 2022-09-30
Please specify a start date.
Select Variables
Observations
Model (23)
Disciplines
Hydrology (23)
Water and Energy Cycle (23)
Measurements
Platform / Instrument
Spatial Resolutions
Temporal Resolutions
Portal
Number of matching Variables: 23 of 1965
Total Variable(s) included in Plot: 1
Keyword :
Search
Clear
Variable
Units
Source
Temp.Res.
Spat.Res.
Begin Date
End Date
Reset
Plot Data
Go to Results


GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Select Plot
Time Averaged Map
Select Date Range (UTC)
Select Region (Bounding Box or Shape)
-180, -90, 180, 90
Select Variables
Observations
Disciplines
Measurements
Reset
Plot Data
Go to Results


GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Select Plot
Time Averaged Map
Select Date Range (UTC)
Select Region (Bounding Box or Shape)
-180, -90, 180, 90
Please specify an end date.
Select Variables
Observations
Disciplines
Measurements
Reset
Plot Data
Go to Results


giovanni.gsfc.nasa.gov says
Do you want to cancel the execution of this service?
OK
Cancel
History
2. Time Averaged Map
User Input
Lineage
1. Time Averaged Map
Processing Input file 700.
Acknowledgment Policy
Back to Data Selection


EARTHDATA
Find a DAAC
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
Select Plot
Time Averaged Map
Select Data Range (UTC)
2020 - 01 - 01
2022 - 09 - 29
Select Region (Bounding Box or Shape)
66.0938,7.8662,99.1408,40.9131
Select Variables
Observations
Model (1260)
Observation (705)
Disciplines
Aerosols (265)
Atmospheric Chemistry (232)
Atmospheric Dynamics (772)
Cryosphere (18)
Hydrology (646)
Ocean Biology (17)
Oceanography (39)
Water and Energy Cycle (798)
Measurements
Number of matching Variables: 0 of 1965
Keyword :
Variable
Root Zone Soil moisture (GLDAS_CLSM025
Select a Shape...
Responsible NASA Official: Angela Li
Web Curator: M. Hegde
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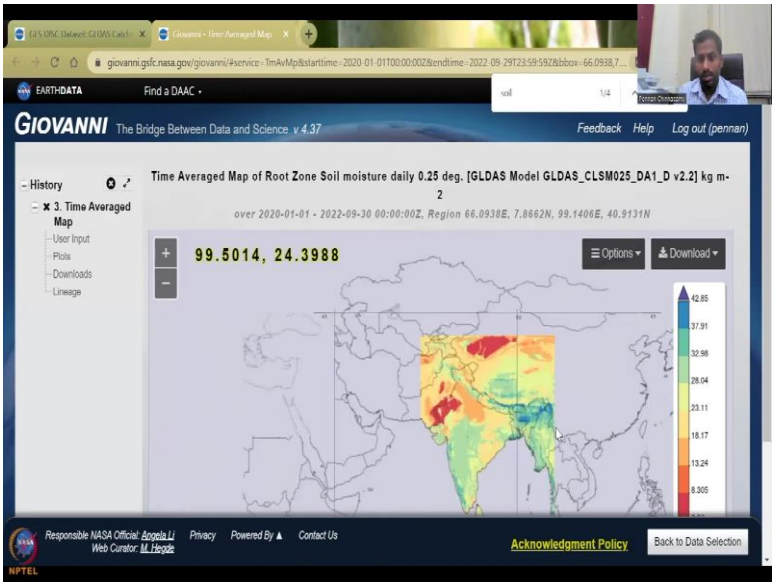
Reset
Plot Data
Go to Results
NPTEL


EARTHDATA
Find a DAAC
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
History
3. Time Averaged Map
User Input
Plots
Downloads
Lineage
Time Averaged Map of Root Zone Soil moisture daily 0.25 deg. [GLDAS Model GLDAS_CLSM025_DA1_D v2.2] kg m-2
over 2020-01-01 - 2022-09-30 00:00:00Z, Region 66.0938E, 7.8662N, 99.1406E, 40.9131N
99.5014, 24.3988
Options
Download
42.85
37.91
32.98
28.04
23.11
18.17
13.24
8.305
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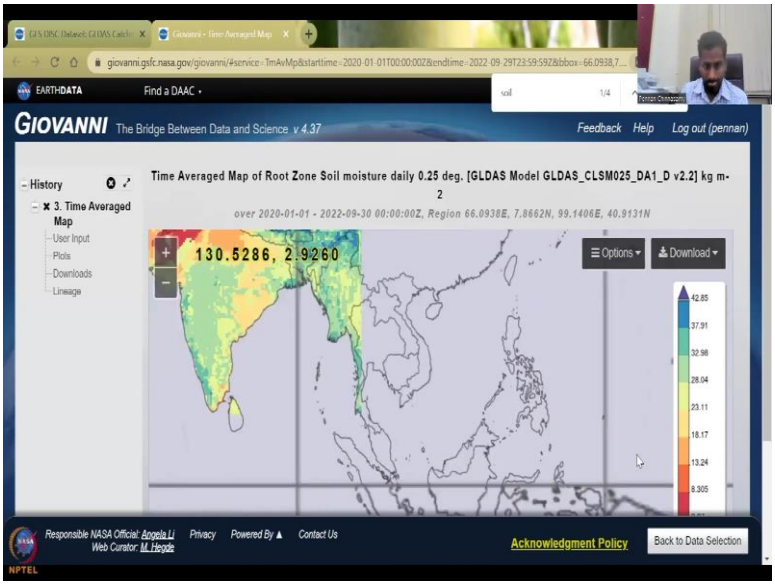
Back to Data Selection
NPTEL


EARTHDATA
Find a DAAC
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
History
3. Time Averaged Map
User Input
Plots
Downloads
Lineage
Time Averaged Map of Root Zone Soil moisture daily 0.25 deg. [GLDAS Model GLDAS_CLSM025_DA1_D v2.2] kg m-2
over 2020-01-01 - 2022-09-30 00:00:00Z, Region 66.0938E, 7.8662N, 99.1406E, 40.9131N
130.5286, 2.9260
Options
Download
42.85
37.91
32.98
28.04
23.11
18.17
13.24
8.305
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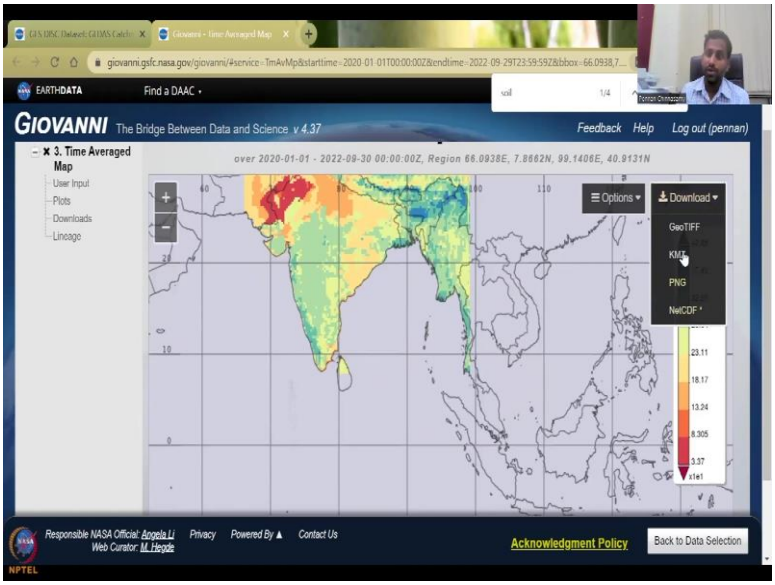
Back to Data Selection
NPTEL


EARTHDATA
Find a DAAC
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
3. Time Averaged Map
User Input
Plots
Downloads
Lineage
over 2020-01-01 - 2022-09-30 00:00:00Z, Region 66.0938E, 7.8662N, 99.1406E, 40.9131N
Options
Download
GeoTIFF
KMZ
PNG
NetCDF
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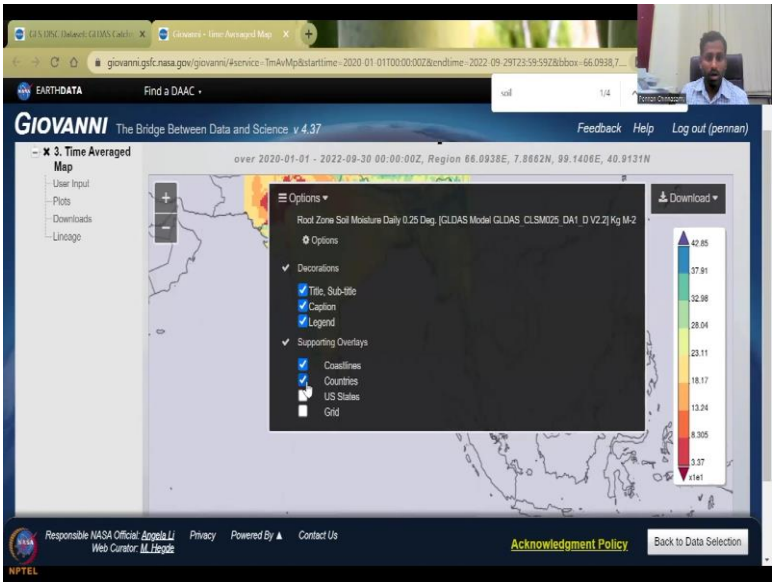
NPTEL


EARTHDATA
Find a DAAC
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
3. Time Averaged Map
User Input
Plots
Downloads
Lineage
over 2020-01-01 - 2022-09-30 00:00:00Z, Region 66.0938E, 7.8662N, 99.1406E, 40.9131N
Options
Root Zone Soil Moisture Daily 0.25 Deg. [GLDAS Model GLDAS_CLSM025_DA1_D V2.2] Kg M-2
Options
Decorations
Title, Sub-title
Caption
Legend
Supporting Overlays
Coastlines
Countries
US States
Grid
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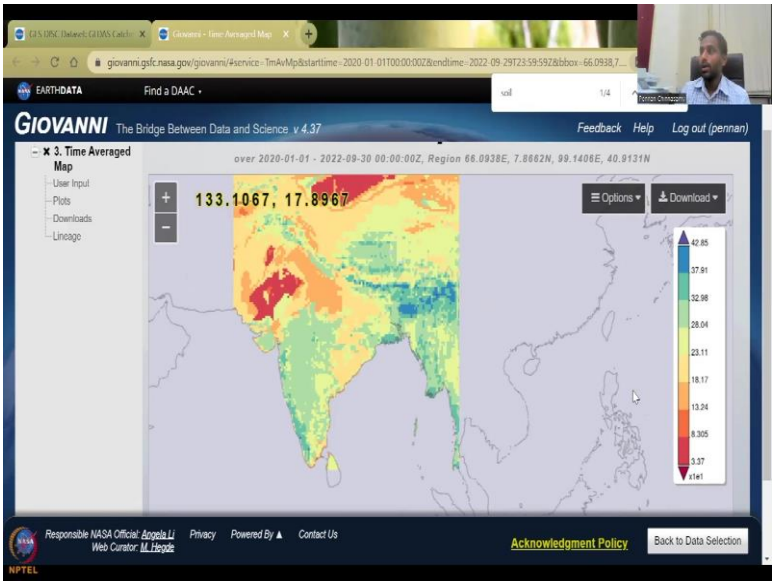
EARTHDATA
Find a DAAC
GIOVANNI The Bridge Between Data and Science v 4.37
Feedback Help Log out (pennan)
3. Time Averaged Map
User Input
Plots
Downloads
Lineage
over 2020-01-01 - 2022-09-30 00:00:00Z, Region 66.0938E, 7.8662N, 99.1406E, 40.9131N
133.1067, 17.8967
Options
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Back to Data Selection
NPTEL

So, you can take it from online archive, you can click, you can go here in the online archive, remember, we said 2022. So, we can click on 2022 and then download the months. So, 1 to 9 we have so January you can get the data and then download so you can see here it is daily 0102. So, Jan, 1, Jan 2, etc. So, every month data is kept, then there is Giovanni Web Services data source. Giovanni is what I also give the link for that is also pretty much useful to collect the data for your images.

And sometimes it does pull your analysis directly here, because you are already given the date range, you are given the box. Everything is being pulled and here you could see, let us do that again. You have a bounding box as you can draw the box, close it and then the data range we said somewhere in 2022 1st of December, and then 2023 2nd of Jan, and then it automatically sees how many variables are there, search. So,il moisture search, it is coming. So, you can see here, good resolution, the unit of the data and what depth 0 to 10 centimeters, soil moisture.

So, as I said 0 to 10 centimeters is 1 and then 10 to there are 4, 5 they have 0 to 200 centimeters is also there, 0 to 10, 10 to 40 centimeters, and then 40 to 100, so 40 centimeters to 100 centimeters here you have 4200 it is not sorted well, but you will find it and then 100 to 200 centimeters, or 0 to 200, 100 or 200 everything is there. So, all these are aggregated together or in separate terms as you can see here, 0 to 10 then 40 to 10, 10 to 40 40 to 100, 100 to 200 all these days, you can click on one particular data set and then download the data. So, it will tell you like these are the layers that is done these are the units you will see that meters is point is centimeters.

So, all these 200 centimeters so it is 0 to 10 centimeters 10 to 40, 40 to 100 and 100 to 200 centimeters. So, data about the data is given pretty well and then you can download the data here. You want to download you can download or plot, plotting is good, because you can actually look at the data in real time as I said, Giovanni is mostly for visualizing the data, you can have comparisons of 2 time periods or you can have a particular time series and then ask the computer to plot.

You will have to have a good internet it is some input start time has to be different. You can go back, you can sort it or just type soil moisture, rootzone moisture we have. And then we want to say time averaged, or you want a time averaged between the data time series, what do you want, you can select here, so I am going to say for a particular date, I want a time series average differences. Time averaged map is fine, when you have to set a start date, so I am

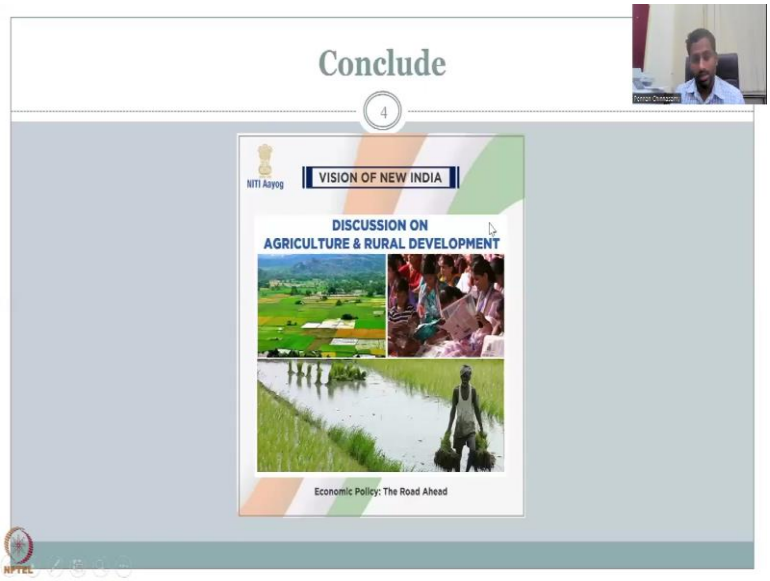
going to say 2021 and then anytime is fine and then you can say until 29 September they have, so let it do and plot.

So, now it is running in the background, the model, you could see the thing. So, this is actually talking to a supercomputer in with NASA and using the NASA infrastructure to plot the map only when the map is plotted well, and you see that there is no data gaps, you can download the data, because most of the time you actually download the data and find out that it is not worth it because you actually do not have data there. Maybe we should have given a smaller bounding box. So, back to Data Selection and here as I said we will do the bounding box for India click this box in the India and then go here to plot data.

So, it is loading the files and then processing the input file it should be faster than the doing for the whole globe. So, now you understand that even for a supercomputer of that stature it is very difficult. So, here you could see that not all the data of the world is mapped only the India the bounding box that we had is going to be mapped. So, you see here, these are the data that we use, the units everything is given in the reading part. So, you can do it you can download as a GeoTIFF.net, all these will directly go into the database of GIS.

So, all these have geolocation already there KMZ, png, NetCDF GeoTIFF, you can add subtitles so for example, you do not want download the data but use this as an image so GeoTIFF as an image, you can add titles, caption legends, coastline United States, you can take the grid off, you can take the country's boundary. So, now there is no issue of the boundaries you can see it is clear. We want to say, the Indian region, the tile that we downloaded is going to be used. I think I have gone a little bit over time because I did not want to break this tutorial. So,rry about it. But, I think we will stop here.

(Refer Slide Time: 39:40)



So, this I will conclude today's lecture. Please play with this a lot, the website. In the next class, I will again, take you along with the GLDs website. NASA has data so that you could at least look at climate variables. Now you have seen the water, let us look at climate precipitation, evapotranspiration, those kinds of things. Thank you.