Downloading Satellite Imagery

Authors: Ritu Anilkumar *Prepared On: 16 January 2024*

There are many kinds of information from satellites that can be helpful for different things. It's important for people to know which satellite data to get for their specific needs. One of the primary considerations is the spatial resolution which provides information about how clear objects on the ground can be imaged. High spatial resolutions will be able to image smaller objects well, but will increase computational requirement if the analysis is to be performed over a large area. In contrast, coarse spatial resolution datasets can provide large scale (country-level or global-level) datasets which can be analysed with minimal computational requirements, but they fail to identify objects smaller than a few hundred metres. To understand the difference between resolutions, see the below figure.

Figure: *On the left is a Cartosat image which is a very high resolution image that provides a great level of detail. The second image is a medium resolution image which provides some information but the clarity is poor. The third image is a coarse resolution image with very few details depicted.*

Below, we categorize satellite datasets based on their spatial resolution and highlight some of the applications they can be used for.

	High resolution	Medium Resolution	Coarse Resolution
Spatial Resolution	<5 m/pixel	5-100 m/pixel	>100 m/pixel
Applications	- Cadastral mapping - Urban planning - Precision agriculture - Disaster management	- District level agricultural statistics - Natural resource mapping - Disaster risk reduction - District to state level land cover studies	- Ocean monitoring - Atmospheric studies - Global land cover studies
Examples of Indian satellites	Cartosat 1, 2 ,3 series	Linear Imaging Self Scanning Sensor (LISS) III at 23.5m/pixel, LISS IV at 5.8m/pixel, AWIFS at 56m/pixel	Ocean Colour Monitor, INSAT 3D

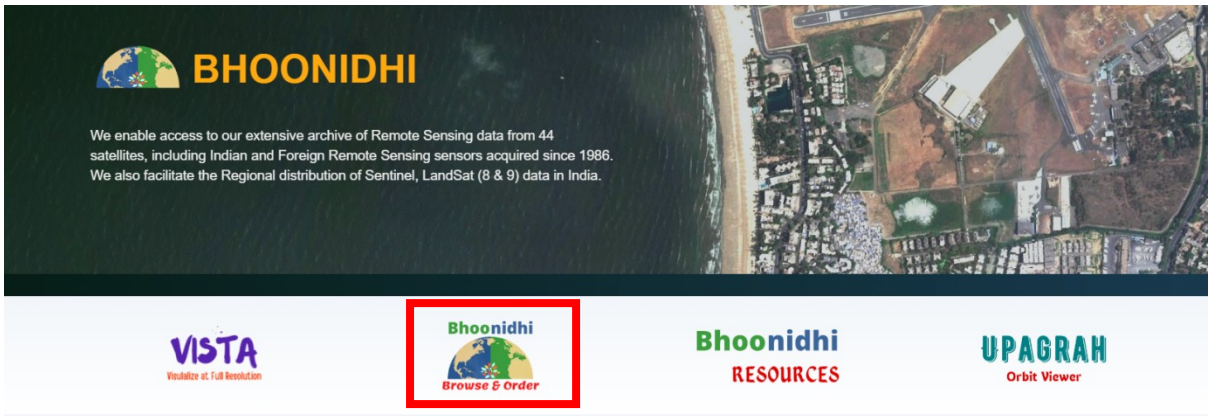
Examples of Global satellites	Skysat, Planetscope, SPOT, WorldView	Sentinel -2 series, Landsat series, ASTER	MODIS

In the next section, we demonstrate how some of the Indian datasets can be downloaded from the Bhoonidhi portal. In the final section, we detail the procedure for downloading datasets using the Earth Explorer Portal.

Downloading satellite datasets using ISRO's Bhoonidhi Portal

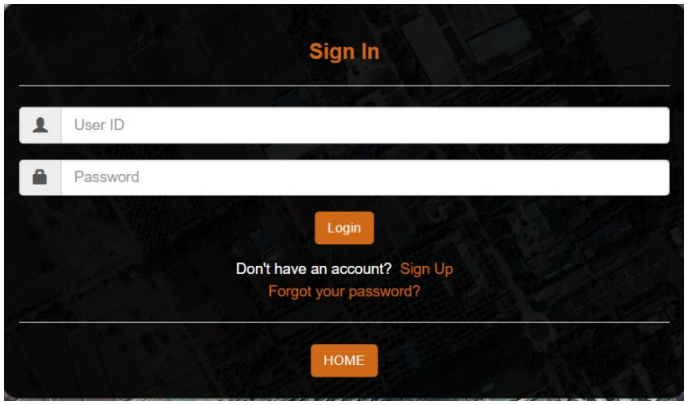
Below, we detail the steps to access coarse resolution OCM-2 datasets. The OCM dataset is freely available to Indian users and can be accessed from the ISRO Bhoonidhi platform

1. The Bhoonidhi portal of ISRO can be accessed at https://bhoonidhi.nrsc.gov.in/. The landing page appears as follows:

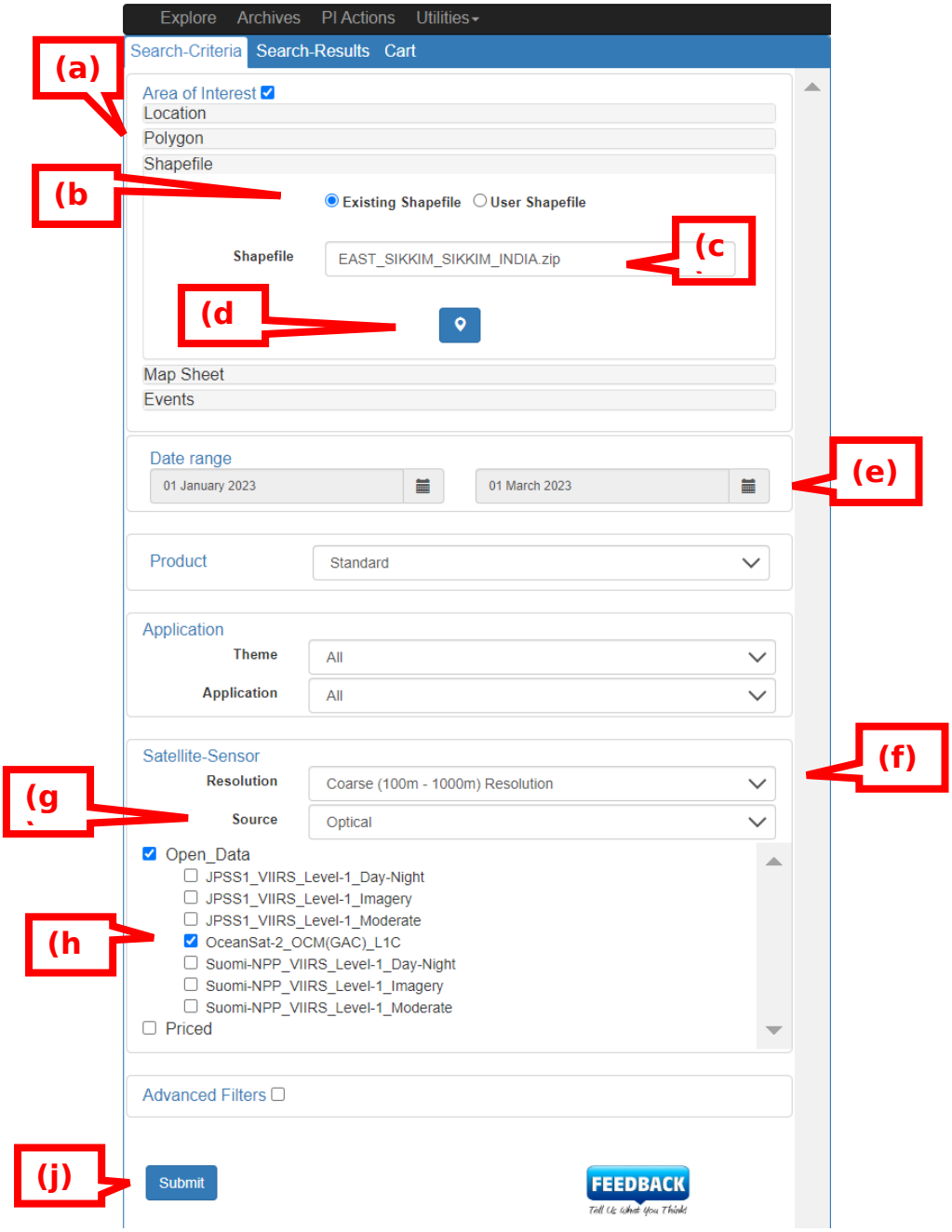


2. Click on Bhoonidhi Browse and Order (outlined in red above) to be redirected to the following webpage:

3. Login to the portal. If you do not have a login ID, sign up and create your login ID by filling out the information requested.



4. See the figure below:



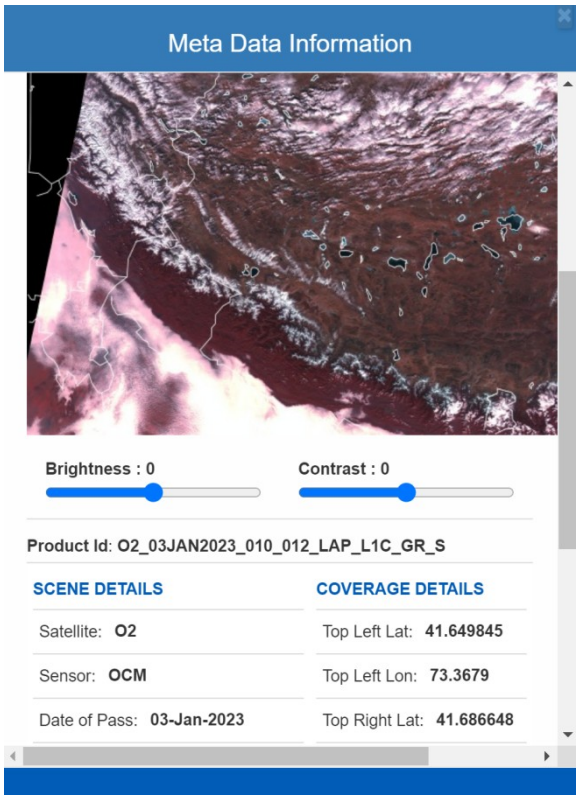
Once you are logged in, you can fill out the required information columns on the left to access the satellite data of your interest. We are demonstrating the example of coarse resolution dataset OCM for East Sikkim and the dates 1 January 2023 to 1 March 2023. Perform the following steps for this:

a. Click on shapefile
b. Click on existing shapefile
c. Choose your desired district from the drop down
d. Click on the location icon
e. Choose the desired dates
f. Set resolution to coarse resolution
g. Set source as Optical
h. Check the box priced and select LISS III BOA
i. Click Submit

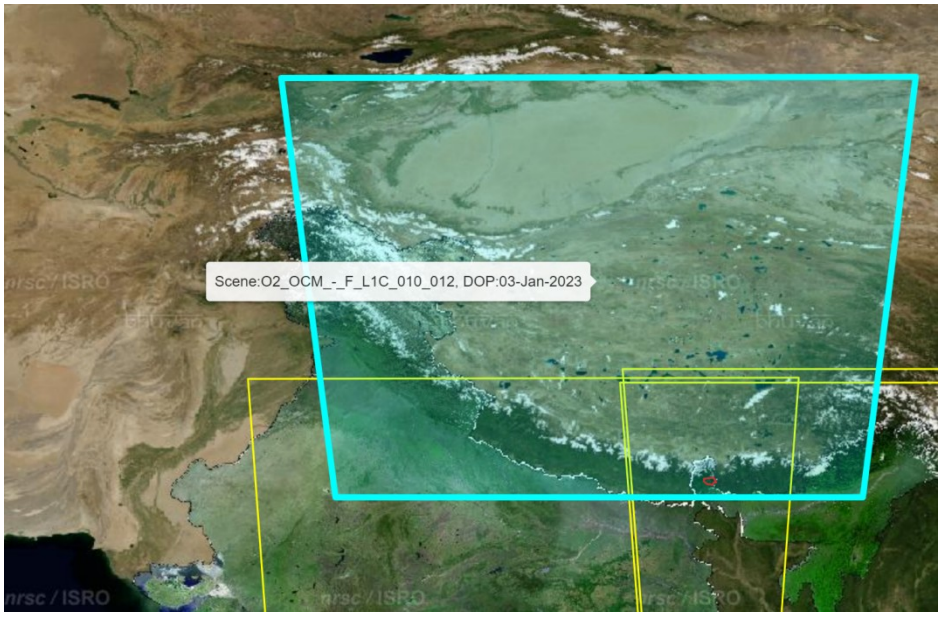
5. A list of images available appears.

There are a few icons next to the images which are explained as follows:

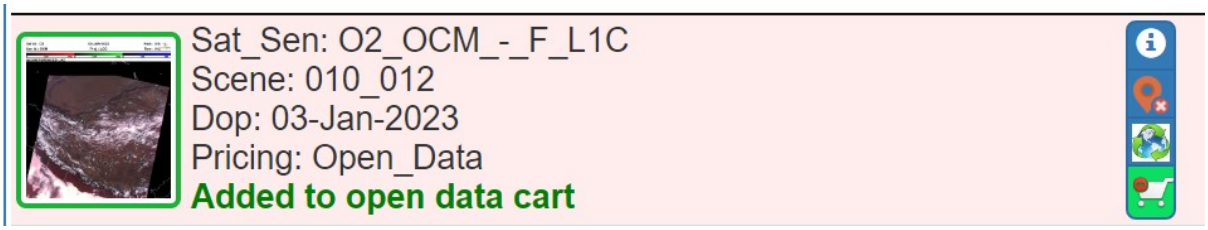
a. Metadata view button: On clicking this button, a pop up with a view of the image as well as the information about the image such as satellite, sensor, date and time of acquisition etc appears.



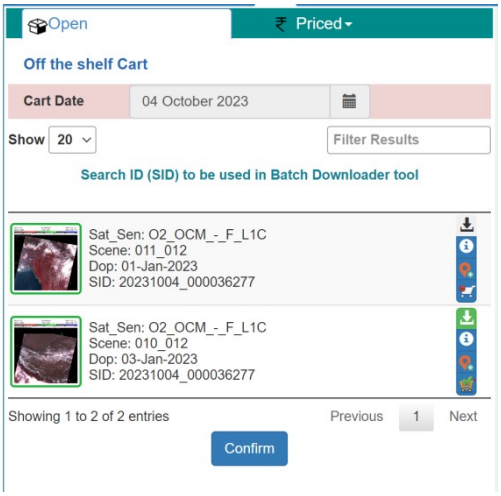
b. Image extents: This button will depict on the map window the boundary of the image selected. The boundary appears in cyan colour. The yellow boundaries are the boundaries of the other images in the list.



c. Publish on map: This button is used to display the satellite image in the map view. Using this, we can check if the area of our interest is visible in the selected satellite image or no. This option is deactivated for OCM
d. Add to cart: This option is to add the image to cart for download. Upon selecting this button, a notification specifying added to open data cart appears.



6. Finally, to download the image, perform the following steps:
   a. Select the Cart tab
   b. Click on confirm to download

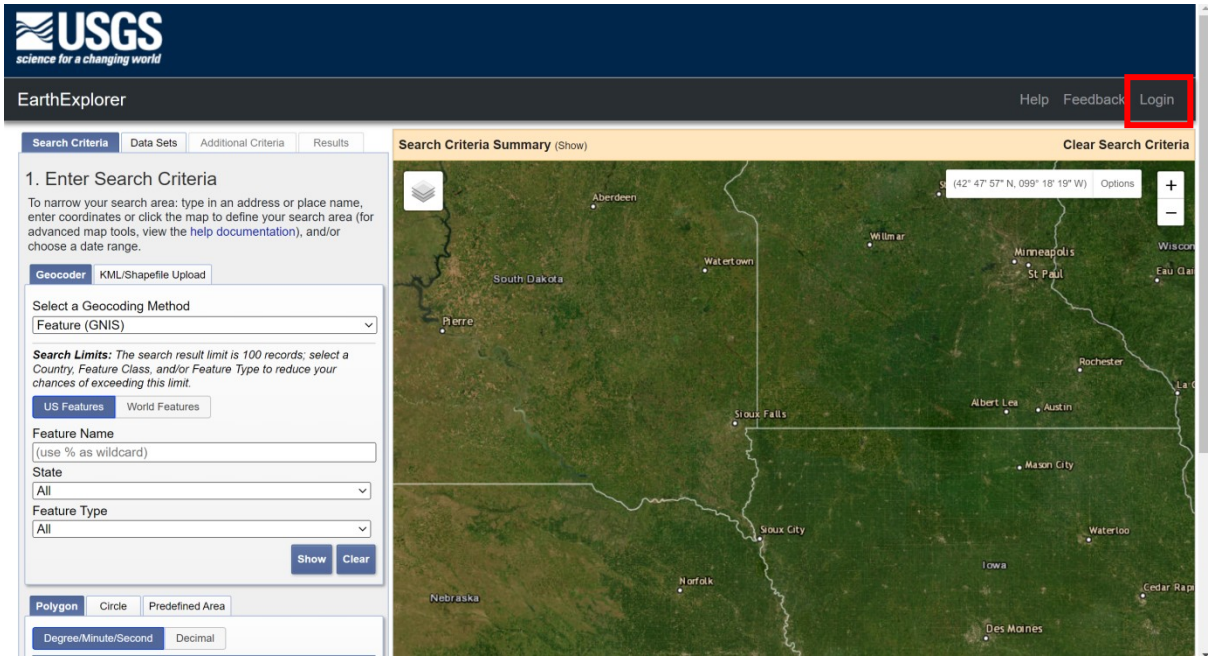


c. The download button turns green once confirmed. Click on the download option. The file will automatically start download.

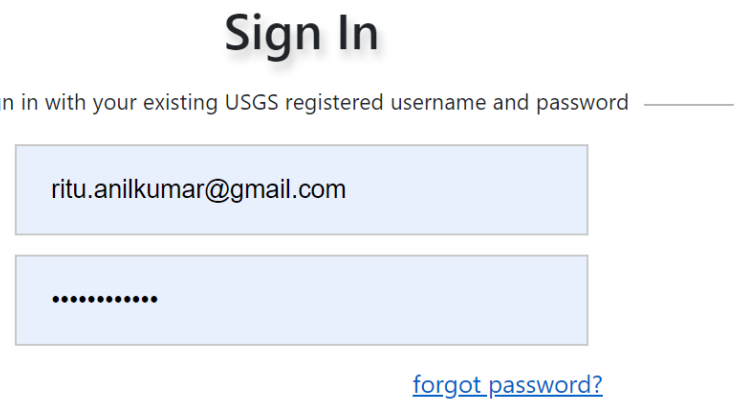
Downloading satellite datasets using Earth Explorer Portal

In addition to the reflected energy, several additional data products can be derived using satellites. This includes elevation, temperature, precipitation, land cover maps etc. In this exercise, we will download the elevation datasets from the United States Geological Survey's Earth Explorer portal.

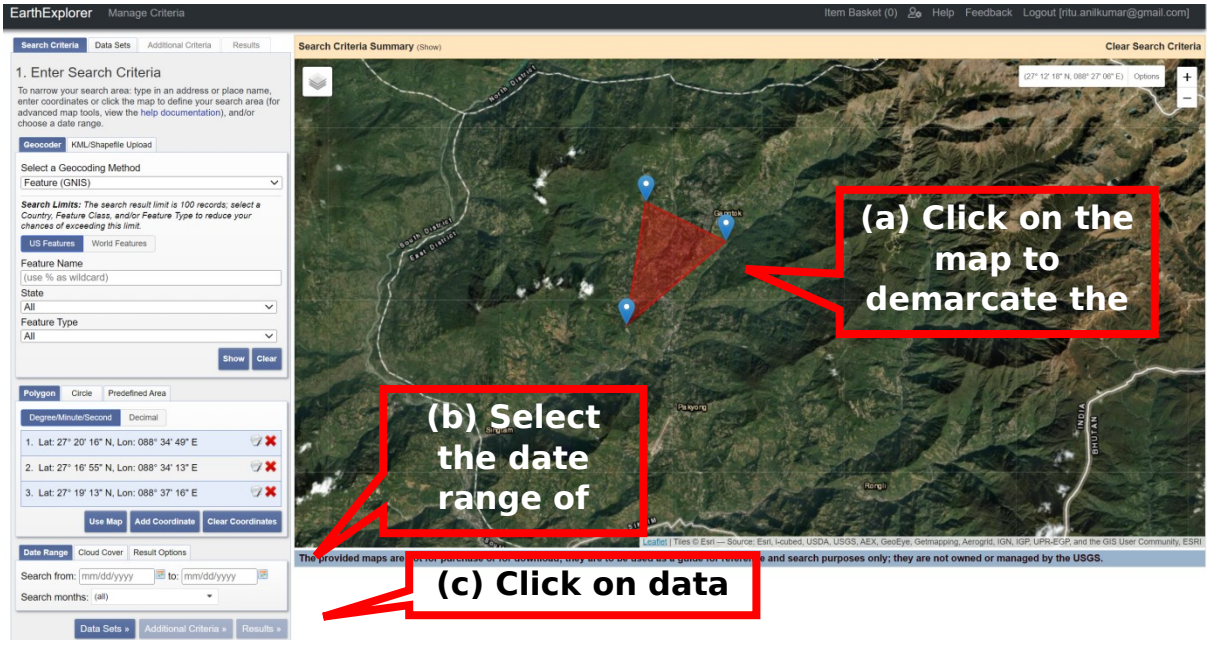
1. Type https://earthexplorer.usgs.gov/ to get:



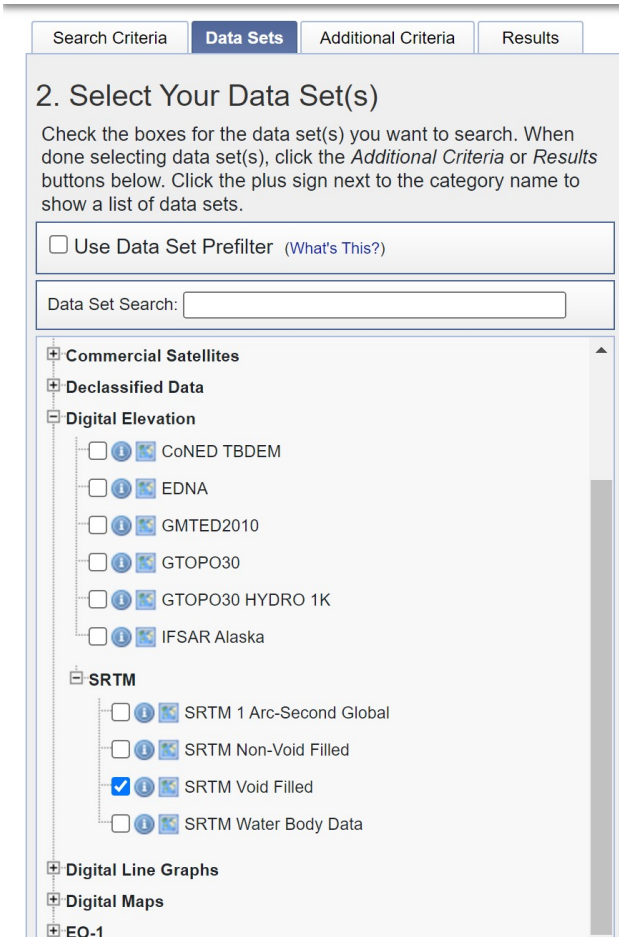
2. Login to the portal using your credentials. If you don't have a login ID, please create a login ID using the signup form.



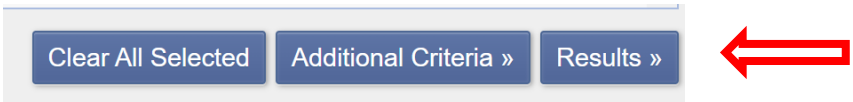
3. Once you are signed in, perform the following steps:
    a. in the map window, zoom in to the location of your interest and click on the map to drop points to demarcate your study area.
    b. You may also add dates of your interest by clicking the calendar option
    c. Click on data sets to choose which satellite data you wish to download.



4. Once you have selected data sets, scroll to digital elevation and select SRTM.

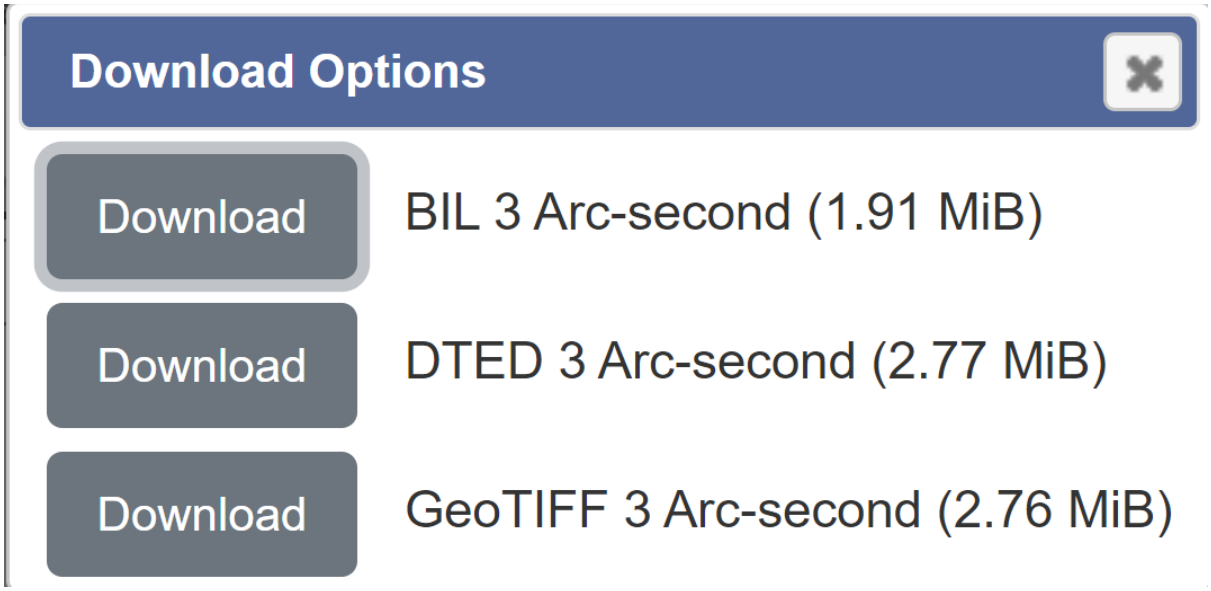


5. Click on results to view available data that satisfies the criteria



6. The available images are listed:

7. To download the image, click on the  icon. A popup appears as below:



8. Choose the geotiff file and click download. The file will be downloaded.

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