



Created By: Lane Carter
Advisors: Paul Evangelista, Jim Graham
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Software: Internet Explorer, Windows Explorer, WinZip

Lesson 1: How to Download and Decompress USGS GloVis Landsat Data

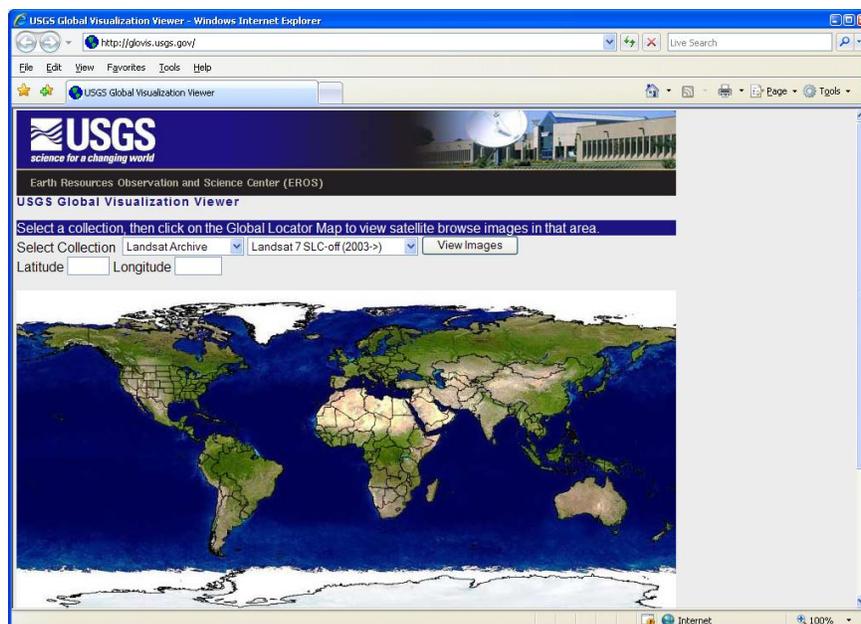
Background

The purpose of this tutorial is to explain the process one must go through in order to download data from the Landsat 7 satellite via the USGS Global Visualization server (GloVis). Throughout this tutorial, I will be using Colorado as the area of interest. This process can be utilized for any data available from the USGS Global Visualization Viewer.

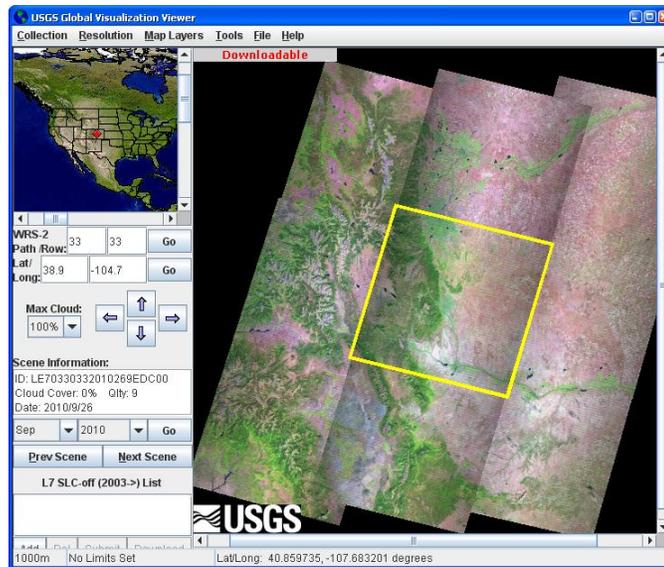
In this example Landsat 7 data from 2003 will be used mainly due to the fact it is prior to the SLC malfunction on the satellite. The Scan Line Corrector (SLC) malfunction on the Landsat 7 satellite occurred in May of 2003. All data retrieved since this malfunction has bands of scan lines across most of the image. Only about 20% of the image is free of these scan lines, which makes data analysis more difficult. In consideration of a more complete appearance, no data from these recent dates will be used.

GloVis basics

1. Navigate your internet browser to the USGS GloVis website: <http://glovis.usgs.gov/>
2. The page should be similar to this:



3. Next, click on the area of interest. This will bring up a window concentrated on the area of your choice. In this case I will be clicking near the middle of the state of Colorado. (If the window does not open, or you receive a pop-up notice, you can either temporarily allow pop-ups or navigate to your browser options and change the pop-up settings there)
4. The window should resemble this in some way:



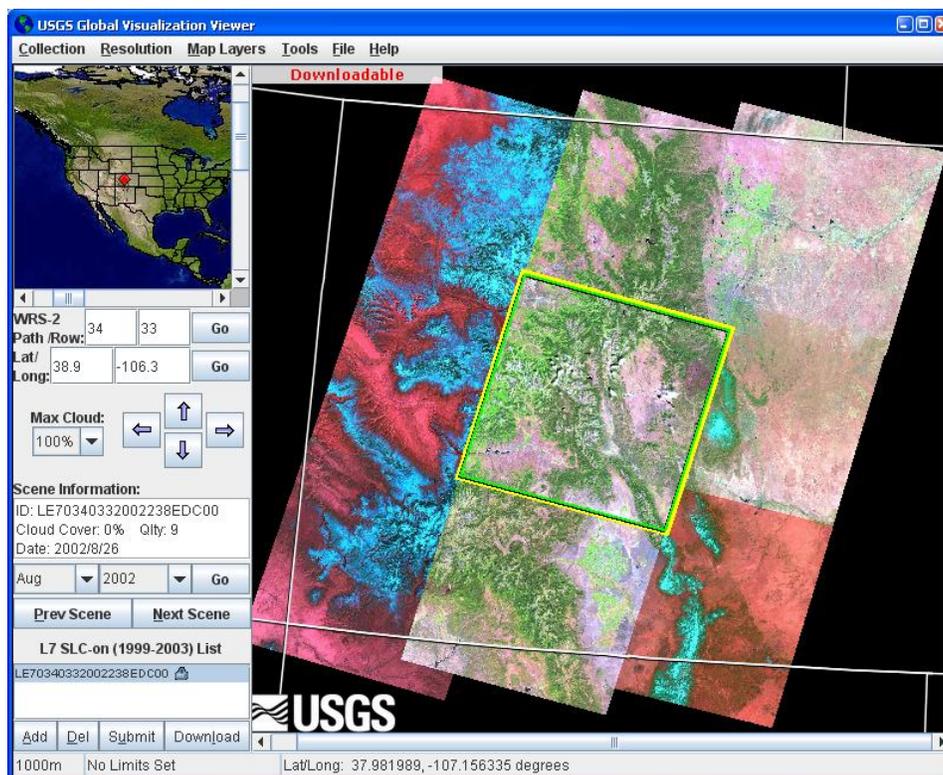
5. Notice, on the left hand side is a larger extent map showing what area you are zoomed in on. Underneath this are tools to be used while navigating downloadable data. On the right side, GloVis is showing a compilation of the Landsat 7 satellite images. The yellow square is outlining what represents one “scene.” These scenes are laid out in the direction the satellite travels and can be downloaded individually.
6. Useful tools within the GloVis viewer:
 - a. *Navigational arrows*: middle/left hand side of window. One can also navigate the scenes being seen by left-clicking and dragging the cursor.
 - b. *WRS-2 Path/Row*: This is directly below the large extent map and tells the user which scene is highlighted on a grid format. The path numbers decrease from left to right and the row references increase from top to bottom.
 - c. *Scene Information*: This section allows the user to see the date the satellite image was taken and allows for navigation by month and year as well as providing an ID for each data scene (e.g. *LE70330342003106EDC00*).
 - d. The bottom left window is what will be used when downloading individual scenes of data. This includes tabs: “Add,” “Del,” “Submit,” and “Download.”

- e. Finally, the options at the top allow you to choose specific data being viewed, change resolution, and add various layers. For this example I use the “Admin Boundaries” in order to see which scenes I will need to encompass the state of Colorado.

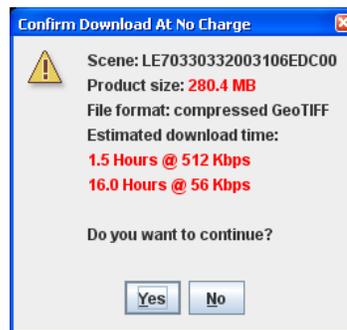
Downloading the Data

Before downloading the data, it is helpful to create the folder(s) in which you intend to store your data. Also noteworthy: the data will be downloaded in a packaged format of a *.tar.gz* file (Information on how to decompress this file will be covered in another step).

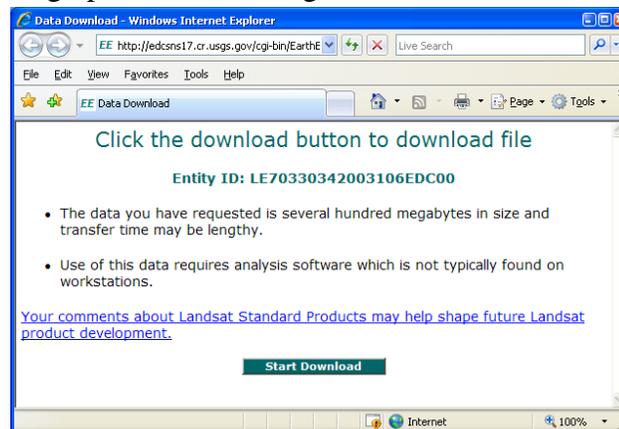
1. In order to download the data, a username and password are required for a USGS account. Setting up an account is free. Simply follow the registration process provided by the link when you attempt to download data for the first time.
2. Within the GloVis viewer navigate to the scene you are interested in (when it is highlighted in yellow). This can be done using the arrows, or by the click of the mouse. Once the scene of interest is selected, notice its *Path/Row* numbers. These will be visible within the file name downloaded.
3. Next, in the bottom left hand corner, click the “Add” tab. It should be the only tab available to click. This will add the scene you chose to the window just above the tabs. The download tab will activate if the scene is available for download. It should look something like this (also notice the green box around the scene once it has been added):



4. A person can add several scenes to this download list, but each scene must be downloaded separately. If a scene is added to the list and the “Download” tab is not illuminated and/or the icon to the right of the file name is not present, the scene is not available. If this happens, perhaps you can navigate to a similar scene on a different date that is downloadable.
5. Click the “Download” tab.
6. This will bring up a prompt asking if you are sure you would like to continue to download the data. It should look something like this:
(Notice: the large time estimates are most likely not accurate. Depending on the processing power of your computer, download time could actually be as short as 3 minutes for each scene)



7. Click yes- this will bring up another warning window:



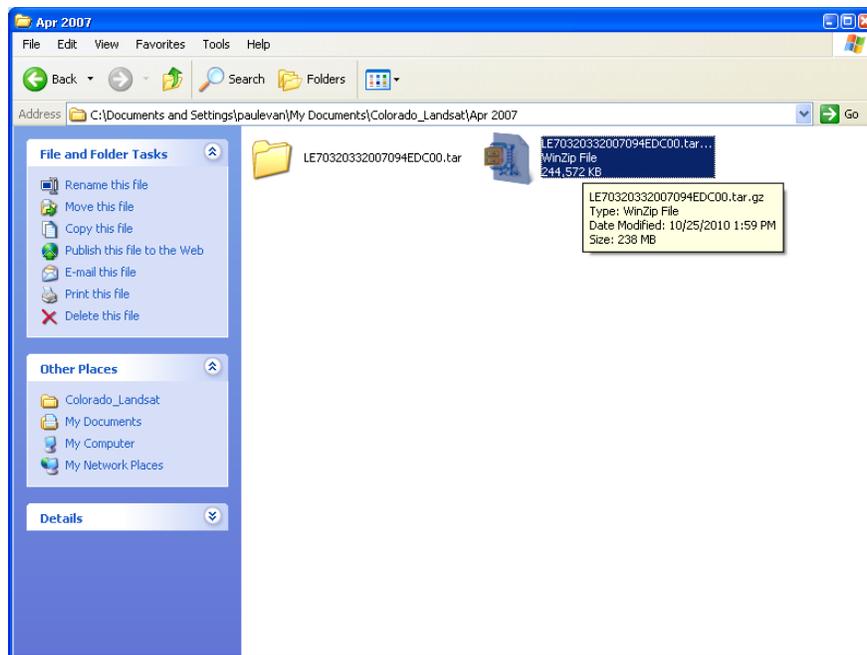
8. Click “Start Download” and then the download should begin (If a security notice appears at the top of the window, right click and select “download file.” An open/save prompt will appear. Save the file to the folder you designated earlier.

Note: The file will appear with a name something similar to *LE70330342003106EDC00.tar.gz*. Notice there should be familiar numbers embedded in the file name. In this case the *Path*, *Row*, and *Date taken* can be seen. For this example the *Path* is 33, the *Row* is 34, and the satellite image was taken in 2003.

Decompressing the data

This step may be done a number of different ways with numerous compatible programs. Usually the file format with which we are dealing with (*.tar.gz*) will require some type of decompressing software package, most of which can be found online for a free download. If you know you have a program specific to un-packaging/decompressing this file type, feel free to use the process you are familiar with in organizing the files. This section of the tutorial is designed for those not familiar with *.tar.gz* files, and learning the process to un-package/decompress them with a program known to work.

1. Download the program needed to decompress the files. Again, feel free to use what you are comfortable with, but if it is not able to manage *.tar.gz* files, WinZip is known to work and will be used for the rest of this tutorial.
 - a. To download WinZip, navigate your internet browser to the website (<http://www.winzip.com/download.htm>) and scroll down to the green “Download WinZip Now” button.
 - b. Click the “Download...” button and click save on the prompt shown.
 - c. Navigate to where you would like to save the program for current and future use.
 - d. Now, any file downloaded in a *.tar.gz* format will appear in your folder as a WinZip file and have an icon like the one selected below:

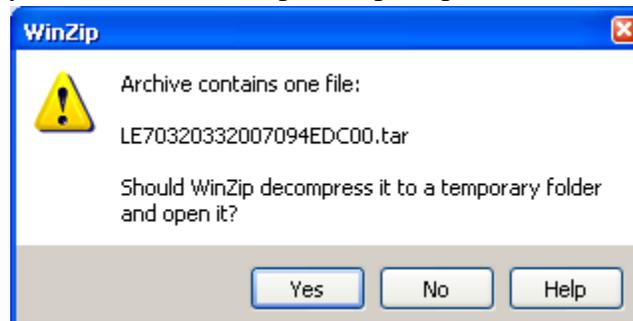


2. Extracting *.tar.gz* files is fairly simple once WinZip is downloaded.

Note: if at any time you are prompted with a WinZip window like the one below, click on the “Use Evaluation Version” instead of “Buy Now.” Clicking the evaluation version will allow you to use the functions of WinZip for free instead of paying for the software.



- a. Locate the downloaded Landsat data file (which should now be seen as a WinZip file with the WinZip icon next to it) within the data folder created previously.
- b. Highlight the file you want to extract and right click. Scroll down to the Winzip tab and select your extraction method. In my organizing, I like to separate each Landsat scene (single pair of *Path* and *Row* references) into individual folders so I choose the tab labeled *Extract to folder C:\ Doc...\ LE70320332007094EDC00.tar.gz*, and then I rename it later. If you did choose this option a prompt like this will appear:



Click “Yes” and the extraction will begin. The Extraction window may look similar to this:



- c. This will not necessarily apply to all, but if you chose the extraction method shown above, WinZip will go through two separate extractions, one immediately following the other.
- d. At the end of this extraction, you will have your original WinZip file directly next to a folder with the same name (If you used a different extraction method, you may need to navigate your workspace in order to locate it). This folder contains all of the extracted files from the original.
- e. It may be in your best interest to group the original with the extracted data in the new folder, or you may want to keep it in a different location. Either way, simply click and hold the original file, then drag it to its new location.
- f. Finally, you can rename the newly acquired folder something more simplistic. For example, I would rename the folder "*LE70320332007094EDC00.tar*" to *32-33*. This way I know which *Path* and *Row* the data within this folder belongs to. Organization like this is especially important when dealing with many different Landsat scenes from numerous time periods. Below is the organization of folders I use:

