QuickStart: SRTM Image Data

Welcome. If you just can't wait to start playing with the SRTM image data, or just don't have the patience for reading tedious documentation, you'll need to know at least the following. For more detail see SRTM_Image.doc.

All SRTM data are divided into tiles extending over 1° x 1° of latitude and longitude, in "geographic" projection. For the DEMs, data from every acquisition that crossed a tile were mosaicked and combined, so there is only one data file for each 1° tile. However for image data every data take that crossed a tile is included as a separate file (no mosaicking or combining has been done) and some files may contain only partial data. In addition, because of the SCANSAR technique involved, each SRTM swath was made up of four slightly overlapping subswaths. Data from each subswath is also included in a separate file, so every image pixel acquired by SRTM is included in this set.

There are two files for each subswath included in a tile:

.mag - radar image data
.inc – local incidence angle for each sample in the image file

Naming convention:

- As with the DEM files, the first 6 characters of each file name for image data indicate the geographic coordinates of the center of the lower left (southwest) sample of each file.
- For image files this is followed by 6 numbers that indicate the data take number, consisting of the orbit number followed by a serial number for that orbit.
- This is followed by a subswath number, which increases outward from the spacecraft nadir point, and is the key to the polarization for that subswath.

    o SS1 = subswath 1, HH polarization   approx 30° - 43° look angle.
    o SS2 = subswath 2, VV polarization   approx 44° - 52° look angle.
    o SS3 = subswath 3, VV polarization   approx 47° - 60° look angle.
    o SS4 = subswath 4, HH polarization   approx 52° - 62° look angle.

- Example: File N07W081_032_010_SS3_1_01.mag has its lower left sample centered on 7°N latitude, 81°W longitude, was the 10th data take on orbit 32, and includes data from subswath 3 indicating VV polarization.

Format:

- Both image and incidence angle files are sampled at 1 arc second of latitude and longitude (~ 30 meters at the equator), and are in geographic projection (AKA Plate Caree). Thus both files have 3601 samples and 3601 lines. Incidence angle files were first averaged to 3 arc seconds before sampling to 1 arc second.
- Image files are 8 bits/sample, with the values indicating radar cross section, or brightness, scaled linearly between -50 dB and +40 dB. Data numbers (DN) can be converted to backscatter cross section in dB using the expression $dB = 0.3529*DN - 50$
- Incidence angle files are 16 bits/sample, measured in hundredths of a degree (i.e. 4321 = 43.21°). The 2 bytes are in Motorola "big-endian" order with the most significant byte first, directly readable by systems such as Sun SPARC, Silicon Graphics and Macintosh. DEC Alpha and most PCs use Intel ("little-endian") order so byte-swapping may be necessary.