

# LANDSAT MONTHLY UPDATE

May 2003

The Landsat Program is managed by the U.S. Geological Survey under authority established by Presidential Decision Directive NSTC-3.

## Program News

### IGS Metadata

IGS metadata from Argentina, Australia, Brazil, Canada, China, Europe, Japan, and South Africa continue to be archived successfully. Bangkok, Thailand (BKT) resumed sending metadata to EDC on May 27, 2003. On May 28, Kiruna, Sweden (KIS) finished sending their historic metadata records to EDC for the years 1999 through 2001. We expect to receive similar metadata from Maspalomas, Spain (MPS) and Neustrelitz, Germany (NSG) very soon. As of May 31, 2003 there were 22,062 L7 IGS subintervals archived for 330,196 Landsat 7 Worldwide Reference System (WRS) scenes.

## Technical News

### Data Validation and Exchange

In the month of May, the Brazil and Thailand stations provided the USGS with L0Rp data for their biannual revalidations. The Brazil and Thailand L0Rp data were found to be of equivalent quality to the corresponding USGS L0Rp data.

Although Canada is not responsible to provide RCC data for validation or exchange purposes, they were successfully validated to be of equivalent quality to the USGS data. The USGS is now able to recover approximately five scenes that were lost at EDC due to a downlink anomaly. Thanks very much to the Beijing, China station for sending the USGS RCC data in support of anomaly investigations. These are excellent examples of the value of data validation and exchange.

The Landsat Archive Manager (LAM) 4.3.0 release will allow the USGS the capability to provide the IGS with subsetted RCC data on an operational basis. The IGS that provide the USGS with RCC data will receive subsetted data within their acquisition circle as part of the two-way validation process during the month of June.

Editor's note: From time to time, techniques in using Landsat data will be described in this update. The objective is to keep the science community aware of the possibilities Landsat offers. For more information about this example please contact Clyde Spencer of Bio-Geo-Recon ([bgr@jps.net](mailto:bgr@jps.net)).

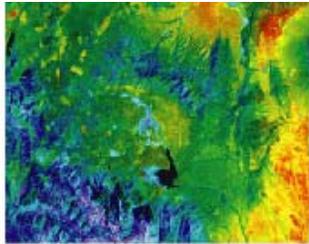
### Data Fusion Example

Landsat thermal imagery has produced coarse resolution. The resolution is nominally 120 meters per pixel with Landsat TM; while it has been improved to 60 meters per pixel with the ETM+ sensor, it is still twice as coarse as the other multispectral bands. This coarse resolution can be reduced with the example shown, using a variation on the "pan sharpening" approach.

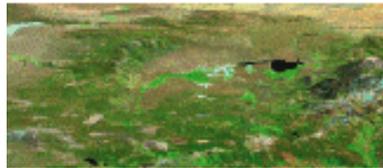
For this example, a Landsat 7 ETM+ data set (27 July 2000) of the central Sierra Nevada (California) was used. This had been re-sampled to 25 meters per pixel for the multispectral imagery, 50 meters per pixel for the thermal imagery, and projected to UTM zone 11 by the EROS Data Center. A region of interest (2500 X 2250 pixels) centered on Long Valley Caldera was cut out for all bands including the thermal band. However, the thermal band was first re-sampled with cubic convolution to the same resolution (25 m per pixel) as the other bands. A simulated natural-color image was composited from bands 7,4, and 2 (RGB) by visually adjusting the histograms to remove the magenta tones commonly observed in this combination. This was draped over a mosaicked DEM and is file "LV\_Caldera\_surface.JPG". This is looking East.

The thermal band (ETM+ band 6, low-gain) was converted from an 8-bit byte image to an inverse floating-point (FP) image with values from 0 to 360 (equivalent to degree angles), corresponding to the 'hue' image produced by the ENVI (RSI, Boulder, CO) software package's RGB to HSV color transform. The thermal band was also converted to a floating-point image with a range from 0.0 to 1.0, corresponding to the range of the ENVI 'saturation' image. The RGB to HSV transform was performed on the 7,4,2-band combination. Then, the inverse HSV to RGB transform was performed using the FP 'value' image produced, the 0-360 FP inverse-thermal image as the 'hue,' and the 0-1.0

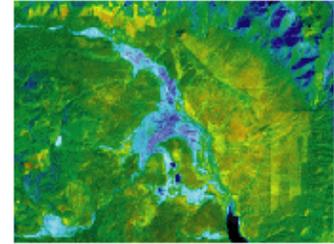
FP thermal image as the 'saturation' image. The resulting image was then stretched with a 2% linear stretch to improve the contrast and saturation for display. No corrections were made for elevation or emissivity. The first image (LV\_Caldera\_thermal1.JPG) is the final result, with a standard ROYGBIV rainbow-color range, with reds being hot and blues being cold. Water displays as black, regardless of temperature, and the snowfields along the crest of the Sierra Nevada show white. The temperatures are clearly modulated by elevation, although this affect could be removed easily if desired. What is interesting are the hot spots that are at the intermediate elevations, and are unremarkable in the simulated natural-color image - many of them correspond to well known hot springs. The detail on magnification is visually equivalent to the 7,4,2-band combination. File "LV\_Caldera\_thermal2.tif" is an 800 X 600 pixel, full-resolution area from the center of the caldera.



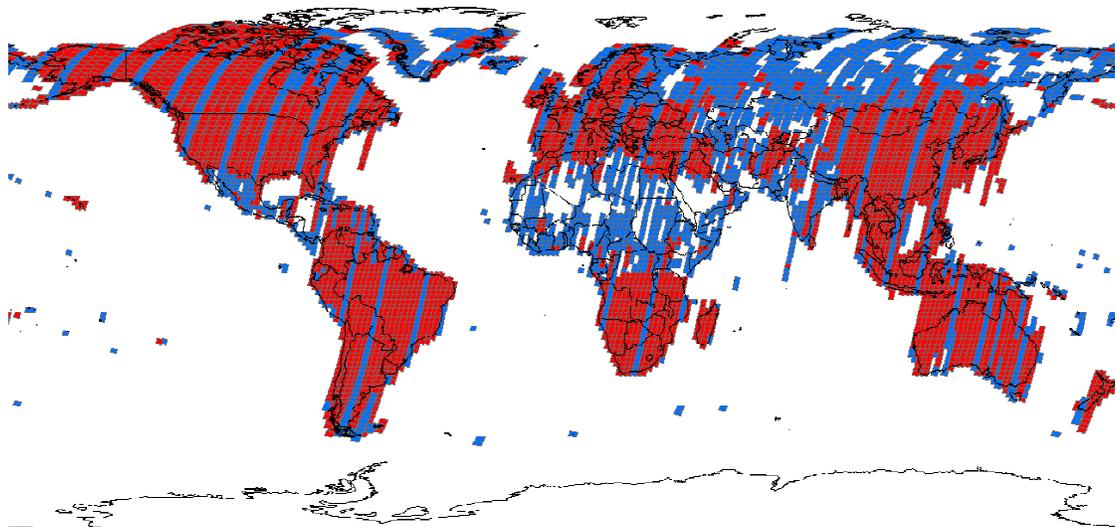
LV\_Caldera\_thermal1.jpg



LV\_Caldera\_surface.jpg



## Update on Landsat Acquisitions



Daytime full scenes acquired globally  
01 May 2003 through 31 May 2003

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## Meetings

### LGSOWG #32

The Landsat Ground Stations Operations Working Group (LGSOWG) #32 meeting is scheduled to be held in Hiroshima, Japan from October 13 - 17, 2003. The Hiroshima Institute of Technology, NASDA, HIT, RESTEC, and HEEIC will co-host the event. More information on meeting preparations and logistics will be coming out over the next several months.

The Landsat monthly update is an informal communication tool, prepared monthly and distributed electronically to USGS Landsat partners, to provide information about Landsat activities and related topics of interest. If you have any ideas, comments, corrections, or successes you would like to share with the Landsat community, please contact Ronald Beck, USGS Landsat team, at the following e-mail address: [beck@usgs.gov](mailto:beck@usgs.gov).

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