LANDSAT Update - Volume 2, Issue 1, 2008

USGS Data Search and Discovery Survey Reveals New Insights

In the last issue, we talked about the Landsat customer satisfaction survey and the satisfaction those respondents reported for the two primary data search tools that USGS EROS offers: Earth Explorer and GloVis. To delve further in to the "why's" of the customer satisfaction ratings, the USGS performed another, more focused survey of Earth Explorer and GloVis users.

Of the 231 people sampled in this data discovery survey, 119 of them provided useful responses, for a response rate of 53%. Eighty of the respondents (69%) reported preferring Earth Explorer and 28 (24%) reported preferring GloVis, but again, satisfaction ratings for GloVis overall were higher than those for Earth Explorer. In this survey, we asked a few more critical questions to help us discover why.

Why don't they use GloVis?
We asked the users who stated that they do not use GloVis to explain, in their own words, why they don't use it. We then categorized the written responses. There was an overwhelming similarity in many of the responses—it appears many users don't know GloVis exists. This could be a plausible explanation for the comparatively large usage rate of Earth Explorer.

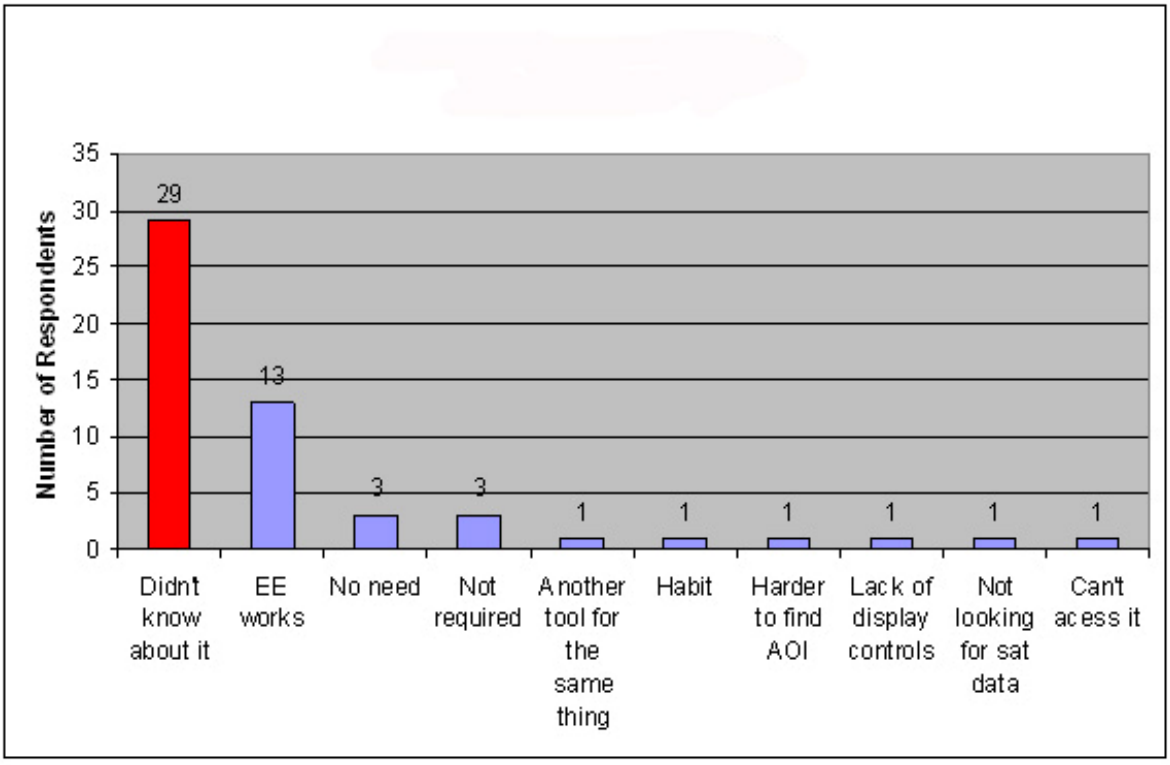

Figure 1. Why don't you use Glo Vis? (written responses)

Of course, GloVis is not helpful for seeking data that is only available in Earth Explorer, but it's definitely good for Landsat image searches (which was the original intent of the GloVis tool). The survey results show that of all the datasets available, over half (56) of Earth Explorer users use Earth Explorer to search for Landsat imagery.

What does this mean for users?
Landsat data users who have been using Earth Explorer may also want to give GloVis a try for their data searches and orders. It's a very visual way of finding Landsat data.

Results shown are as reported in the survey. Because of survey biases, they may not accurately reflect the opinion of Landsat users.

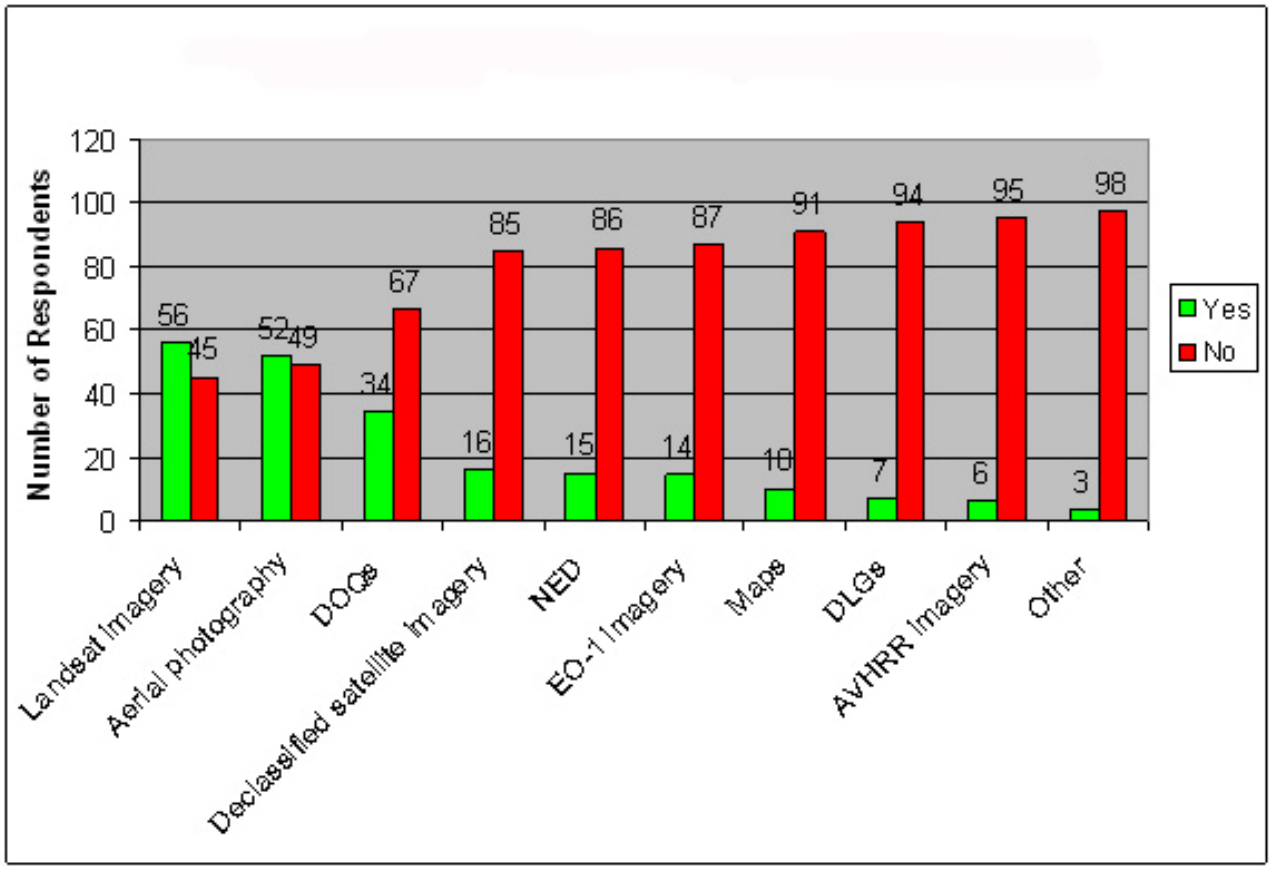

Figure 2. What types of data do you use EE to search for?

Sioux Falls...We Have a Problem

A satellite that has survived 8 times longer than its design life is bound to have a long history of miraculous recoveries. When Landsat 5 launched on March 1, 1984, expectations were high based on the success of the previous four missions. Since then, at least 22 different problems have surfaced (called anomalies), all of which have been overcome by redundant systems or ingenuity of the Flight Operations Teams. (For current information on the status of Landsat 5 please go to the Landsat homepage: http://landsat.usgs.gov/index.php)

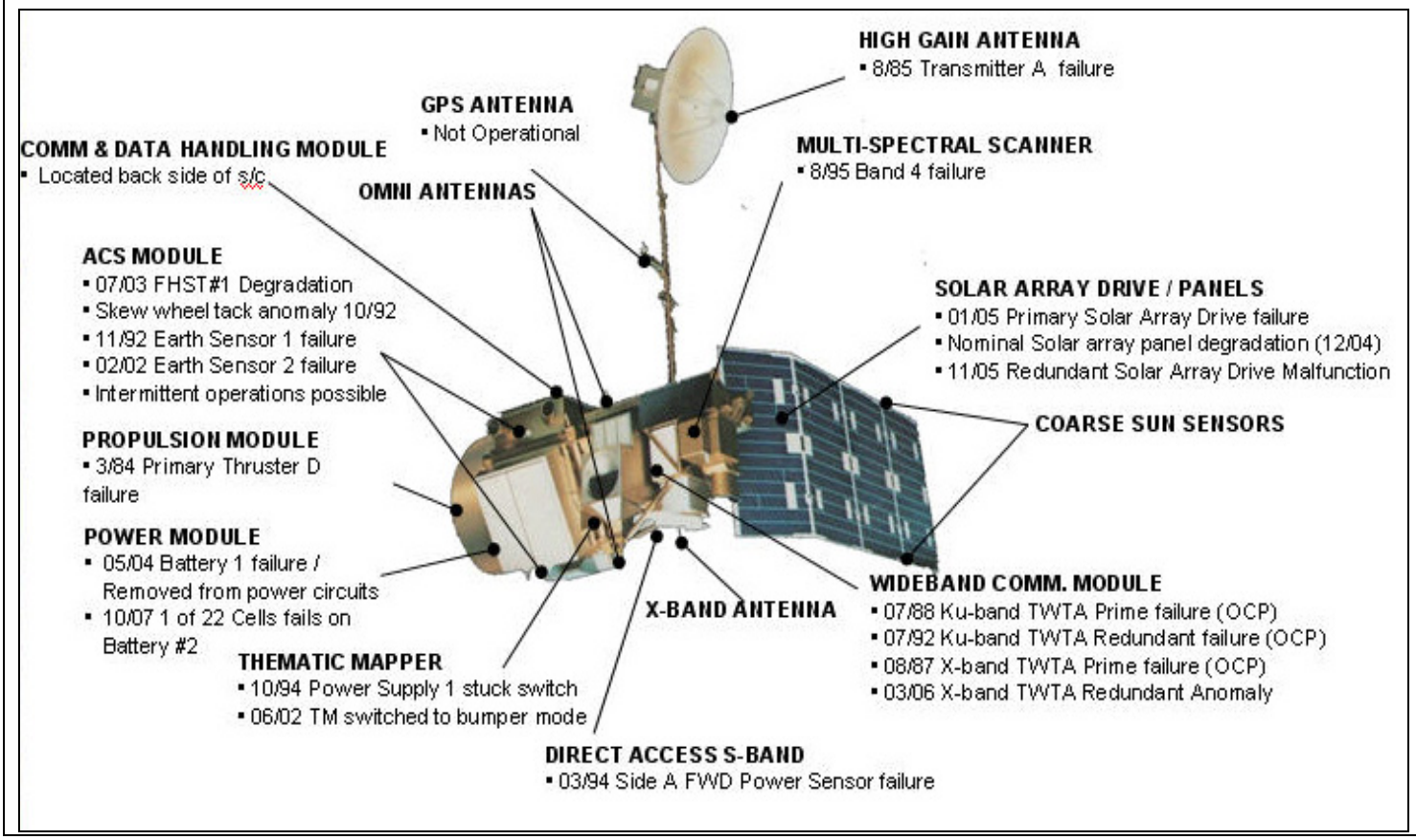

Figure 3. Landsat 5 Flight Segment anomalies

Landsat Spotlight

Martha Anderson

Figure 4. Martha Anderson, Ph.D.

Anderson is a **Research Physical Scientist** at the U.S. Department of Agriculture - Agricultural Research Service (USDA-ARS) Hydrology and Remote Sensing Laboratory in Beltsville, Maryland, USA.

Anderson's research focus includes water, energy and carbon flux mapping at field to continental scales using thermal remote sensing, drought monitoring and early detection based on land-surface temperature signals, remote sensing of soil moisture for assimilation into hydrologic and meteorological models, and studies on the effects of landscape heterogeneity on land-atmosphere interactions.

Anderson has been awarded a number of research grants, many associated with water fluxes and land surface energy, and surface soil moisture studies employing a number of satellite sensors and the data they produce. Her primary focus as a member of the Landsat Science Team is mapping drought and evapotranspiration, using Landsat and GOES thermal imagery.

The Global Land Survey (GLS) Dataset

The USGS Landsat Project is currently focused on a major effort to process and disseminate four global datasets, circa 1975, 1990, 2000, and 2005. The three oldest data collections are a reprocessing of the tri-decadal global Landsat orthorectified datasets that have been a standard in the community for many years. Improvements to geometric and topographic inputs, incorporate by MDA Federal, Inc., will result in a higher precision dataset, called the Global Land Survey (GLS), and will be identified by acquisition dates (GLS 1975, GLS 1990, and GLS 2000). As the reprocessing effort moves forward, a new dataset, the Global Land Survey (GLS 2005), will be completed. All new collections will be registered to the GLS 2000 dataset.

The North America portion of the GLS 2000 dataset will be released in the first quarter of 2008, and continental groups will follow (Africa, Eurasia, etc.). The GLS 2005 data will be released following the availability of the GLS 2000 data. The GLS 2005 is a mixed dataset that incorporated the best scenes from either the Landsat 5 Thematic Mapper (TM) or the Landsat 7 Enhanced Thematic Mapper Plus (ETM+). This new data collection will be completed by the end of 2008.

The partners for the Global Land Survey include NASA and the University of Maryland. For more information on the GLS 2005 dataset, please see http://mdgls.umd.edu/ or http://landsat.usgs.gov/project_facts/mid_decadal.php.

Did you know…?

Do-It-Yourself Gap-filling with SLC-off data – ERDAS Imagine
NOTE: References to non-USGS products do not constitute endorsement by the U.S. Government.

For many, Landsat 7 ETM+ SLC-off data has been difficult to use due to a hardware failure that results in 22 percent of the data missing from each scene. The Landsat Project has developed several products that can minimize the gaps. The most popular is the "off-to-off" product that takes two (or more) ETM+ scenes, radiometrically matches them, and then combines them for more complete coverage. Now that the Landsat Project is distributing orthorectified data at no charge, users can combine their own scenes with Commercial-off-the-Shelf software. Below, the directions for combining scenes in the Leica Systems ERDAS Image program are described. No-charge SLC-off data can be found at Earth Explorer (Landsat Standard L1T dataset) and GloVis (found under Landsat Science > SLC-off Std L1T).

Use model-maker to add each band in Image 1 to the corresponding band in Image 2. The following statement says:
Where Image 1 > 0, use Image 1 data, Otherwise, use Image 2. Image 2 data will fill the gaps in Image 1.

Use the following syntax (this example is for Band 5) in the model:
EITHER $n1_l71015033_03320070515_b50 IF ($n1_l71015033_03320070515_b50 > 0) OR
$n2_l71015033_03320070531_b50 OTHERWISE

Then you can layer stack, or leave the files as individual bands. Note: these directions do not include radiometric matching.

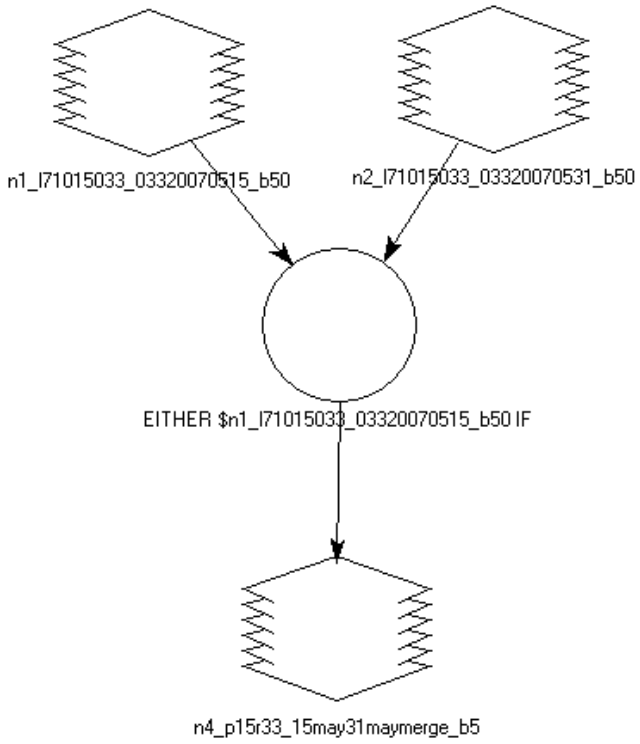

Figure 5. Combining scenes in Leica Systems ERDAS Imagine

While still having a small residual gap, the image below is two scenes combined (without histogram correction applied).

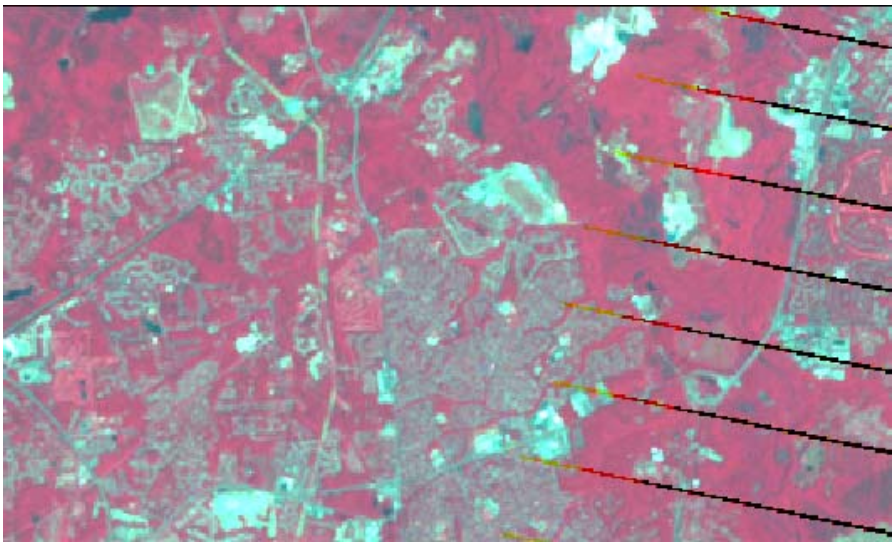

Figure 6. Combined scenes without histogram correction

Landsat Images for your Homepage

If you are not familiar with gadgets, they are mini-web applications that run on any web page or on your iGoogle homepage. Our gadget features beautiful images of our earth from the **USGS EROS Earth as Art** gallery and allows you to download the full-resolution, full-color jpeg (JPG) image right from the gadget. You can also rotate through the image gallery using the arrows. A new image will load every time you visit the page.

All you need to do is click on either (or both) of these links to get started:

- **Add it to your web page or blog:**

http://gmodules.com/ig/creator?synd=open&url=http://landsat.usgs.gov/gadget/earthasart.xml

- **Add it to your iGoogle page:**

http://www.google.com/ig/adde?source=ignsrc1&moduleurl=http%3A//landsat.usgs.gov/gadget/earthasart.xml

Figure 7. Earth as Art Google Gadget

High Elevation

Salar de Uyuni is the world's largest salt flat, located in Bolivia. It comprises over 12,000 sq km in the Potosi region and is at an elevation of 3,653 meters.

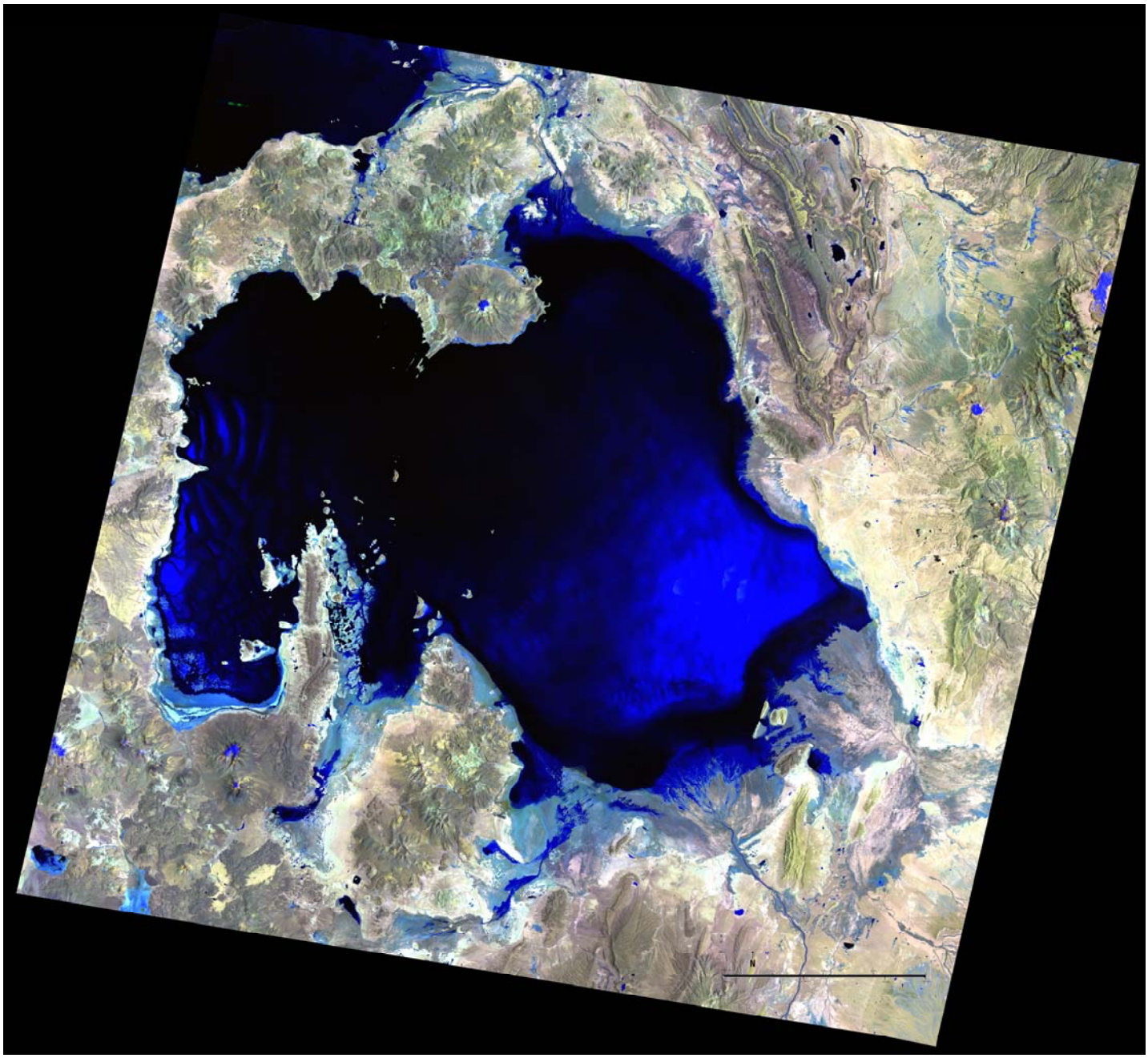

Figure 8. Bands 7,5,4. Landsat 5, January 31, 1987. Path 233/Row 74.

When the huge prehistoric salt lake Lago Minchín, which used to cover all of southern Bolivia, began to dry up, it left several small lakes behind – along with several huge salt pans. Perhaps the most incredible of these is the Salar de Uyuni.

The Salar de Uyuni has salt over 10 meters thick in the center, and supports surface water in portions through much of the year. Islands rise out of it, rocky and covered in cactus, surrounded by salt as far as the eye can see. It has 'ojos', which are deep holes in the salt pan where water circulates to the surface of the salt.

These two Landsat 5 images demonstrate the ways in which minerals appear differently with different spectral band combinations.

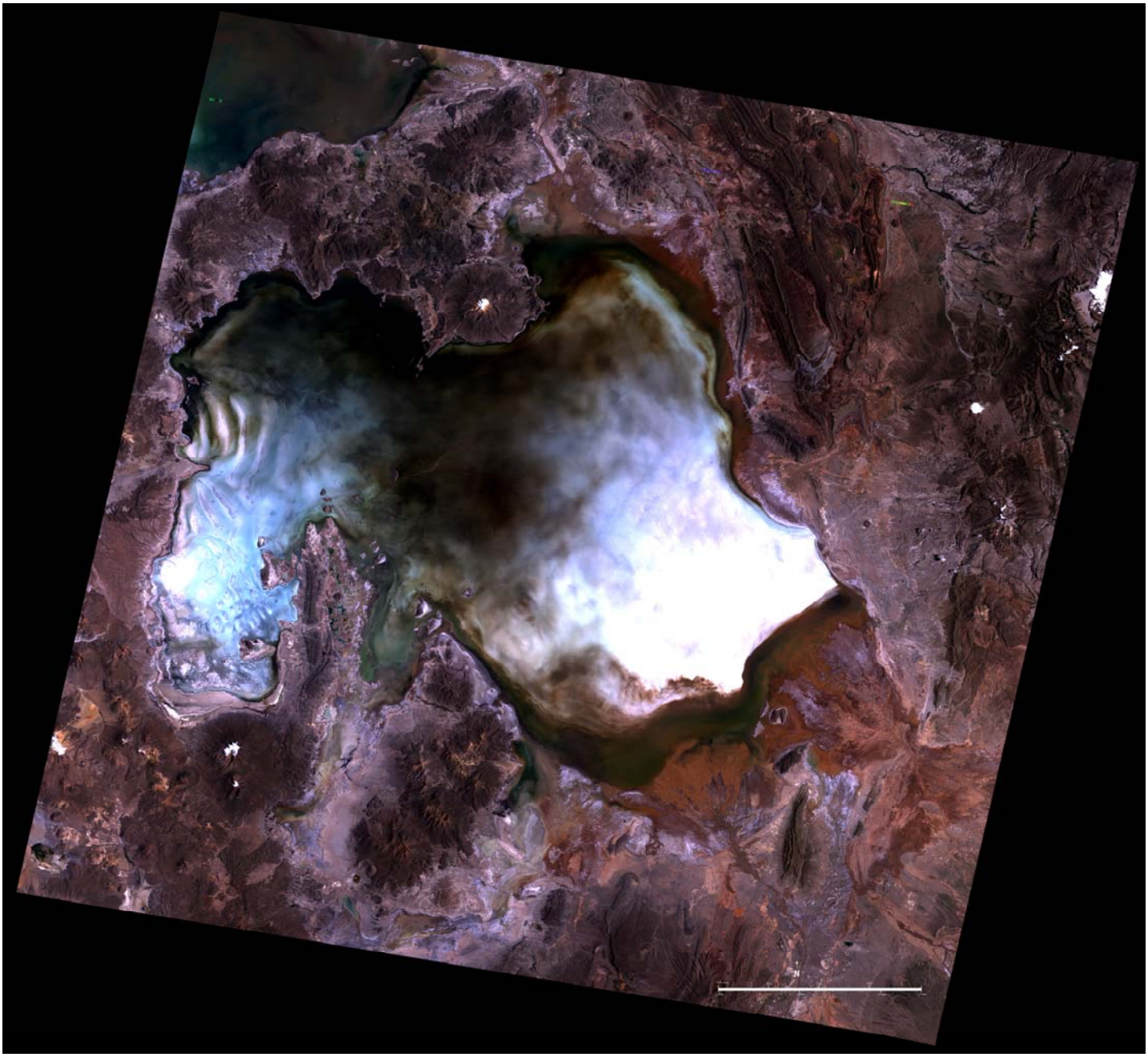

Figure 9. Bands 3,2,1. Landsat 5, January 31, 1987. Path 233/Row 74.

USGS at the Association of American Geographers Conference

Booth # 321

April 15 – 19, 2008

4443 Advancing the Landsat Mission I

Scheduled on Friday, 4/18/08, from 2:30 PM - 4:10 PM

Sponsorship(s):
Remote Sensing Specialty Group

2:30 PM **Author(s):** Curtis E Woodcock - Department of Geography and Environment, Boston University
Title: *Using Landsat to write the history of the surface of Earth: A research agenda*

2:50 PM **Author(s):** Rachel Headley - United States Geological Survey
Kristi Kline - USGS
Title: *The Landsat Project: New Products, Activities, and No-Charge Data*

3:10 PM **Author(s):** Michael Headley - USGS
Title: *The Landsat Data Continuity Mission: Development Status and Product Plans*

3:30 PM **Author(s):** Jeffrey G Masek - NASA GSFC
Rachel Headley - USGS EROS
Steven J Covington - USGS / The Aerospace Corporation
Title: *The Global Land Survey 2005 Project*

3:50 PM **Author(s):** Bruce Quirk - United States Geological Survey
Title: *The National Land Imaging Program*

4543 Advancing the Landsat Mission II

Scheduled on Friday, 4/18/08, from 4:40 PM - 6:20 PM

Sponsorship(s):
Remote Sensing Specialty Group

4:40 PM **Author(s):** Shannon Franks - University of Maryland - College Park
Jeffrey Masek - NASA GSFC
Steve Covington - USGS
Title: *Large Area Scene Selection Interface (LASSI). The methodology used to select scenes for the Global Land Survey 2005*

5:00 PM **Author(s):** Robert Bindschadler - NASA
Douglas Binnie - USGS
Adrian Fox - British Antarctic Survey
Andrew Fleming - British Antarctic Survey
Patricia Vornberger - SAIC
Jerry Mullins - USGS
Title: *The new Landsat Image Mosaic of Antarctica; A part of your world you've never seen before*

5:20 PM **Author(s):** Jim Vogelmann - SAIC
Zhi-liang Zhu - US Forest Service
Susan K Maxwell - SAIC
Title: *Monitoring Long Term Trends in Forest Condition in the Southwestern United States using Multitemporal Landsat Data*

5:40 PM **Author(s):** Chengquan Huang - University of Maryland
Zhiliang Zhu - USDA Forest Service
Hua Shi - SAIC
Samuel N Goward - University of Maryland
John R.G. Townshend - University of Maryland
Title: *An assessment of forest disturbance and regrowth in Mississippi and Alabama using time series stacks of Landsat observations acquired since 1984*

6:00 PM **Author(s):** Samuel N. Goward - University of Maryland
Darrel L. Williams - NASA Goddard Space Flight Center
Andrew Macatee - University of Maryland
Title: *Cloud Contamination in Landsat Imagery: Current and Future Possible Solutions*