



*Long Term Ecological Research
Network Office*

Remote Sensing Data for Field Station Research

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LTER Site Web servers

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Research

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LTER Remote Sensing and Geographic Information System/Technology

The LTER Network uses Remote Sensing and Geographic Information System technologies extensively in its research activities. This page provides information and links to this activity at the LTER sites and LTER Network Office within the LTER Program.

Remote Sensing and GIS

Remote Sensing Data and Collaborations:

- [Satellite Image Data of LTER Sites](#)
- The [LTER Spatial Data Workbench](#), containing browse images of data.
- [Remote Sensing, GIS and Technological Coordination Background](#)
- [LTER-NASA Collaboration](#)
- [LTER General Site Geographic and Landsat WRS coordinates](#)
- [LTER GPS Information](#)
- [MODIS Subsets for LTER Sites](#)
- [International Space Station Photography of LTER Sites](#)
- [Global Fiducial Library \(GFL\) Reconnaissance Imagery](#) for LTER sites

LTER GIS Working Group:

- Report of the 2003 All Scientists Meeting Workshop: [Information Technology for the Decade of Synthesis: Accessing Remote Sensing and GIS Data Through Web Services and 3D Visualization](#)
- [LTER 2002 GIS Working Group Meeting notes](#) related to LTER Network Information System development

Links and information for ecological research:

- NASA's Aerosol Robotic Network ([AERONET](#))
- USDA [UVB Monitoring Program](#)
- Microsoft's "Terraserver" - [Satellite Image Server](#)
- The "Terra Fly Server" developed at Florida International University
- The NASA "World Wind" A "Planetary visualization tool"

For further information, please contact [John Vande Castle](#), Associate Director for Technology Development, U.S. LTER Network Office



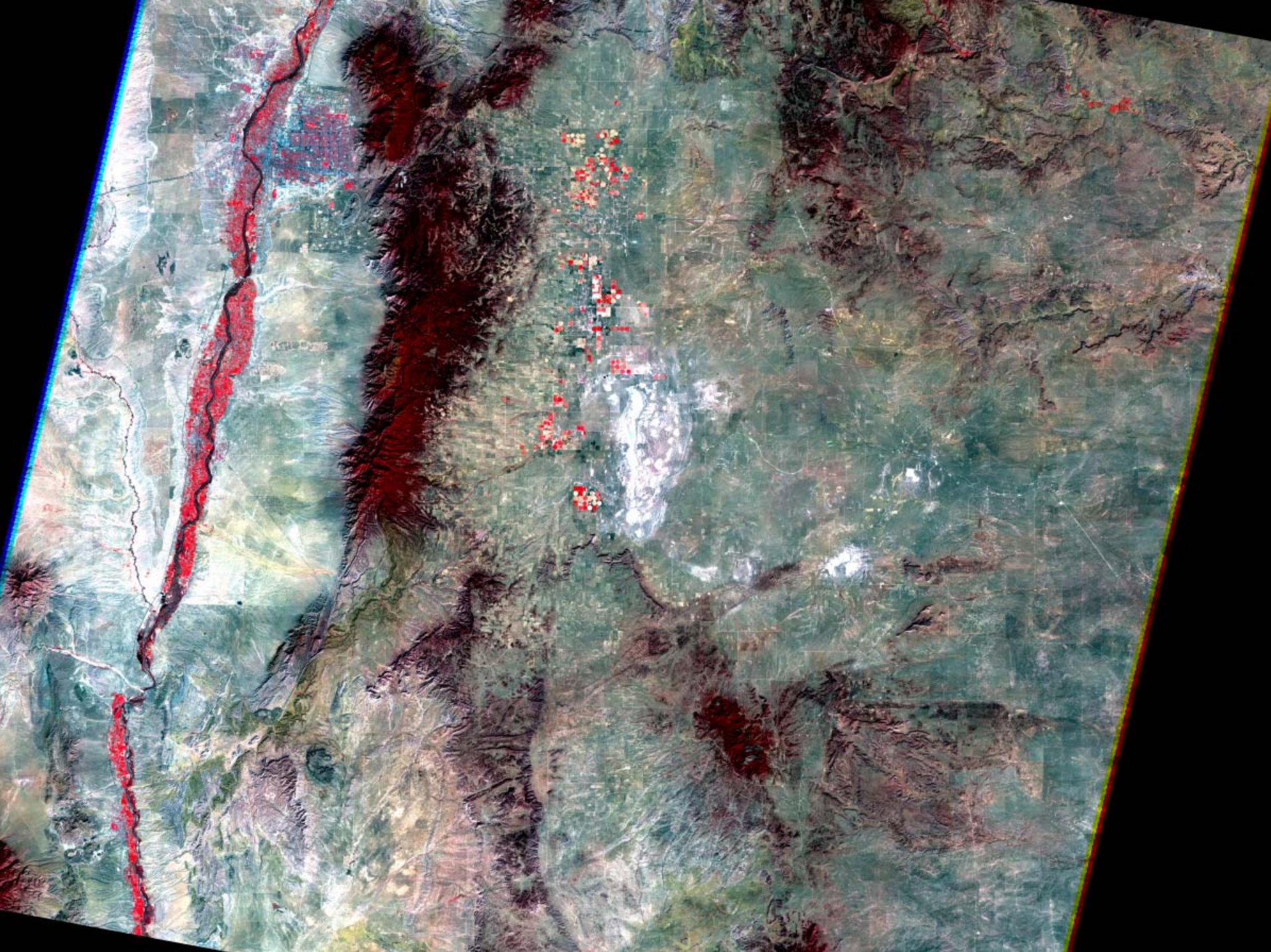
LTER Network Spatial Data Workbench Browse Images

1. H.J. Andrews Experimental Forest (AND), *Blue River, Oregon*
 - ◊ AVIRIS (individual browse images not available)
 - ◊ [SPOT](#)
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
2. Arctic Tundra (ARC), *Toolik Lake, Brooks Range, Alaska*
 - ◊ [SPOT](#)
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
3. Baltimore Ecosystem Study (BES), *Baltimore, Maryland*
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
4. Bonanza Creek Experimental Forest (BNZ), *Fairbanks, Alaska*
 - ◊ [SPOT](#)
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
5. Central Arizona (CAP), *Phoenix, Arizona*
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
6. Cedar Creek Natural History Area, (CDR) *50km north of Minneapolis, Minnesota*
 - ◊ [SPOT](#)
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
7. Coweeta Hydrologic Laboratory (CWT), *Otto, North Carolina*
 - ◊ [ADAR](#)
 - ◊ [SPOT](#)
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
8. Florida Coastal Everglades (FCE), *west of Miami, Florida*
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
9. Georgia Coastal Ecosystems (GCE), *Sapelo Island, Georgia*
 - ◊ [TM - Landsat Thematic Mapper](#)
 - ◊ MODIS (individual browse images not available)
10. Harvard Forest (HFR), *Petersham, Massachusetts*
 - ◊ AVIRIS (individual browse images not available)

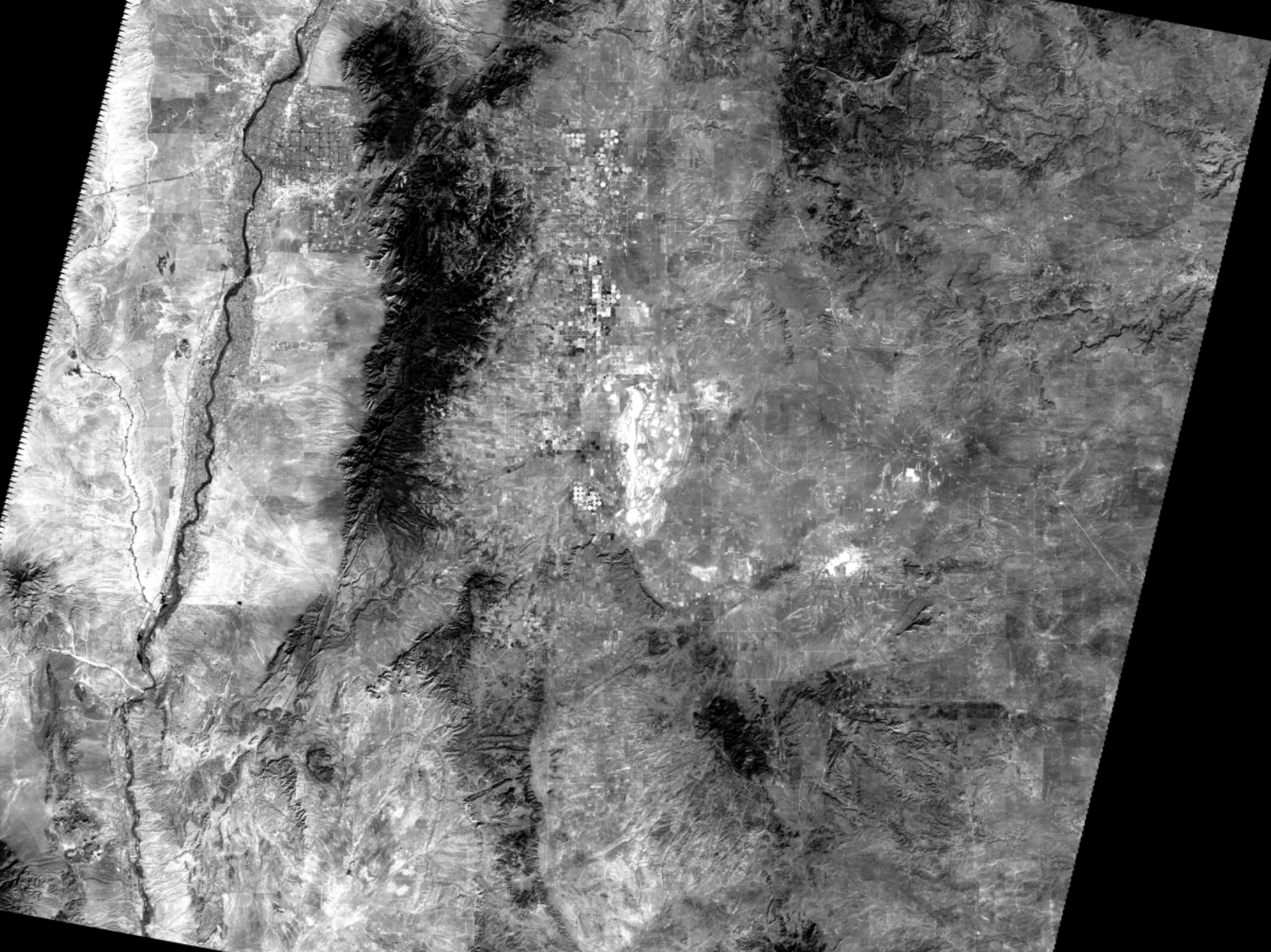
LTER Remote Sensing Data Archive

[Data Access](#)

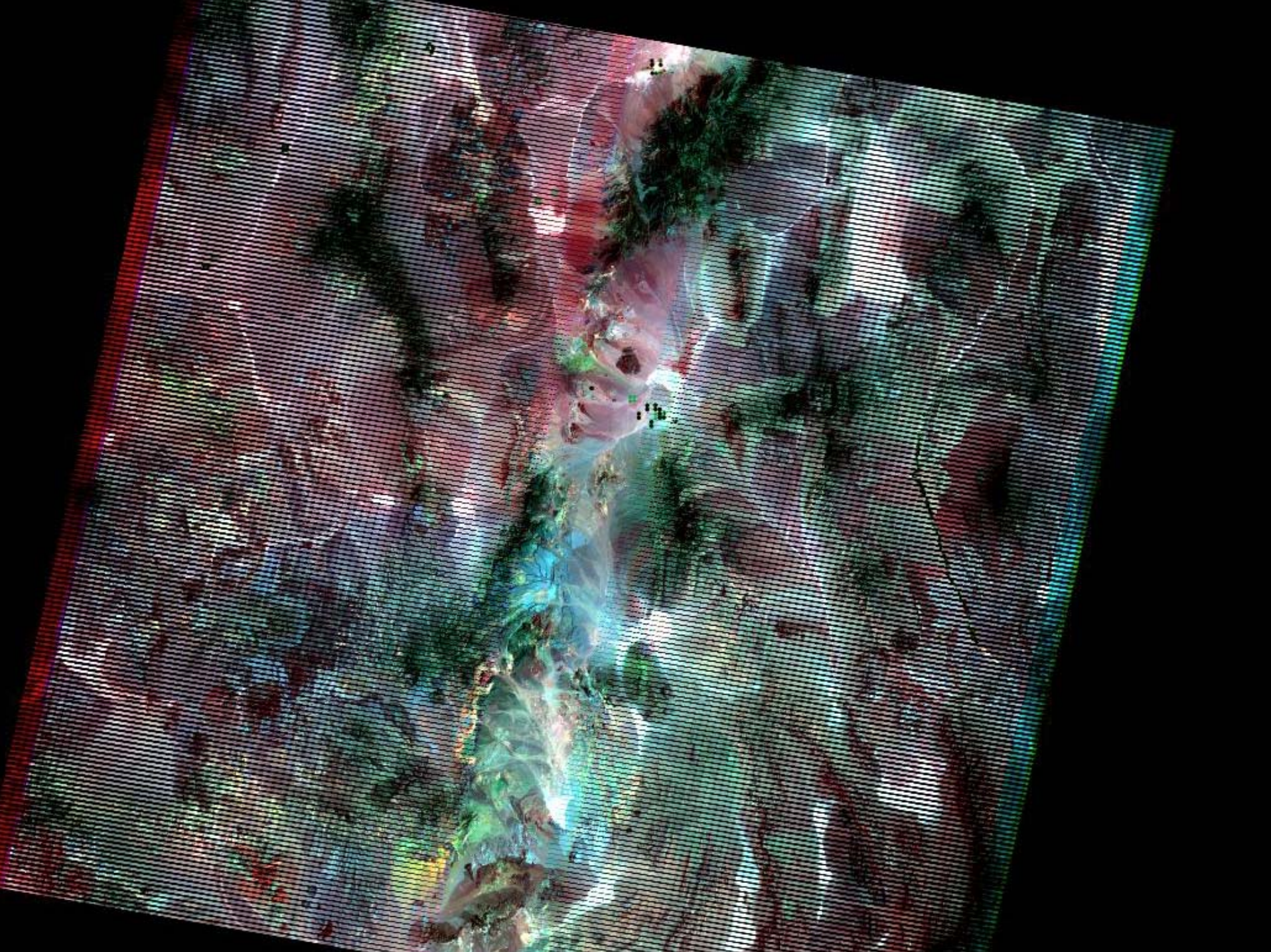


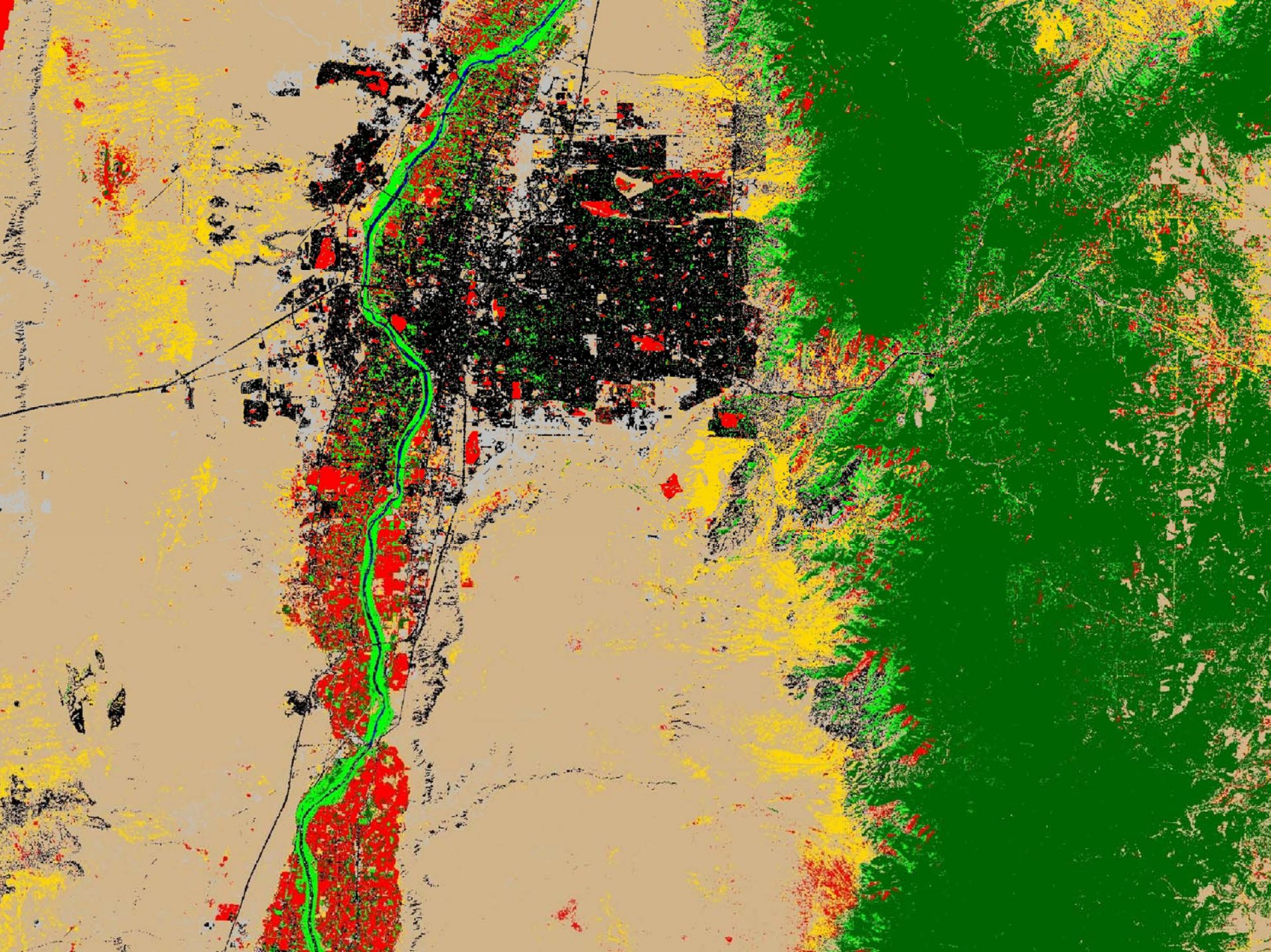


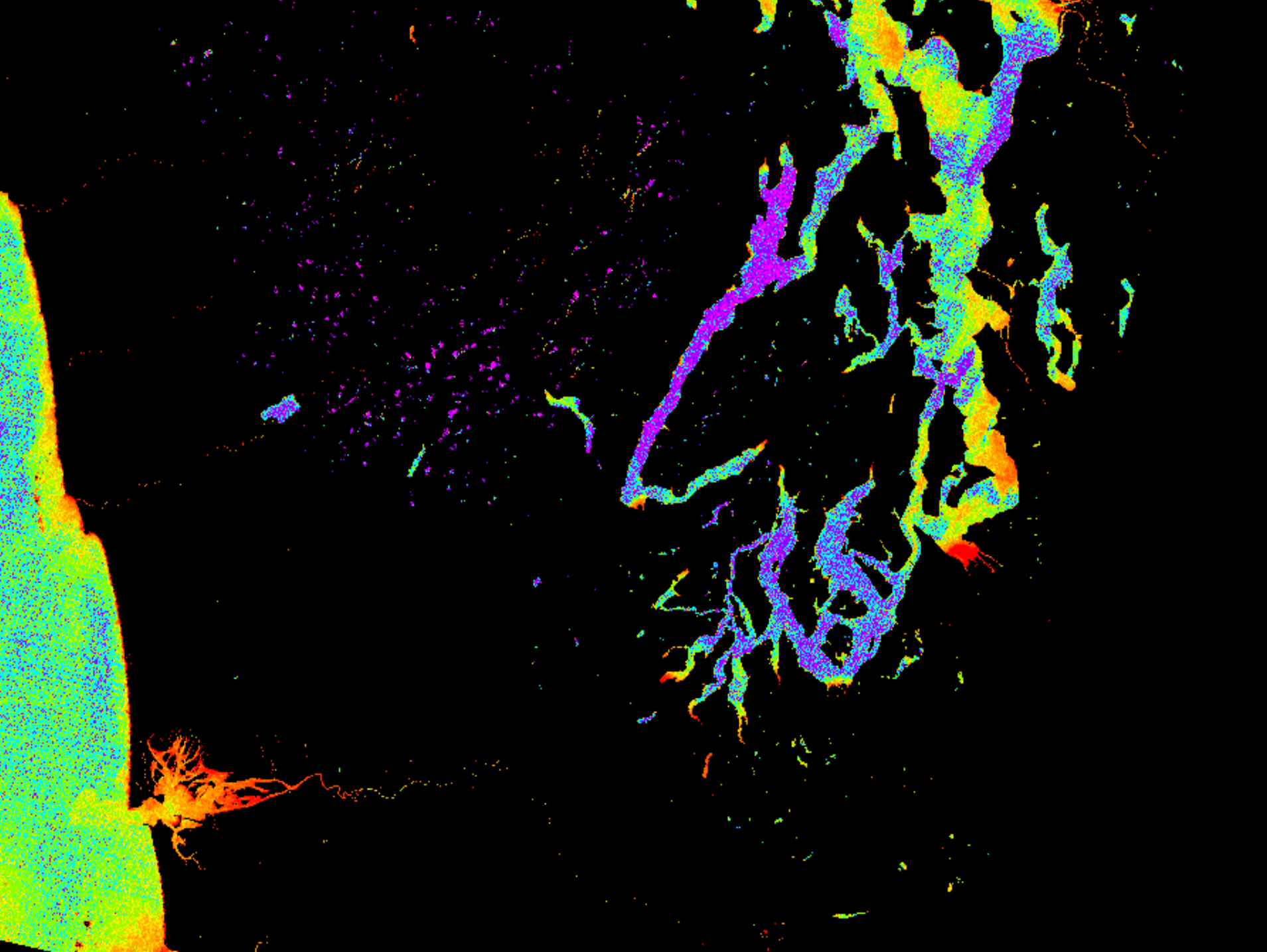










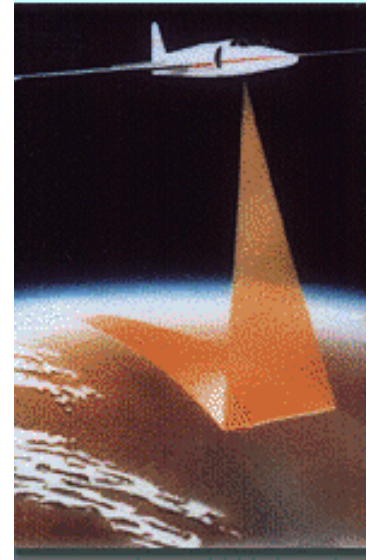


AVIRIS data

- Airborne, ER-2 or Twin Otter
- Spatial resolution: 30 meters
& 3 meters

Spatial Extent:-60km or 6km

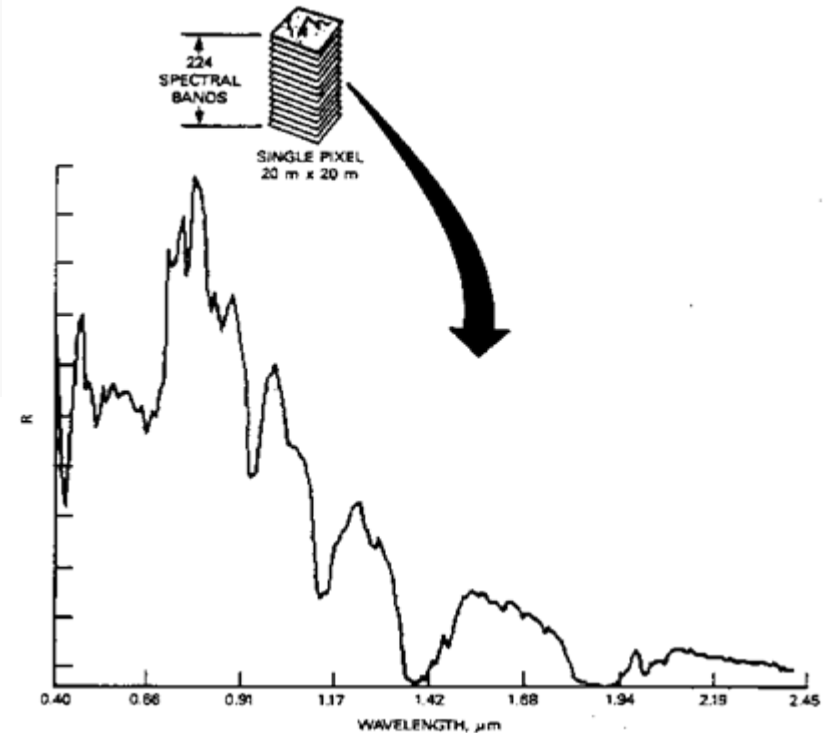
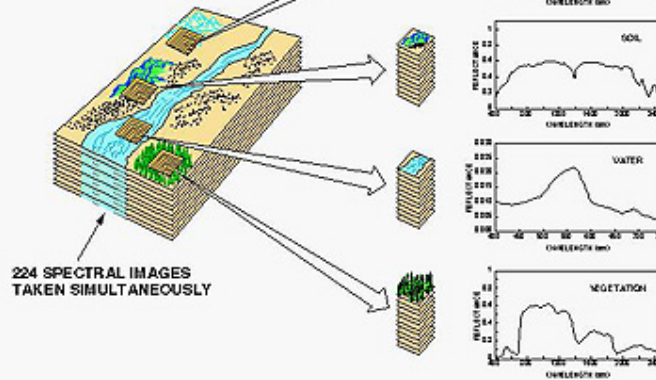
- Hyperspectral: 224 bands
Visible and infrared wavelengths
- Forerunner to EOS
Hyperion (HSI) instrument



JPL

AVIRIS CONCEPT

EACH SPATIAL ELEMENT HAS A CONTINUOUS SPECTRUM THAT IS USED TO ANALYZE THE SURFACE AND ATMOSPHERE



**AVIRIS hyperspectral data cube
> 50 gigabytes of raw data per acquisition**

Multiple sites and multiple dates of acquisition => LOTS of data!



LTER Spatial Data Workbench Browse Website

Long Term Ecological Research Network - Netscape 6

File Edit View Search Go Bookmarks Tasks Help

http://www.lternet.edu/technology/sdw/sev/aviris/Sev20001025.html

Home My Netscape Search Shop Bookmarks Net2Phone Free AOL & Unli... Instant Message WebMail Radio People Yellow Pages Download Calendar Channels

My Sidebar Tabs

- News
- Stocks
- Bookmarks...
- Search

using Netscape Search

Search Results

LTER The US Long Term Ecological Research Network

AVIRIS Browse Files

Sevilleta

f001025t01p03_r01v1.jpg	f001025t01p03_r02v1.jpg	f001025t01p03_r03v1.jpg	f001025t01p03_r04v1.jpg	f001025t01p03_r05v1.jpg
300.45 Kb	299.60 Kb	207.37 Kb	285.12 Kb	243.53 Kb

Clickable map:

Sevilleta

Document: Done (0.941 secs)

Start | Inbox for dp... | Long Term ... | sci2002 | Sci2002.ppt | InQ | LView Pro 2.6 | 1:59 PM




Mozilla Firefox


File Edit View Go Bookmarks Tools Help

http://metacat.nceas.ucsb.edu/knb/servlet/metacat

Go knb metacat

 **Biocomplexity Data Search** Home

search for data on the KNB

 **You ARE logged in (Logout).** You may search the KNB without being logged into your account, but will have access only to "public" data (see "login & registration")

Enter a search phrase (e.g. biodiversity) to search for data sets in the KNB, or click "advanced search " to enter more-detailed search criteria, or simply browse by category using the links below.

» advanced search «

Taxonomy
Amphibian, Bird, Fish, Fungus, Invertebrate, Mammal, Microbe, Plant, Reptile, Virus

Level of Organization
Molecule, Cell, Organism, Population, Community, Landscape, Ecosystem, Global

Ecology
Biodiversity, Competition, Decomposition, Disturbance, Endangered Species, Herbivory, Invasive Species, Nutrient Cycling, Parasitism, Population Dynamics, Predation, Productivity, Succession, Symbiosis, Trophic Dynamics

Measurements
Biomass, Carbon, Chlorophyll, GIS, Nitrate, Nutrients, Precipitation, Temperature, Radiation, Weather

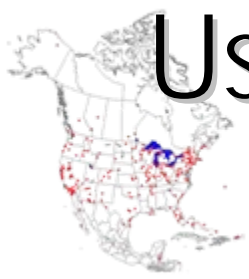
Evolution
Adaptation, Evolution, Extinction, Genetics, Mutation, Selection, Speciation, Survival

Habitat
Alpine, Freshwater, Benthic, Desert, Estuary, Forest, Grassland, Marine, Montane, Terrestrial, Tundra, Urban, Wetland

Data Access

182 data packages found

Title	Contacts	Organization	Keywords
» archive-lter-and-tm-19880723	Vande Castle	LTER Network Office	remote sensing imagery spatial raster earth observation satellite data LTER LandsatTM (Landsat Thematic Mapper) Andrews (AND)
ID: knb-lter-lno.8.1			
» archive-lter-and-tm-19910707	Vande Castle	LTER Network Office	remote sensing imagery spatial raster earth observation satellite data LTER LandsatTM (Landsat Thematic Mapper)
ID: knb-lter-lno.9.1			



Use of Data Archive “Partners”

- Global Fiducial Library Data (USGS)
 - Very High Resolution Reconnaissance Data
- International Space Station Photography (NASA / JSFC)
 - Aerial Photography of LTER sites (event capture)
- MODIS Subset data (NASA / ORNL DAAC)
 - 7x7 km Reflectance, NDVI, EVI, Land Classification





The US Long Term Ecological Research Network

Related Links

[Background collaboration information and current status](#)

GFL example data and background information as a [Web \(html\)](#) and [PowerPoint](#)

Example of GFL data use - presentation of Bruce Hayden ([Web/html](#) and - [PowerPoint formats](#))

Current [LTER GLF Site Surveys](#) prepared by LTER sites used for data acquisition and the [original 1996 GFL list](#)

[Example declassified GFL image](#) (this is a 2.5 mb jpg subset image)

LTER [Spatial Data Workbench](#) image browse page

LTER Medea/Global Fiducial Library (GFL) - Reconnaissance imagery of LTER Sites

The Global Fiducial Program, or Library (GFL) resulted from a National Research Council panel recommending data for a global network of fiducial sites as a tool to address global issues to include, but not limited to sea-level change, tectonic plate motion and other global change issues. With the approval of the LTER Coordinating Committee in 1996, the LTER Network Office has worked to register all LTER sites as GFL targets to enable operational collection of GFL data. Although historic data is publicly available with the declassification of some past intelligence satellite data, although access to current data requires proper security clearance. One other organized group of GFL sites is from the [National Park Service](#). The GFL data are maintained by the USGS.



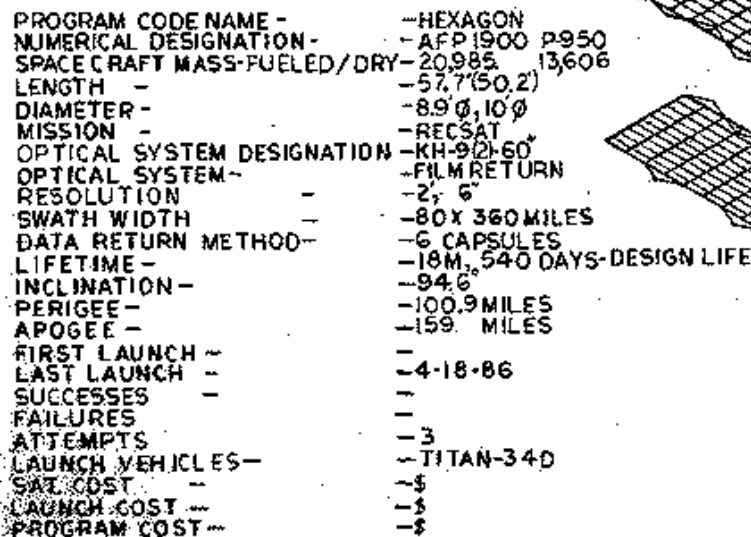
For more information, contact [John Vande Castle](#),
LTER Network Office

[Home](#) | [LTER](#) | [BACK](#) - Copyright 2005 Long Term Ecological Research Network -

This material is based upon work supported by the [National Science Foundation](#) under Cooperative Agreement [#DEB-0236154](#). Any opinions, findings, conclusions, or recommendations expressed in the material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

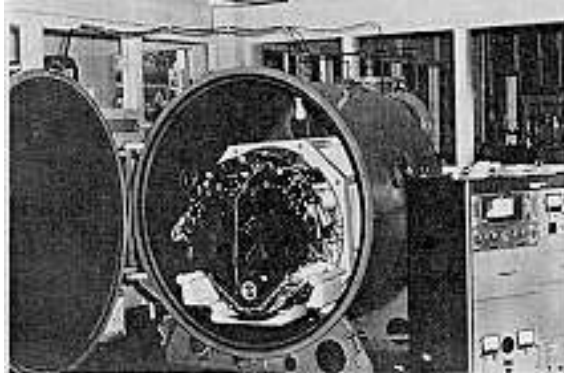
Please [contact us](#) with questions, comments, or for technical assistance regarding this web site.

BIG BIRD

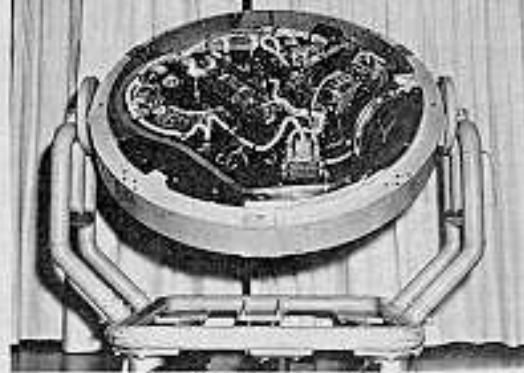


CONTRACTORS -LOCKHEED -SYSTEMS

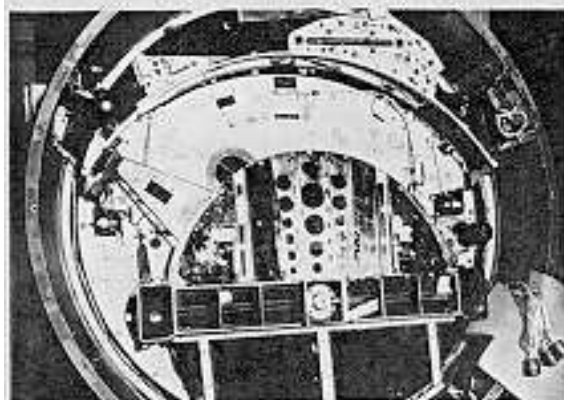
© C.P. VICK 1996



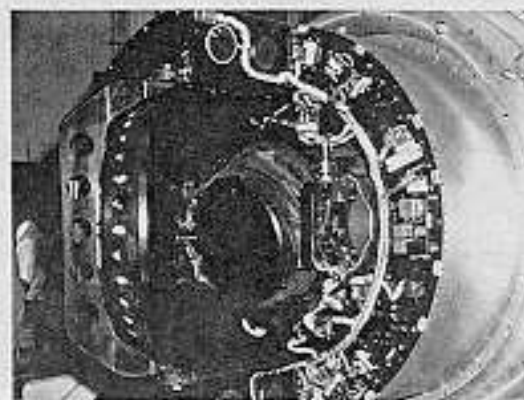
The Original CORONA (C)



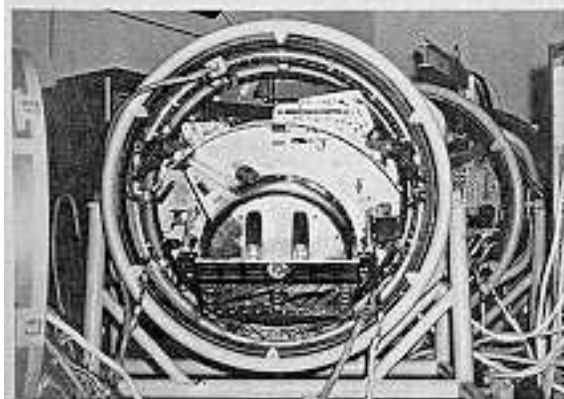
The ARGON (A)



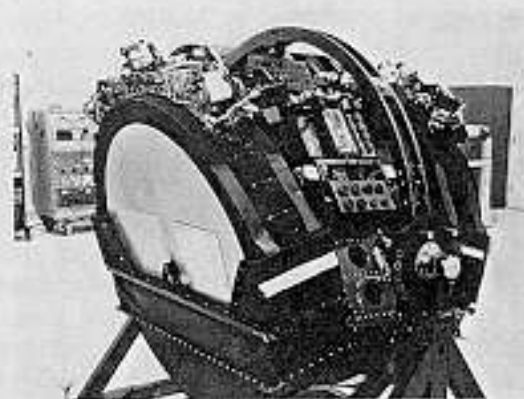
The Mural (M)



The LANYARD (L)



The J-1

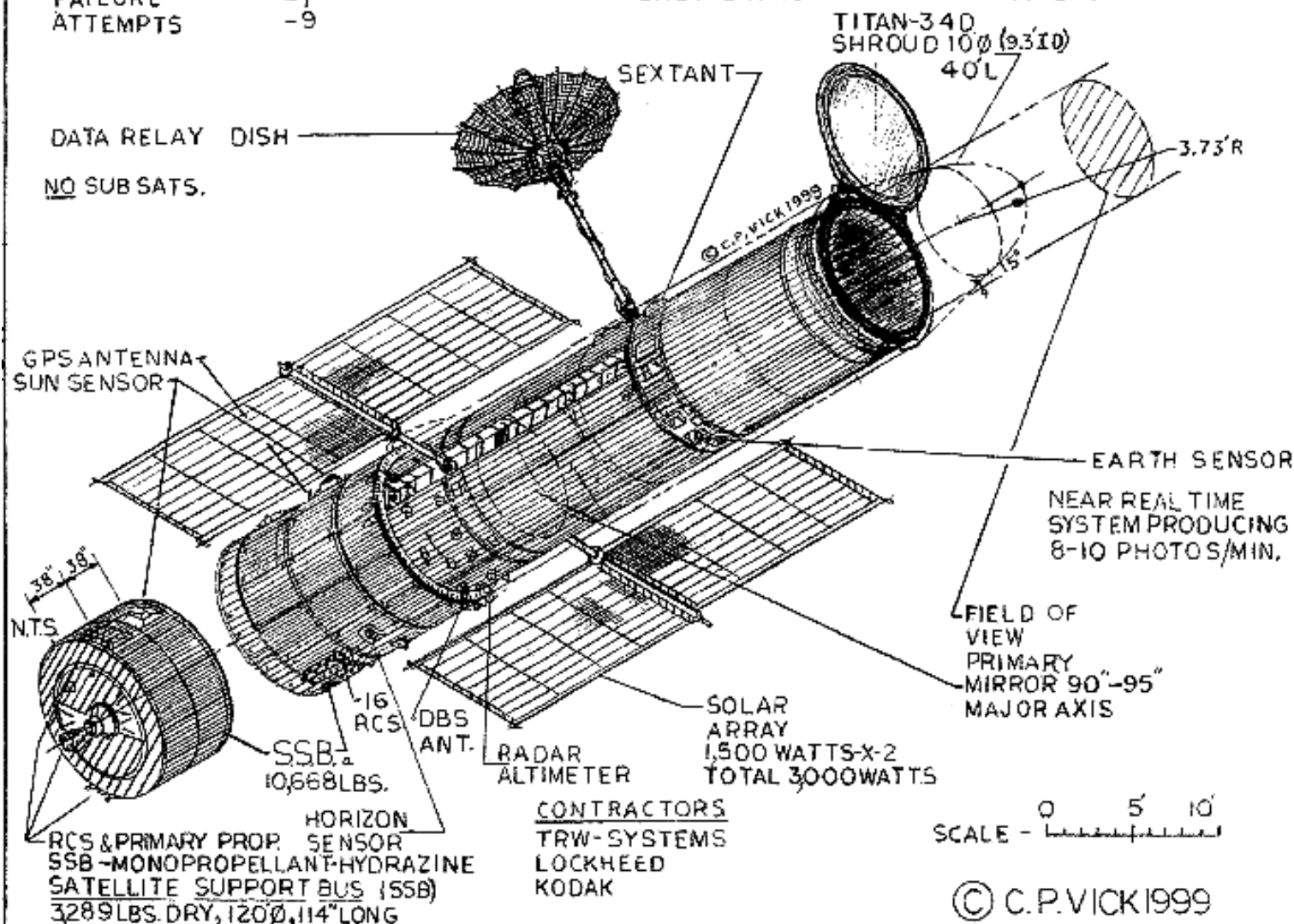


The Constant Rotator or J-3

LAUNCH COST -
 SAT. COST -
 PROGRAM COST -
 PROGRAM CODE NAME -KENNAN, CRYSTAL
 NUMERICAL DESIGNATION-AFP-1010,5500
 SPACECRAFT MASS 13289 D, 20,668-29,760 LBS
 LENGTH -43.17'
 DIAMETER -8.94-9.310'
 MISSION -RECSAT.
 OPTICAL SYSTEM DESIGNATION -KH-11
 LAUNCH VEHICLE -TITAN 3D,34D
 SUCCESSES -8
 FAILURE -1
 ATTEMPTS -9

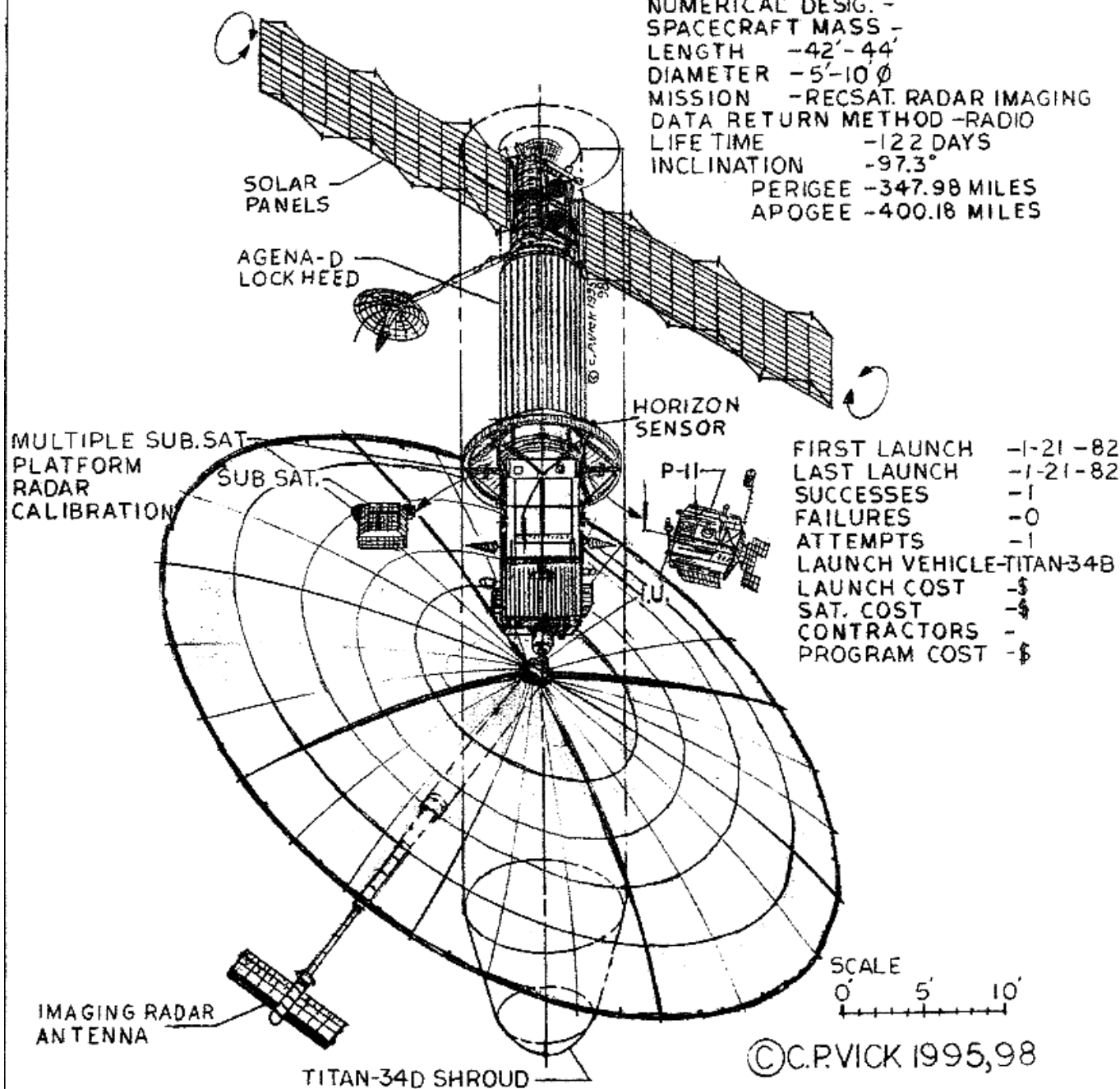
KH-11, KENNAN CRYSTAL

OPTICAL SYSTEM
 RESOLUTION - CCD, ELECTRO-OPTICAL
 SWATH WIDTH - 5.61"-3.937"
 DATA RETURN METHOD - N/A
 LIFETIME - DIGITAL, RELAY SAT.
 INCLINATION - 1053 DAYS
 PERIGEE - 97.1°
 APOGEE - 161
 FIRST LAUNCH - 377
 LAST LAUNCH - 12-19-76
 - 11-6-88



INDIGO

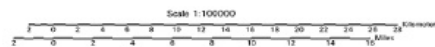
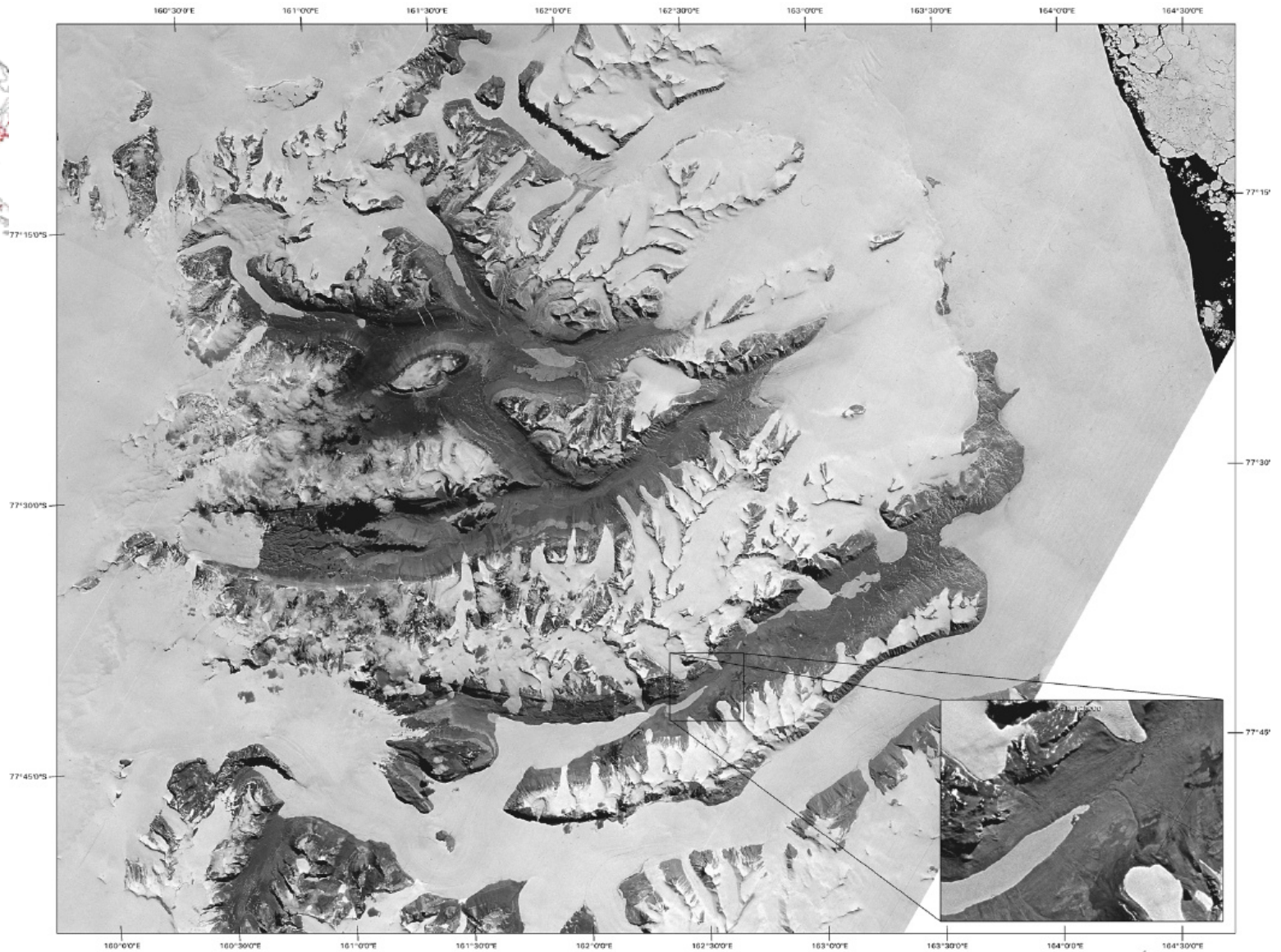
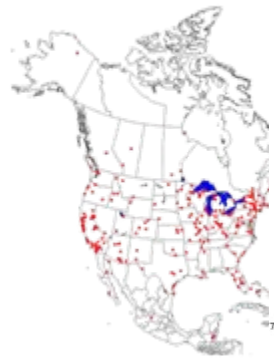
PROGRAM CODE NAME -INDIGO
 NUMERICAL DESIG. -
 SPACECRAFT MASS -
 LENGTH -42'-44'
 DIAMETER -5'-10"
 MISSION -RECSAT. RADAR IMAGING
 DATA RETURN METHOD -RADIO
 LIFE TIME -122 DAYS
 INCLINATION -97.3°
 PERIGEE -347.98 MILES
 APOGEE -400.18 MILES



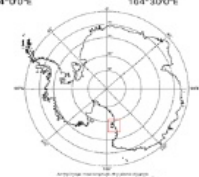
FIRST LAUNCH -1-21-82
 LAST LAUNCH -1-21-82
 SUCCESSES -1
 FAILURES -0
 ATTEMPTS -1
 LAUNCH VEHICLE-TITAN-34B
 LAUNCH COST -\$
 SAT. COST -\$
 CONTRACTORS -
 PROGRAM COST -\$

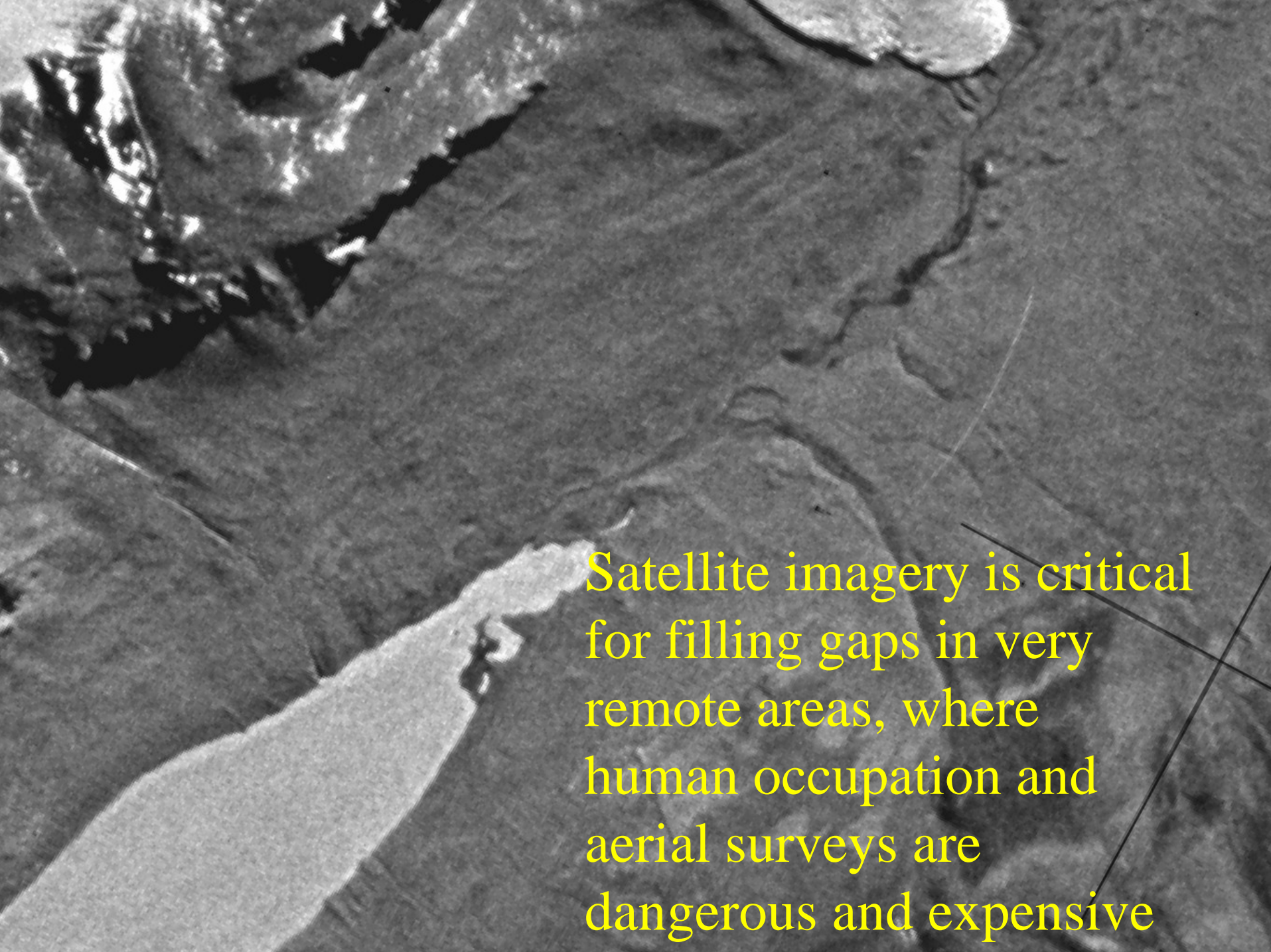
Dry Valleys, Antarctica

Satellite Image Product - 5 December 1975



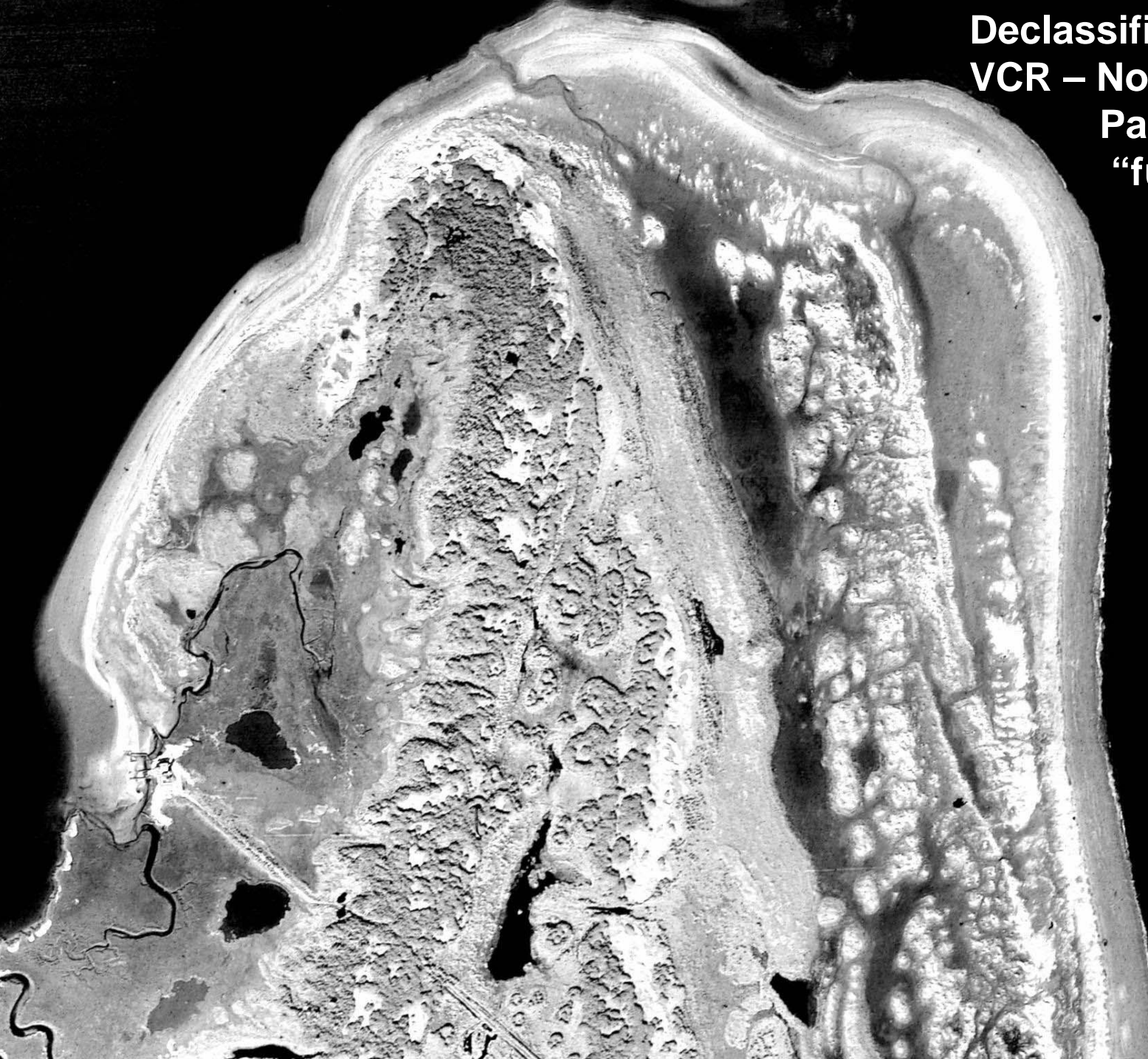
Received for publication 25 September 1999.
A cooperative project of the National Science Foundation,
the National Energy and Mapping Agency, and the
DOE Environmental Center. Main image shows
the McMurdo Dry Valley. Main image shows Lake Bonney
in the Taylor Valley. For imagery and further
information visit:
www.gsc.nasa.gov/earth/ice/antarctica/antarctica.html



A grayscale satellite image of a rugged, mountainous landscape. A prominent river or valley runs diagonally from the top left towards the bottom center. The terrain is characterized by steep slopes, ridges, and deep shadows, indicating significant topographic relief. The overall texture is grainy, typical of satellite imagery.

Satellite imagery is critical
for filling gaps in very
remote areas, where
human occupation and
aerial surveys are
dangerous and expensive

Declassified 1993 NTM
VCR – North end of
Parramore Island
“fuzzed” ~1m

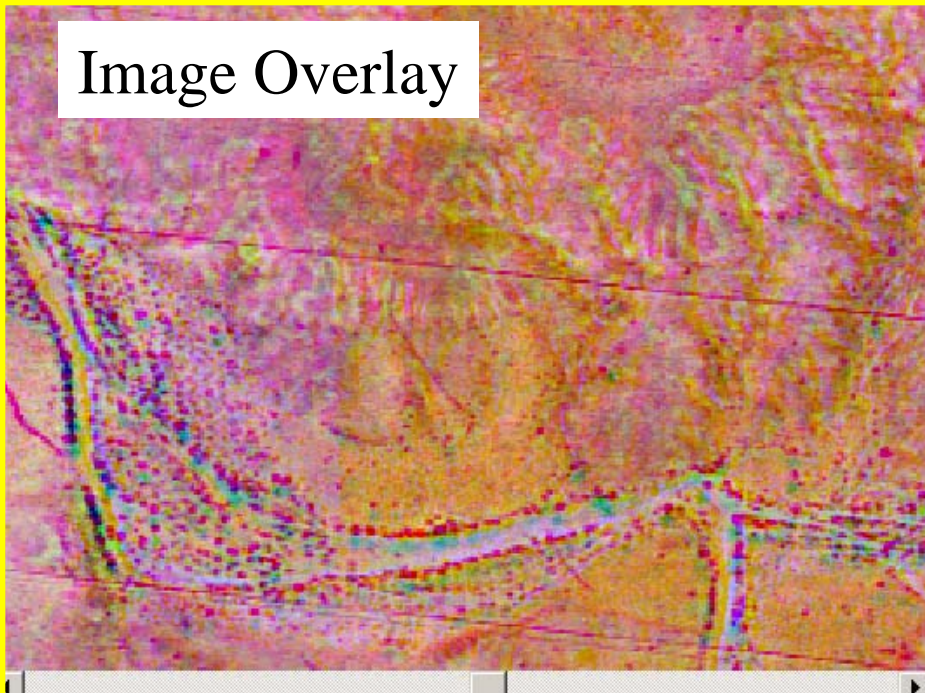


November 21, 1964



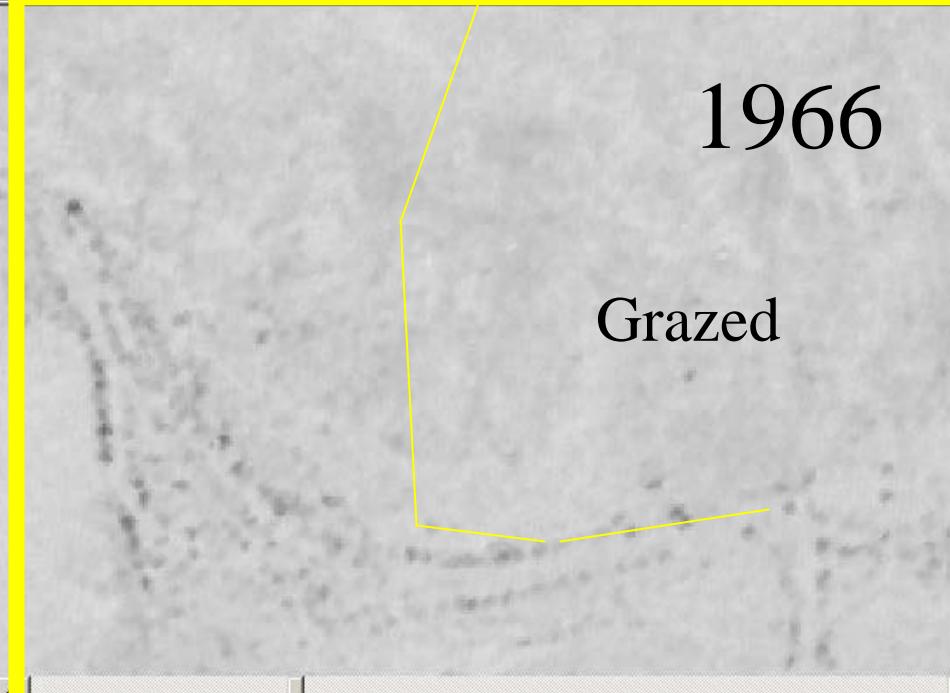
**The first historical CORONA data
for the Sevilleta LTER – long before
it become an LTER site. Size of file
> 1 GB.**

Image Overlay



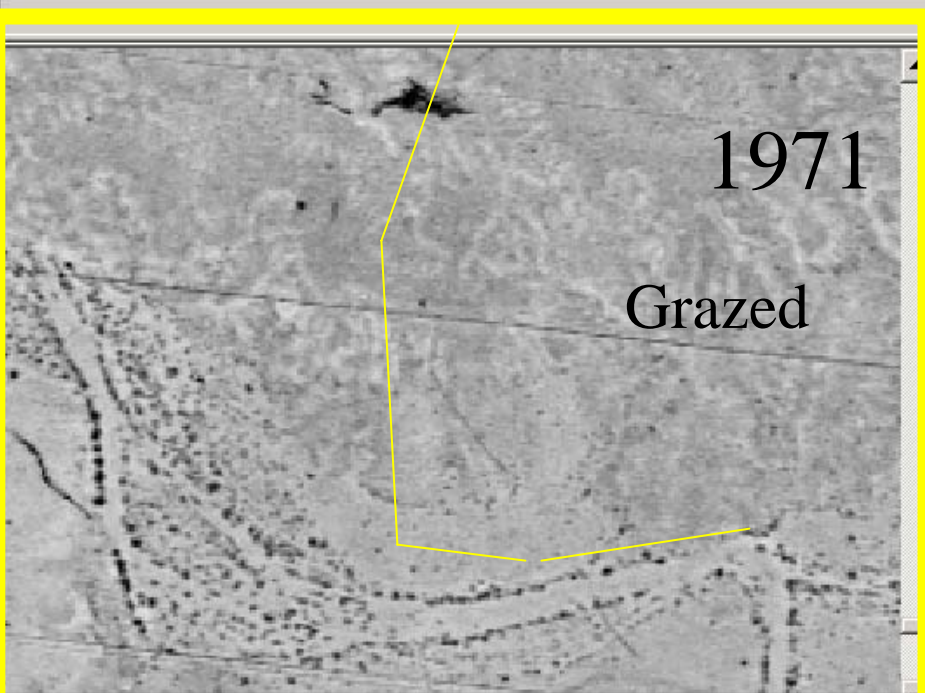
1966

Grazed



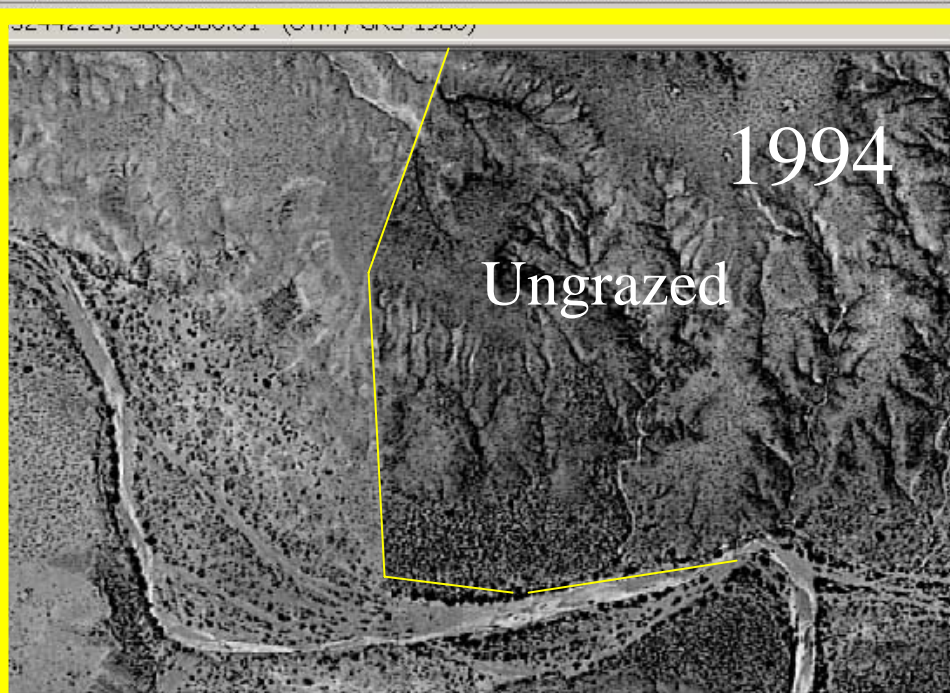
1971

Grazed



1994

Ungrazed





The US Long Term Ecological Research Network

Related Links

[Registered Locations of LTER sites and science plan for ISS photography](#)

[Example PowerPoint describing ISS image and data search of LTER sites](#)

[Example ISS image of the Florida Coastal Everglades LTER in HTML and PowerPoint formats](#)

[Link to map oriented search for imagery](#)

[Link to full technical search for ISS and related data](#)

International Space Station Photography of LTER Sites



National Aeronautics and
Space Administration

International Space Station Photography

Astronaut photography is a uniquely useful dataset due to its inherent variability in spatial scale and temporal frequency. Used together with traditional remotely sensed data, astronaut photography has the potential to increase the temporal resolution of land cover/land use change, vegetation dynamics, and surface soil process information for LTER sites. [William Stefanov](#) is the primary contact at NASA/Johnson Space Flight Center for this collaboration.

This page is maintained by [John Vande Castle](#), LTER Network Office

Space Station Photography of LTER Sites

Collaboration between John Vande Castle at the LTER Network Office and Will Stefanov (formerly with CAP) at the NASA Johnson Space Center to acquire more regular, targeted images of LTER sites. A search shows that most sites have data captured during various missions of the International Space Station. LTER sites have now been added as specific targets the science plan beginning with the ISS 011 crew. Image resolution depends on the camera and lens used.

ISS imagery is freely available online at <http://eol.jsc.nasa.gov/>

Identification: [Mission:](#) ISS010 [Roll:](#) E [Frame:](#) 17590 Mission ID on the Film or image: ISS010
[Country or Geographic Name:](#) USA-FLORIDA [Features:](#) SOUTH FLORIDA, FLORIDA KEYS
Center Point [Latitude:](#) 25.5 Center Point [Longitude:](#) -81.5 ONC Map ID: JNC [Camera Tilt:](#) 51
Camera Focal Length: 50mm
[Camera:](#) E4: Kodak DCS760C Electronic Still Camera
[Film:](#) 3060E : 3060 x 2036 pixel CCD, RGBG array.

[Percentage of Cloud Cover:](#) 10 (0-10) Nadir
[Date:](#) 20050211 (YYYYMMDD) GMT Time: 183608 (HHMMSS)
Nadir Point Latitude: 23.1, Longitude: -78.4 Nadir to Photo Center Direction: Northwest
Sun Azimuth: 206
Spacecraft Altitude: 190 nautical miles (352 km)
Sun Elevation Angle: 50
Orbit Number: 3596



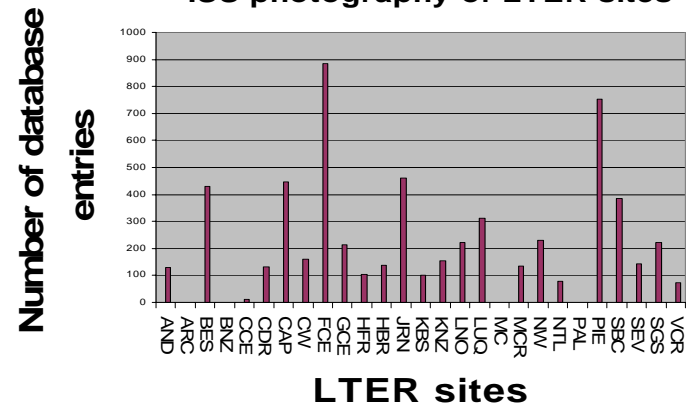
Reefs

Earth Sciences and Image Analysis, NASA-Johnson Space Center. 25 Mar. 2005.
"Astronaut Photography of Earth - Display Record."
International Space Station - Mission 10

<http://eol.jsc.nasa.gov/scripts/sseop/photo.pl?mission=ISS010&roll=E&frame=17590&QueryResultsFile=111229797223601.tsv>

(31 Mar. 2005). NASA-Johnson Space Center.
Last Update: 02 June. 2005

ISS photography of LTER sites



Virginia Coast Reserve LTER– ISS 11 Digital Photography









ISS008E13222



The US Long Term Ecological Research Network

Related Links

[Registered Locations of
LTER site for MODIS
subsets](#)

[Example of MODIS
subset data available](#)

[Example of NDVI time
series from MODIS data](#)

[Link to MODIS subset
data at the NASA ORNL
DAAC](#)

MODIS Subsets of LTER Sites

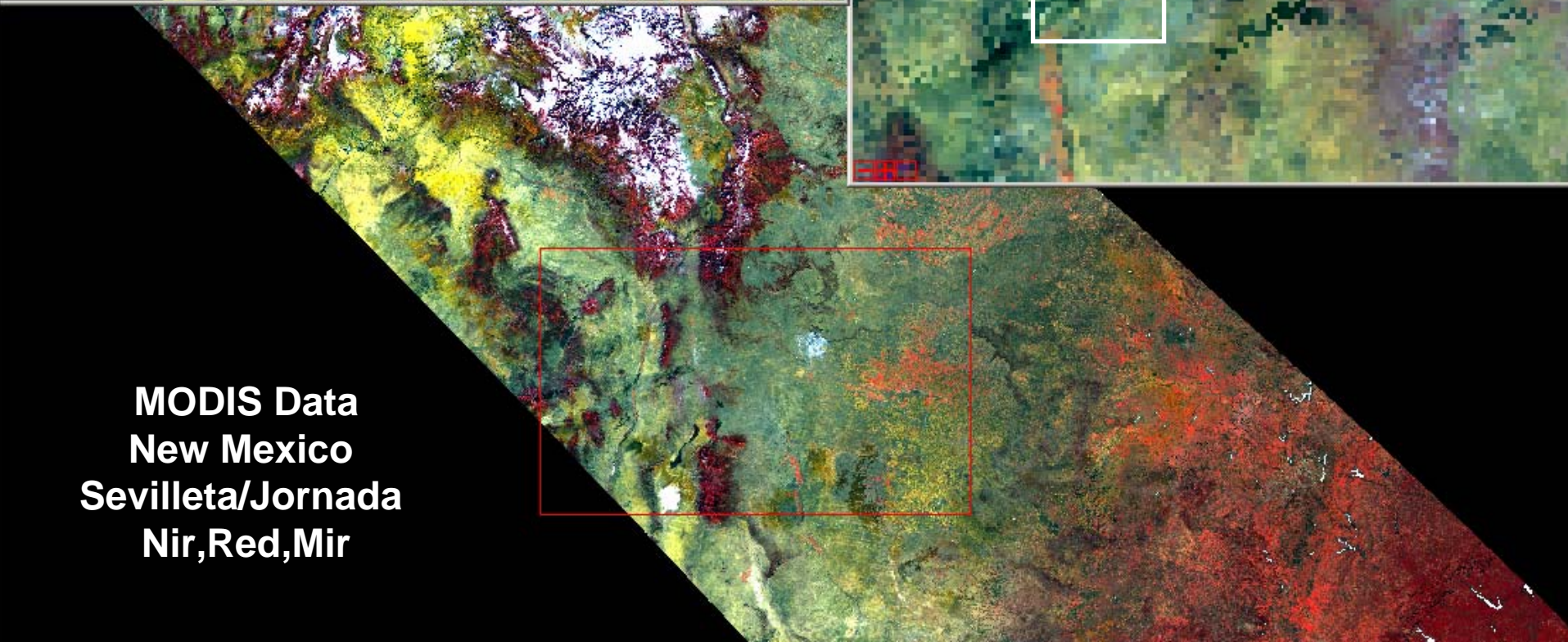
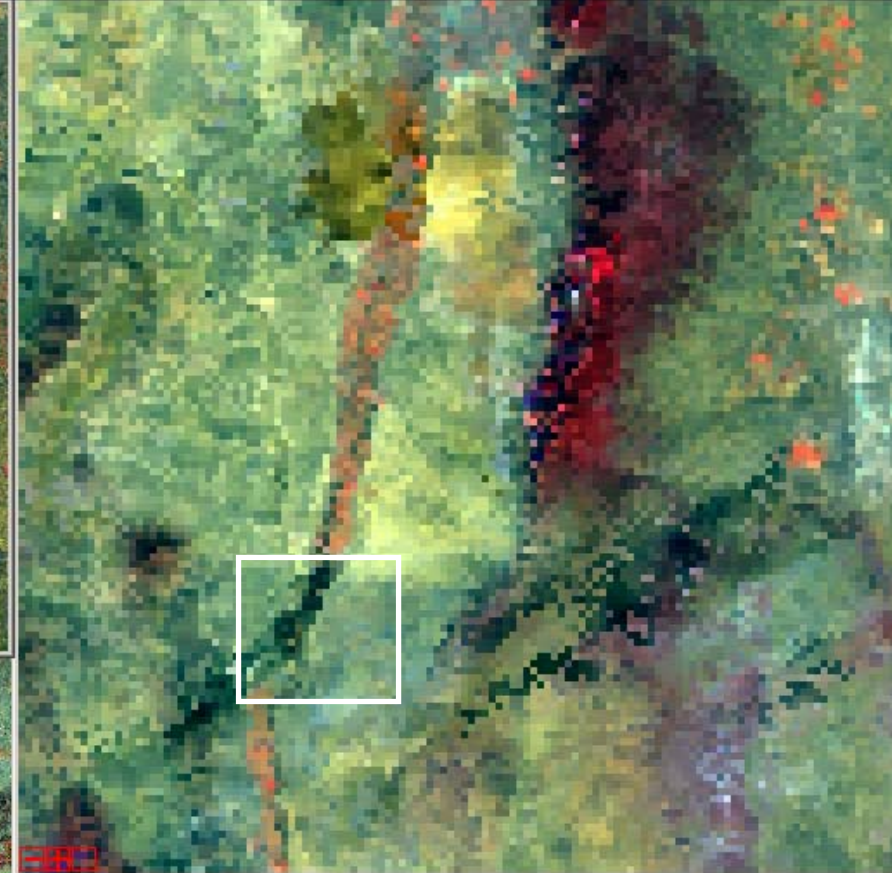
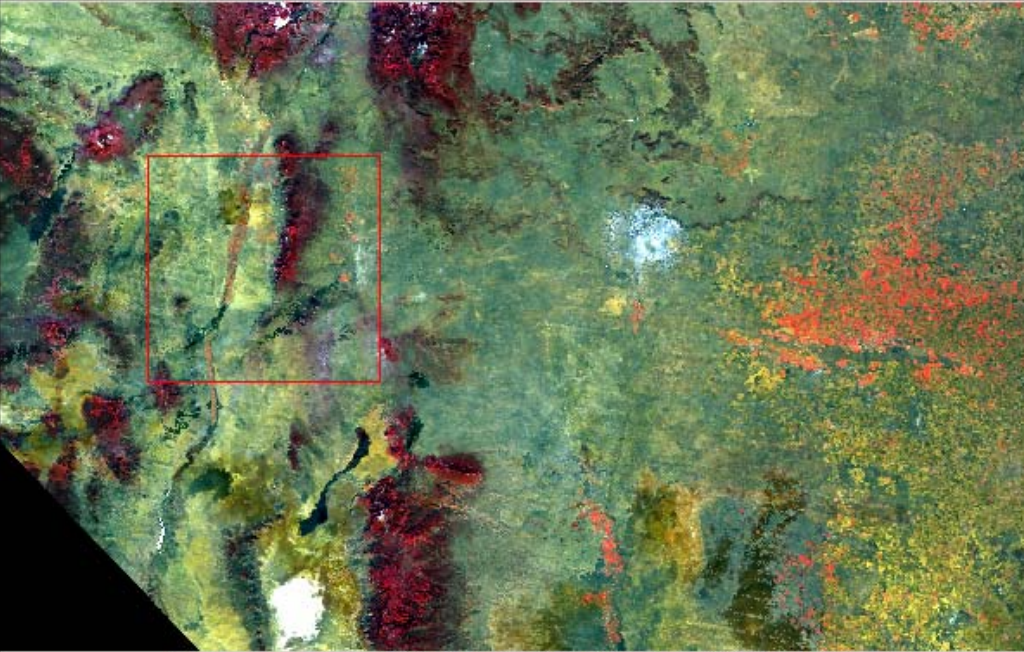


National Aeronautics and
Space Administration






























Data from the MODIS sensor of the Terra and Aqua satellites.

The MODIS Subset data provide summaries of selected MODIS Land Products for validation of models and remote sensing products and to characterize field sites. The Subsets are pixel values of land products for a 7-km x 7-km area centered on field site locations. LTER sites with NASA projects have MODIS subset data extracted now. MODIS subsets for other sites will be completed as the data are reprocessed during 2005.

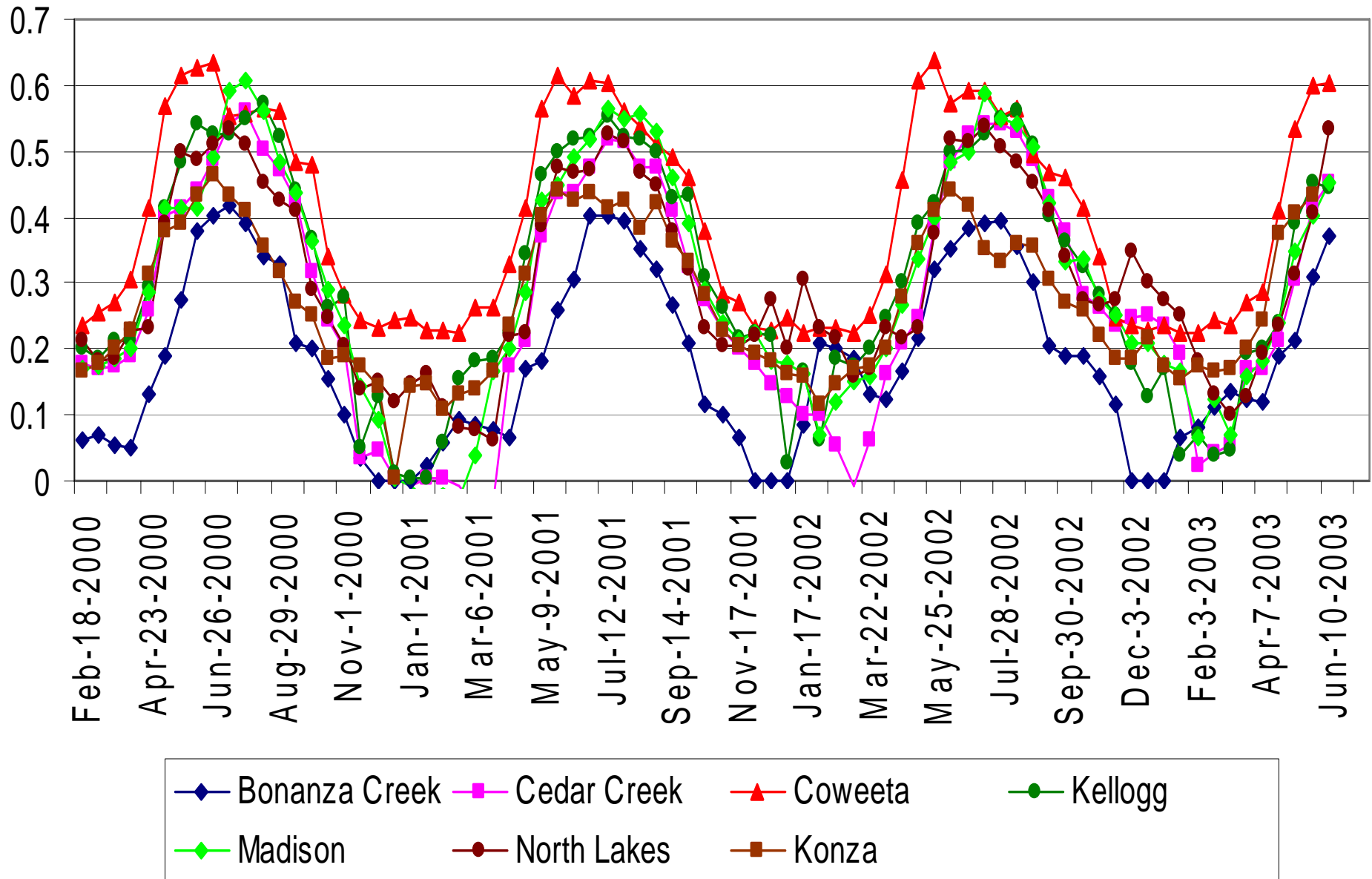
**This page is maintained by [John Vande Castle](#), LTER
Network Office**



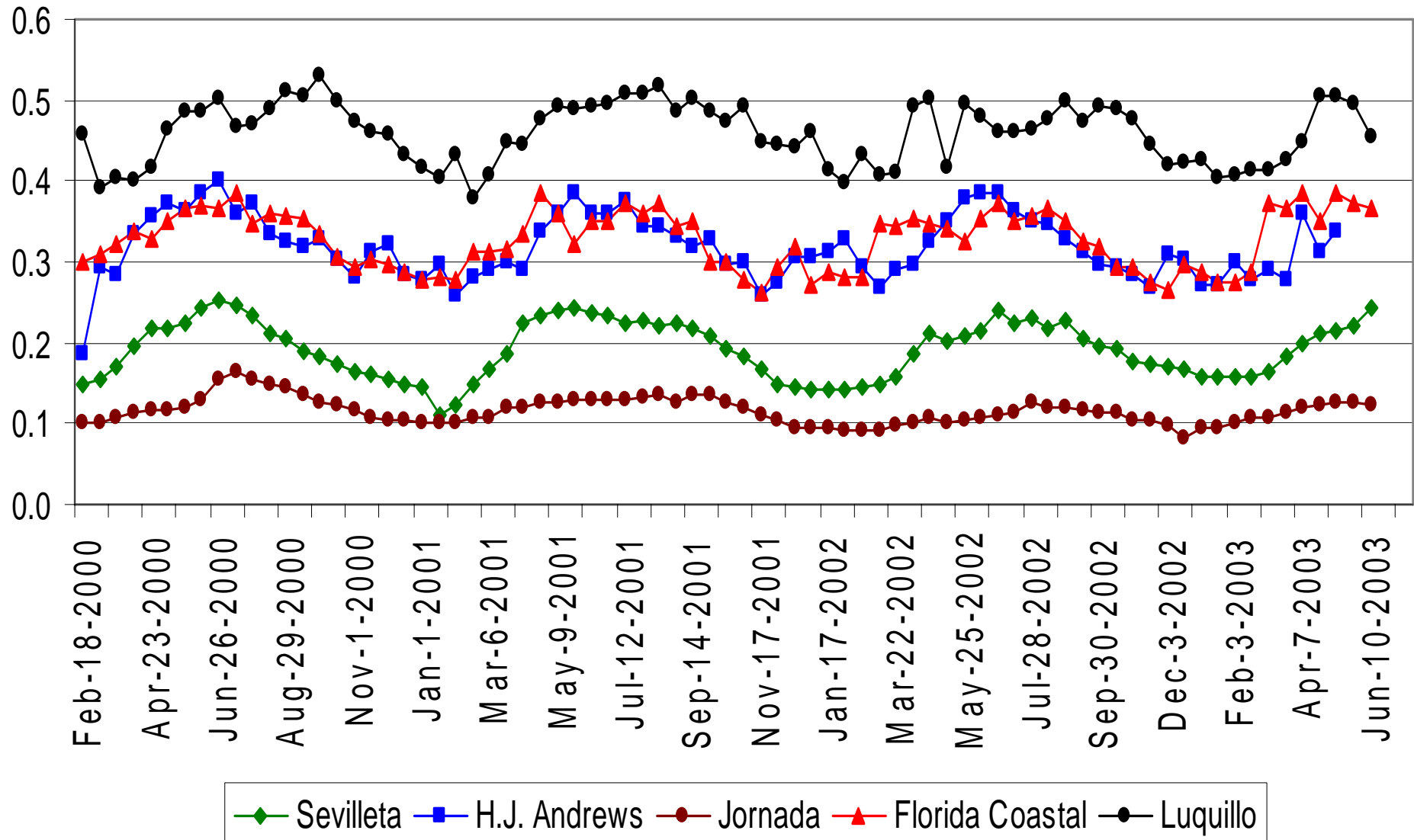
MODIS Data
New Mexico
Sevilleta/Jornada
Nir,Red,Mir

MODIS Product	Terra			Aqua		
	Visualization		Data Download	Visualization		Data Download
	Composite Period	Time Series		Composite Period	Time Series	
Surface Reflectance (M*D09A1)			Data			Data
Land Surface Temperature Land Emissivity (M*D11A2)			Data			Data
Land Cover (12Q1)			Data			
Vegetation Indices (NDVI, EVI) (M*D13A2)			Data			Data
Leaf Area Index/Fraction of Photosynthetically Active Radiation (LAI/FPAR) (M*D15A2)			Data			Data
Gross Primary Production (GPP) Version 4.0 (M*D17A2)			Data			Data
Gross Primary Production (GPP) Version 4.5 (M*D17A2)			Data			
Net Primary Productivity (NPP) Version 4.0 (M*D17A3)			Data			Data
Net Primary Productivity (NPP) Version 4.5 (M*D17A3)			Data			
MODIS Terra BRDF and Calculated Albedo (MOD43B)			Data			
Reflectance Nadir BRDF-Adjusted (NBAR) (MOD43B4)			Data			

Regional EVI - Seasonal



Regional EVI





Site

100x100 km Region 2001-2002 Mean EVI

Luquillo	0.45110962
Coweeta	0.39292729
Florida Coastal	0.31594918
Kellogg	0.31461983
H.J. Andrews	0.31208096
North Lakes	0.30315180
Madison	0.29850677
Konza	0.26944284
Cedar Creek	0.26442688
Bonanza Creek	0.18754226
Sevilleta	0.18716902
Jornada	0.11005499





Remote Sensing Resources

- <http://www.ersc.wisc.edu/resources.php>
- <http://eol.jsc.nasa.gov/>
- <http://glovis.usgs.gov/>
- <http://edc.usgs.gov/>
- <http://edcimswww.cr.usgs.gov/pub/imswelcome/>
- <http://www.landcover.org/>
- <http://www.ssec.wisc.edu/data/>
- http://marine.rutgers.edu/cool/sat_data/
- <http://earth.google.com/> (Google Earth)

