



Global Land Survey Update

Jeff Masek, NASA GSFC

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Outline

Global Land Survey 2010

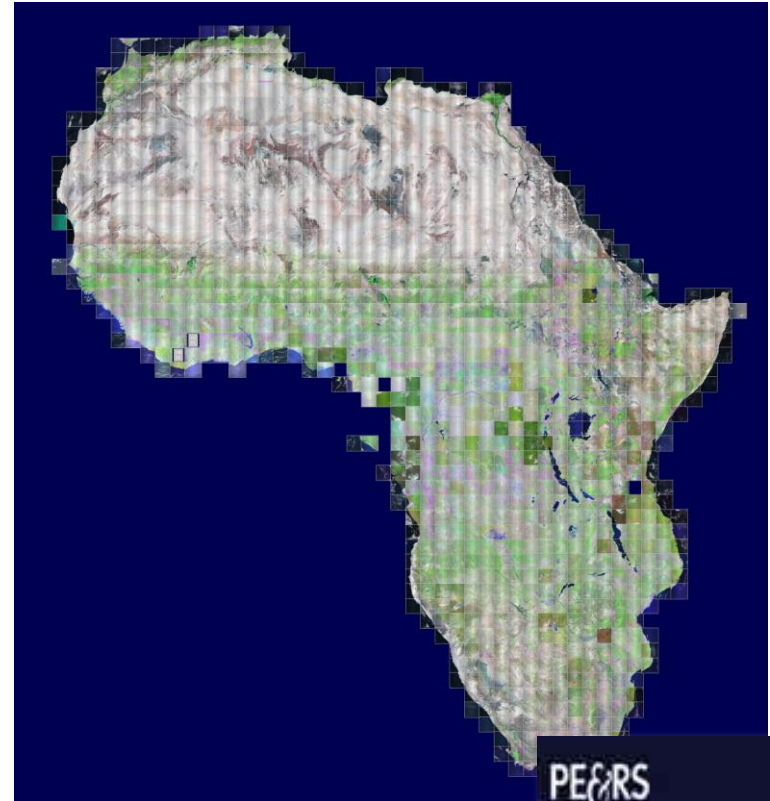
USGS Landsat Global Archive Consolidation

NGA Commercial Imagery

Background: Global Land Survey Data Sets

Global cloud-free, orthorectified Landsat data sets centered on 1975, 1990, 2000, 2005, and 2010

- Partnership between USGS and NASA, in support of USGCRP
- Support global assessments of land-cover, land-cover change, and ecosystem dynamics (disturbance, vegetation health, etc)
- **GLS2010 currently in development**



Browse image mosaic of GLS2005 coverage for Africa; Global Land Survey data sets featured on the cover of Photogrammetric Engineering & Remote Sensing, January 2008



GLS Team

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Science Steering Group

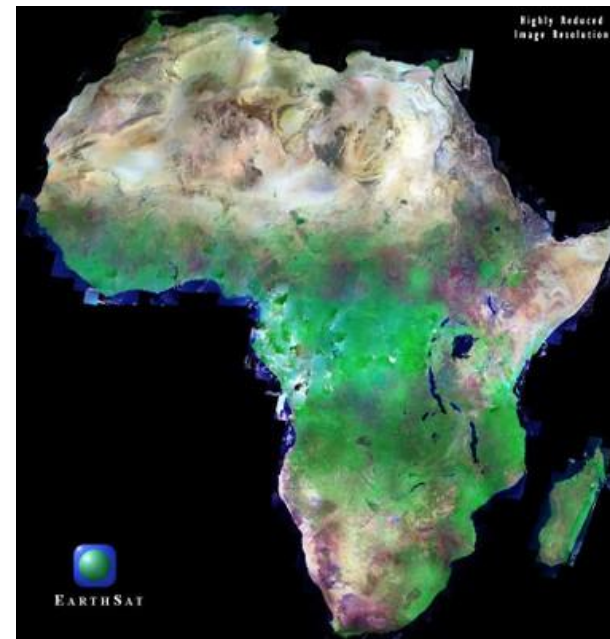
- Chris Justice, UMD

- Sam Goward, UMD

- Curtis Woodcock, BU

- Darrel Williams, GST

- Matt Hansen, SDSU



GLS2010 Data @ EROS

<u>Station</u>	<u>2009 Scenes</u>	<u>2010 Scenes</u>	<u>2011 Scenes</u>
Beijing	187	23	0
Bangkok	2,370	0	0
● Mexico	671	3,525	449
Argentina	19	0	0
Brazil	2,526	18,601	1,507
Alaska	7,368	4,146	0
Gatineau, Canada	51	2,926	298
● Irkutsk	7,606	5,873	0
● South Africa	1,445	1,924	0
KaShi, China	6,414	11,889	0
● Magadan	5,658	1,179	0
● Kenya	865	3,326	1,059
● Moscow	6,872	5,838	0
● Canaries	3,696	4,384	950
Italy	820	3,004	195
Pr. Albert, Canada	144	11,065	737
	46,712	77,703	5,195
EROS	16,000	16,264	992
Alice Springs	5,500	5,515	790
	68,212	99,482	6,977

● GLS Campaign

Campaign Station Status: 2011

- **ScanEx stations (Moscow, Irkutsk, Magadan):** Transitioning to full IC.
 - Should be complete by summer acquisition season.
- **Chetumal, Mexico:** Currently acquiring
- **South Africa:** Currently acquiring
- **Maspalomas (Canaries):** Currently acquiring
- **Malindi, Kenya:** Agreement is in place, funding TBD

GLS2010 Selection & Processing

Mapping epoch planned as 2009-2010 w/ both L5 & L7

- stronger preference for L5 than GLS2005
- Some regions (e.g. N. America) require a 3rd growing season

Scene selection for Australia, East Asia, Indonesia now complete

- US archive data being processed at EROS
- IC selection lists are being submitted to stations

Southern Hemisphere selections completed by July, 2011; defer northern Hemisphere selections until October 2011

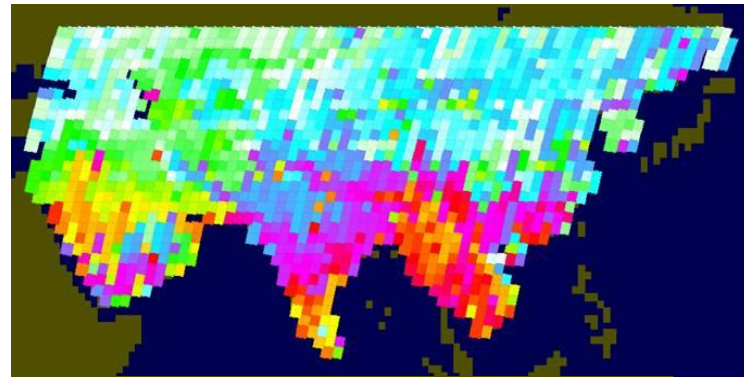
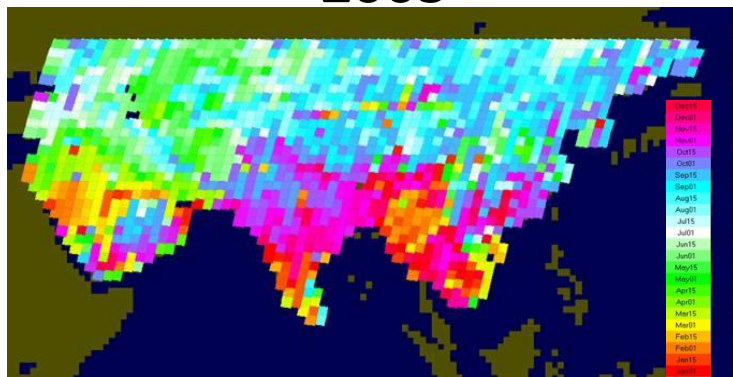
Rolling processing through 2011...anticipate complete data set available by end of year

GLS2010 Asia Selections

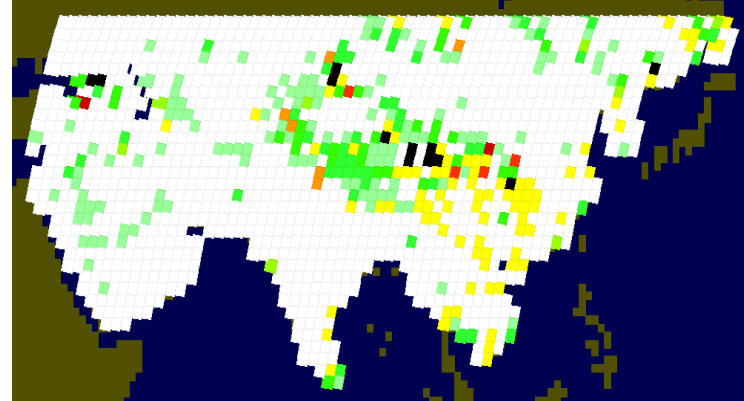
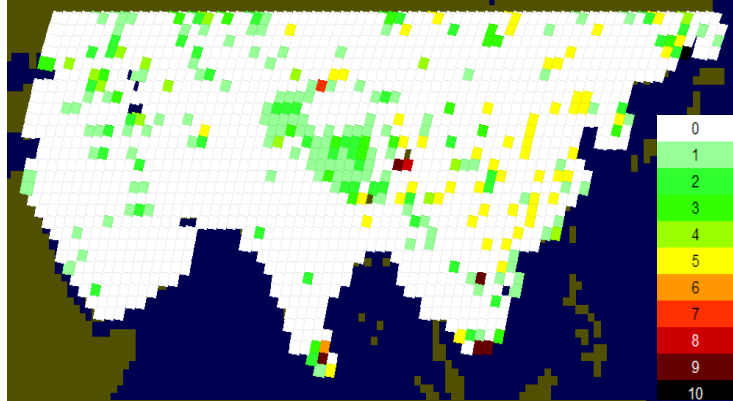
2005

2010

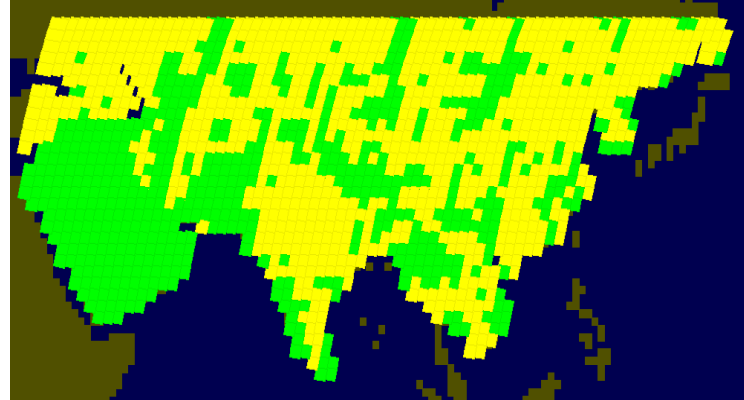
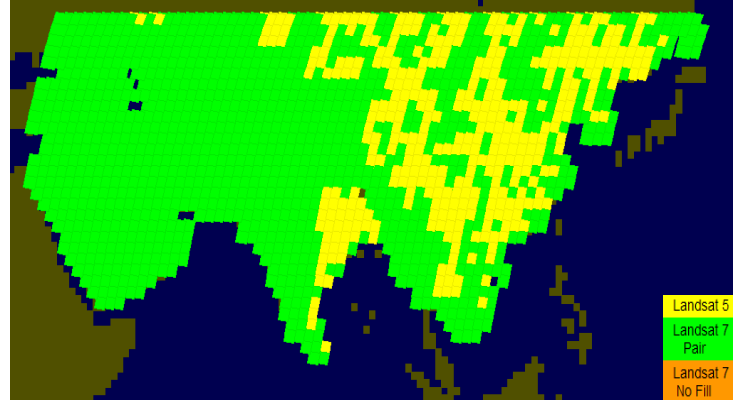
DoY



Cloud
Cover %



Sensor



GLS2010 Format & Distribution

- Format
 - Same processing applied as ‘normal’ Landsat scenes
 - L5 single scenes
 - L7 gap-filled scenes (at EROS)
 - Occasional single L7 scenes if inappropriate for gap-filling
 - Too cloudy
 - Poor gap match
- Scenes will be made available as processed
 - Single scene downloads
- Bulk distribution will be handled on external drive by user request

Future Directions

- The release of free, ortho-rectified data from USGS decreases the need for preprocessed data sets through GLS...but the need for systematic global land cover information @ 30m resolution remains acute
 - *new GEO task to produce 30m global LC w/ annual updates*
 - *China MoST initiative for global 30m LC from Landsat & HJ satellites*
- R & D on 30m Method Development and Product Prototyping by NASA LCLUC is establishing the procedures for global product development

GLS should focus on providing global land use data sets to support NASA Science and International Initiatives (REDD+, GOF-C-GOLD, GLP, etc).

Landsat Global Archive Consolidation

Large numbers (> 1 million?) of unique Landsat scenes reside outside the US Archive

LGAC is a long-term USGS-led initiative to provide copies of these data to the US archive

Each station has data that will enhance the USGS archive
In the short term, some data may have higher science priorities
Each station has technical and non-technical challenges

The Woodcock Metric: **297,790**

(scenes archived to date through LGAC)

Status

Station	# in 1k's	%	Contact	Meta-data	Test Data	Technical Eval			Agreement	Archive Req	Data Recd
						MSS	TM	ETM+			
Europe (ESA)	2,090	42%									
Australia (GA-NEO)	629	13%									
Canada (CCRS)	532	11%									
China (CEODE)	449	9%									
Japan (RESTEC)	275	6%									
Brazil (INPE)	234	5%									
Argentina (CONAE)	195	4%				N/A					
South Africa (CSIR-SAC)	154	3%									
Thailand (GISTDA)	90	2%									
Germany (DLR) @ESA	87	2%				N/A	N/A				
Saudi Arabia (KACST MAW)	69	1%				N/A		N/A			
India (NRSA)	51	1%						N/A			
US (U of Puerto Rico)	42	1%				N/A	N/A				
Ecuador (CLIRSEN)	40	1%				N/A		N/A			
Pakistan (SUPARCO)	24	<1%				N/A		N/A			
Japan (HIT)	21	<1%				N/A	N/A				
Indonesia (LAPAN)	8	<1%				N/A					

GLS 1990 Recalibration

GLS 1990 is simply a geometrically improved version of the original “Geocover” 1990 dataset

- produced in late-1990’s via IC contribution of L1g data
- L5 radiometric calibration historical LUT has changed

⇒ GLS1990 data are poorly calibrated (radiometrically)

USGS EROS is obtaining replacement L0 scenes from IC’s in order to reprocess as “modern” L1t data

- ~50% of GLS1990 already in US archive
- ~45% remaining should be contributed by end of year
- India & Pakistan unlikely to contribute – need new selections

NGA Commercial Imagery

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- Since mid-2000's NGA has procured high-res commercial imagery through the NextView and ClearView contracts

- These data are available for USG use

- US Commercial Satellite Imagery is UNCLASSIFIED

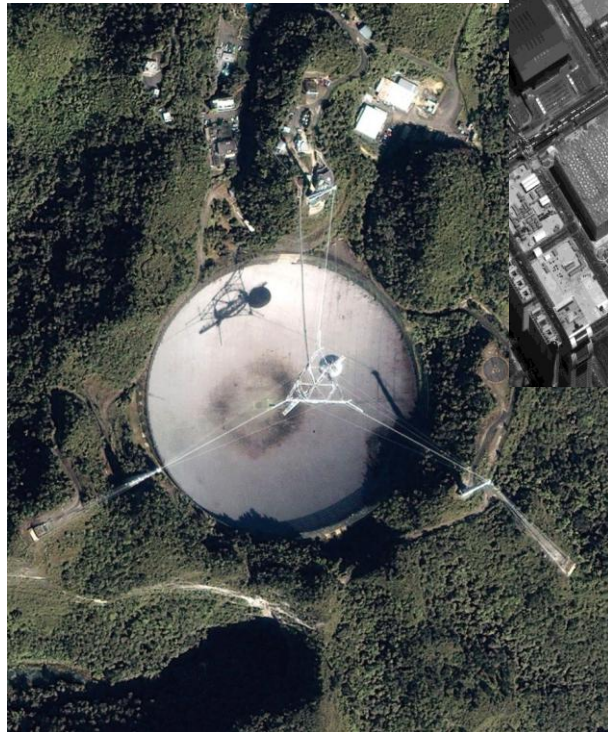
- Available in NITF, GeoTiff formats

- Revisit times vary approximately 1.5 to 4 days

- Panchromatic imagery is .41 to 1m resolution

- Multispectral available from most satellites

- Stereo capability



Arecibo, Puerto Rico (IKONOS) ©
GeoEye 2007



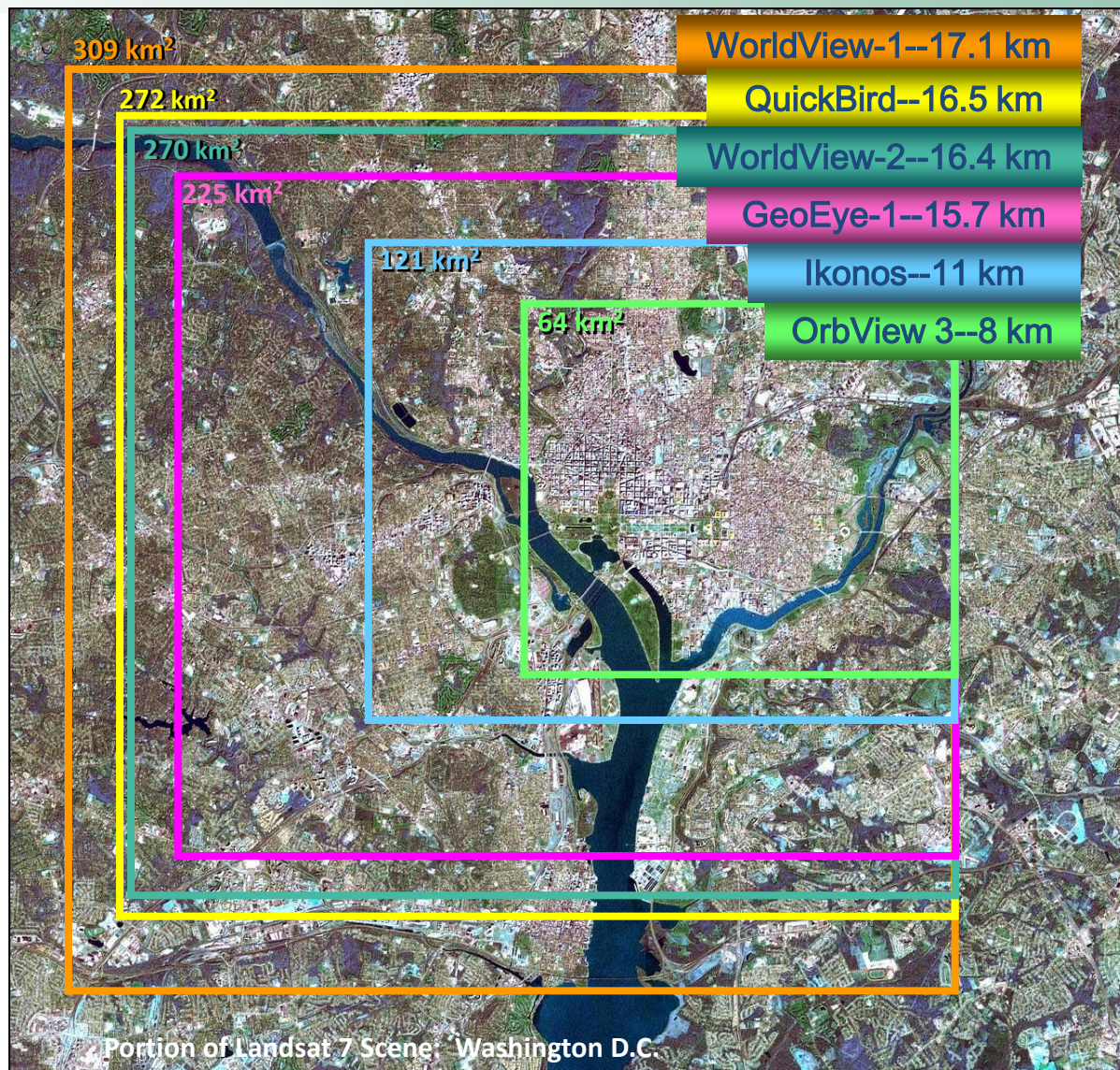
Olympics, China (Worldview 1) ©
Digital Globe 2008

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Commercial Imagery Today

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United States
Commercial
Satellite Imagery
Footprints

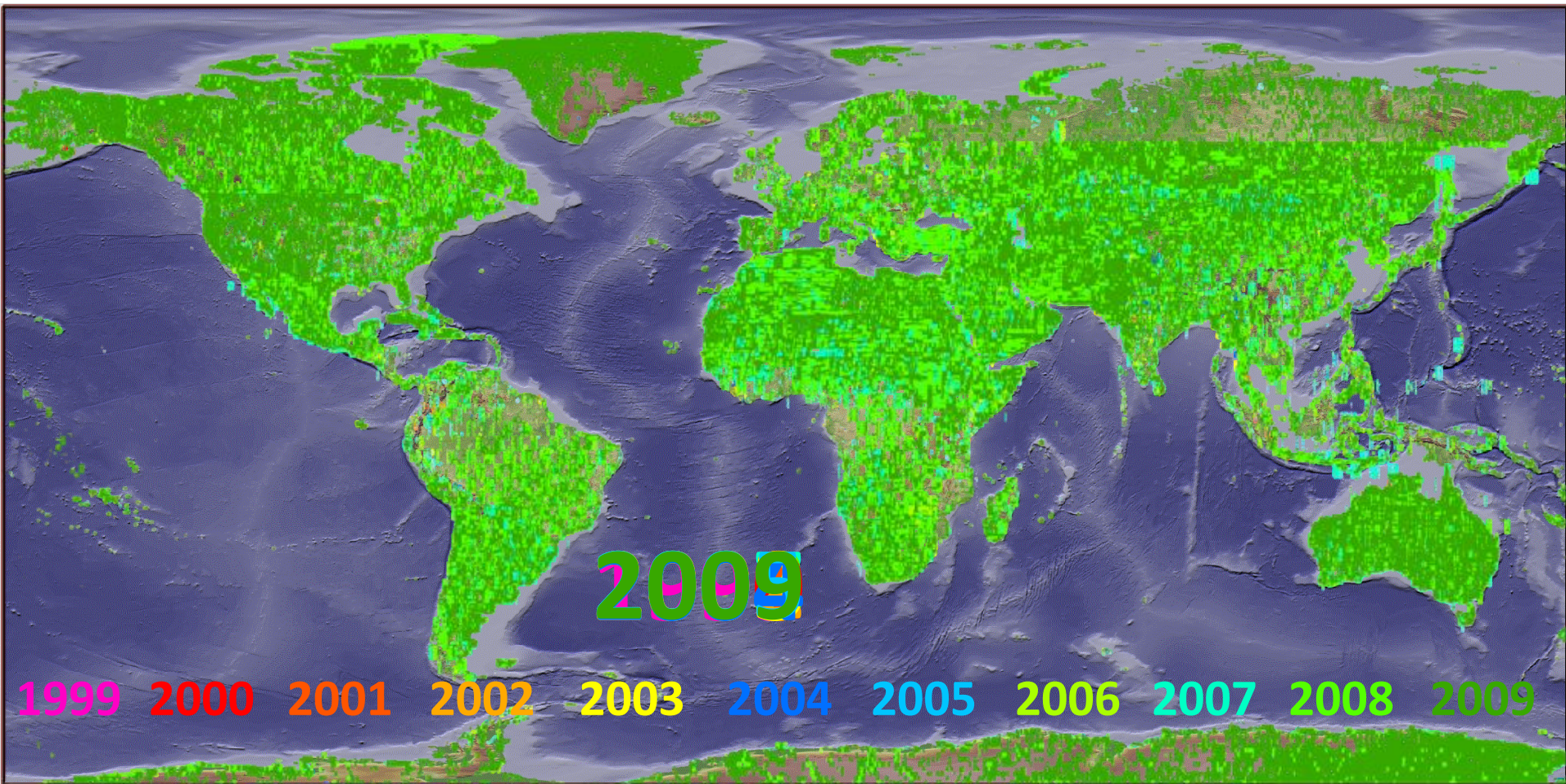


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Commercial Imagery

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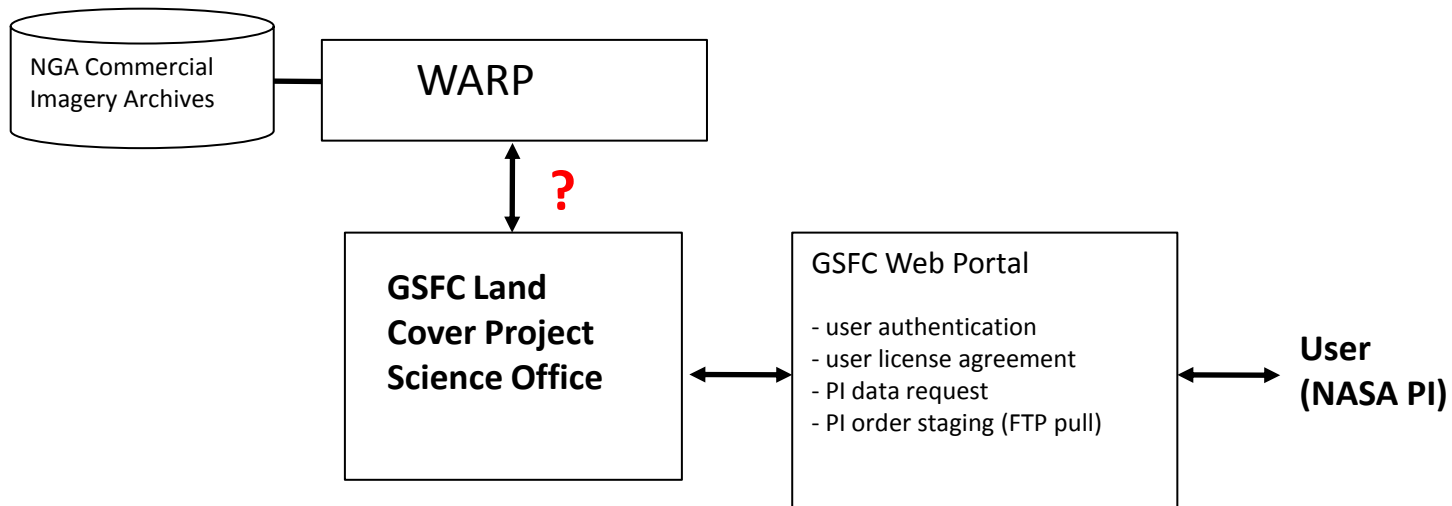
Purchases by Calendar Year



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LCLUC Access to NGA Commercial Data

- NASA/GSFC will provide LCLUC access to NGA commercial archives
 - Support from Martha Maiden, Brad Doorn, Garik Gutman
 - Use for validation of large-area maps, basic research
 - Limited access on trial basis starting late-Spring
- Manual search/order of WARP system by NASA contractor
- Users register, agree to license, and submit location/date of interest
- Data distribution via GSFC staging area





Thank you