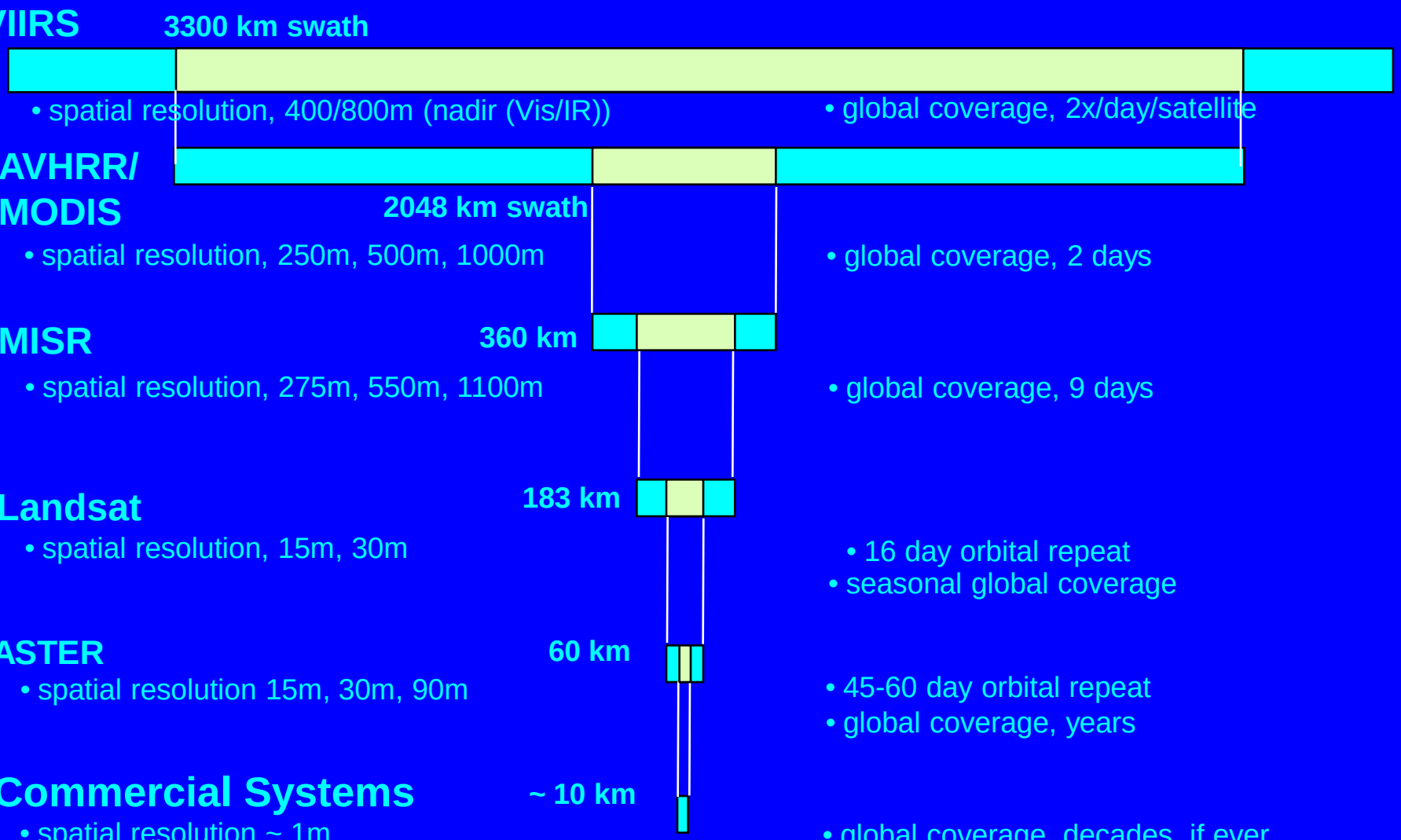
The Landsat Program and its Products: Global Land Surveys

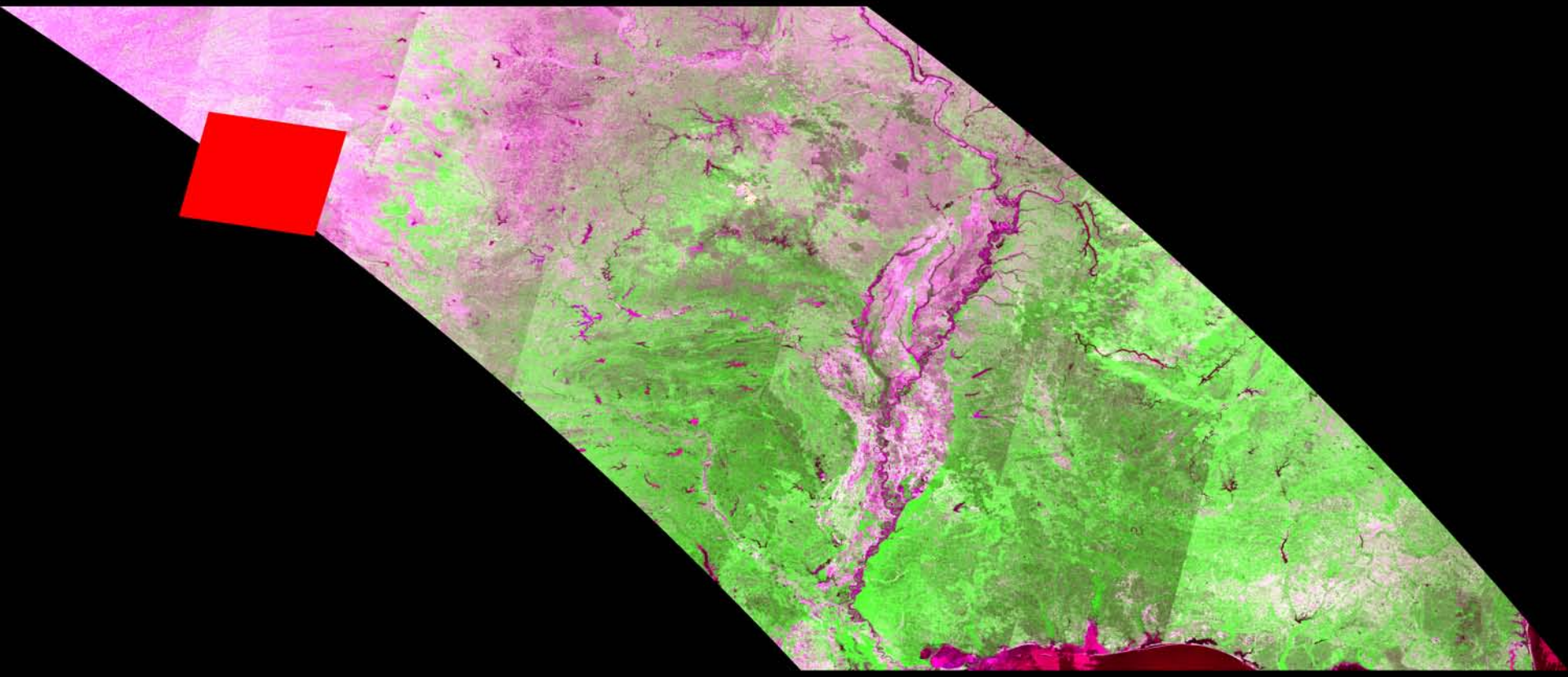
Garik Gutman
LCLUC Program Manager
NASA Headquarters
Washington, DC

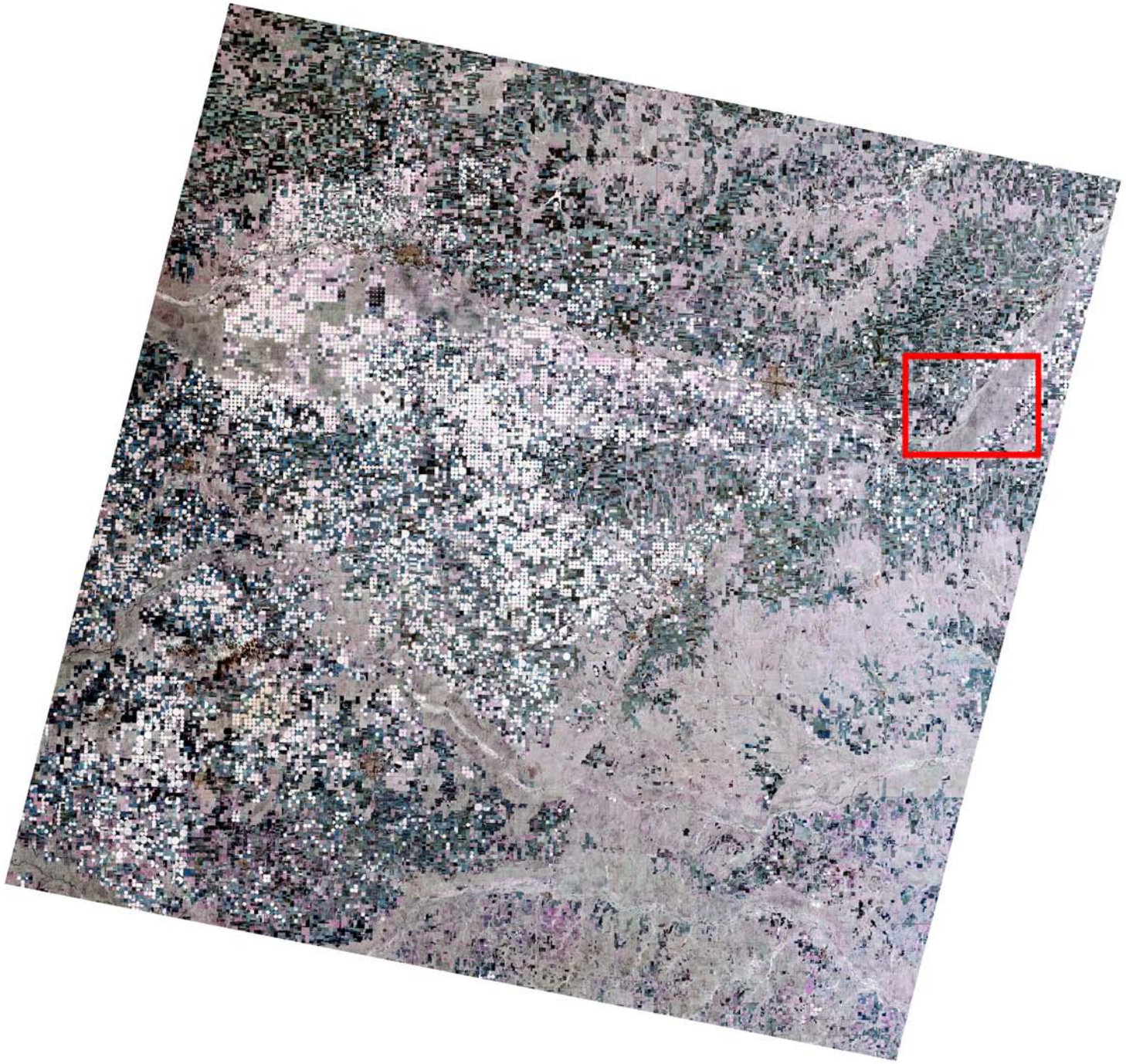
Land-Cover/Land-Use Change Program

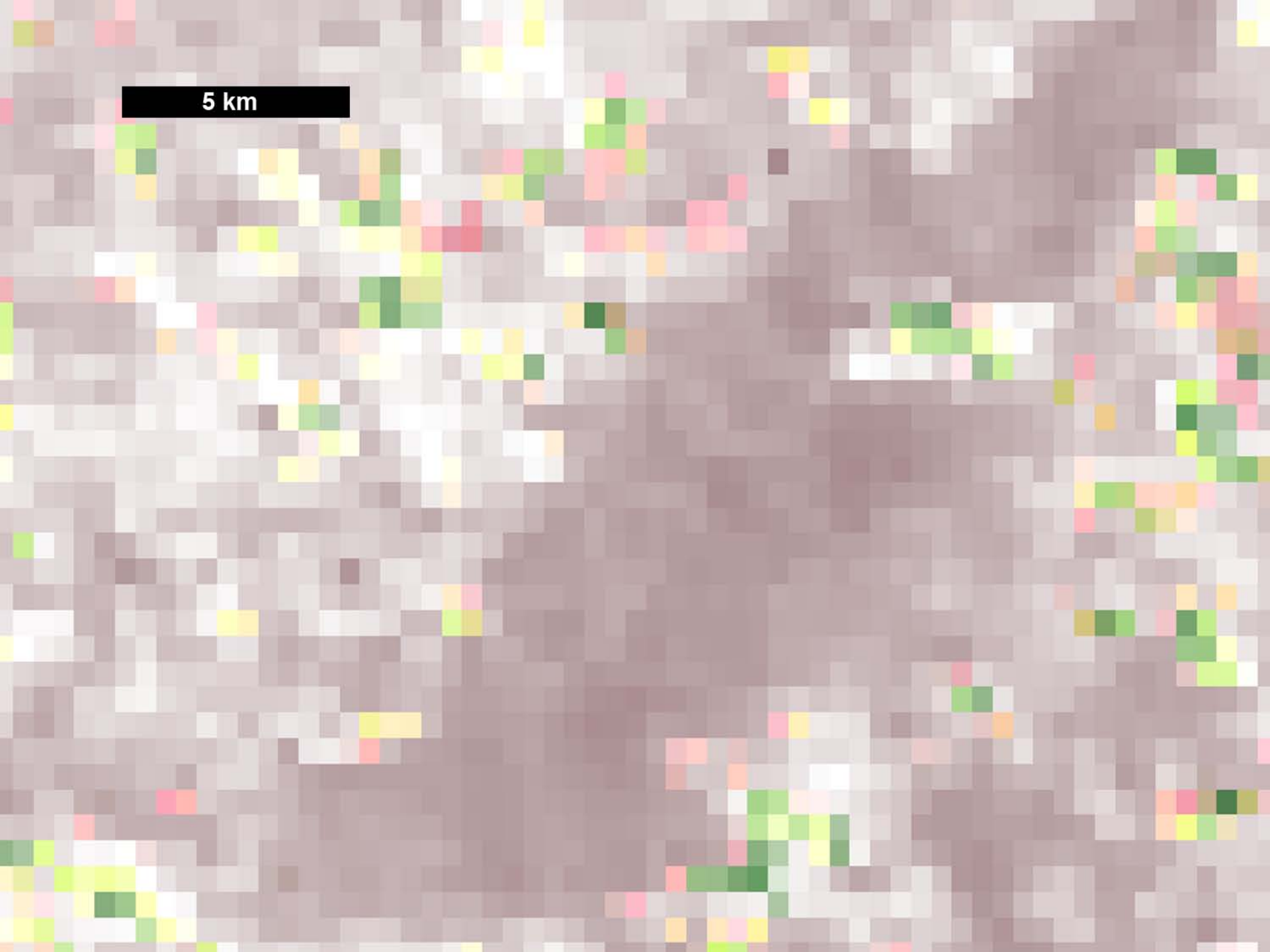
- LCLUC is an interdisciplinary scientific theme within NASA's Earth Science program. The ultimate vision of this program is ***to develop the capability for periodic global inventories of land use and land cover from space, to develop the scientific understanding and models necessary to simulate the processes taking place, and to evaluate the consequences of observed and predicted changes***
- http://lcluc.hq.nasa.gov/

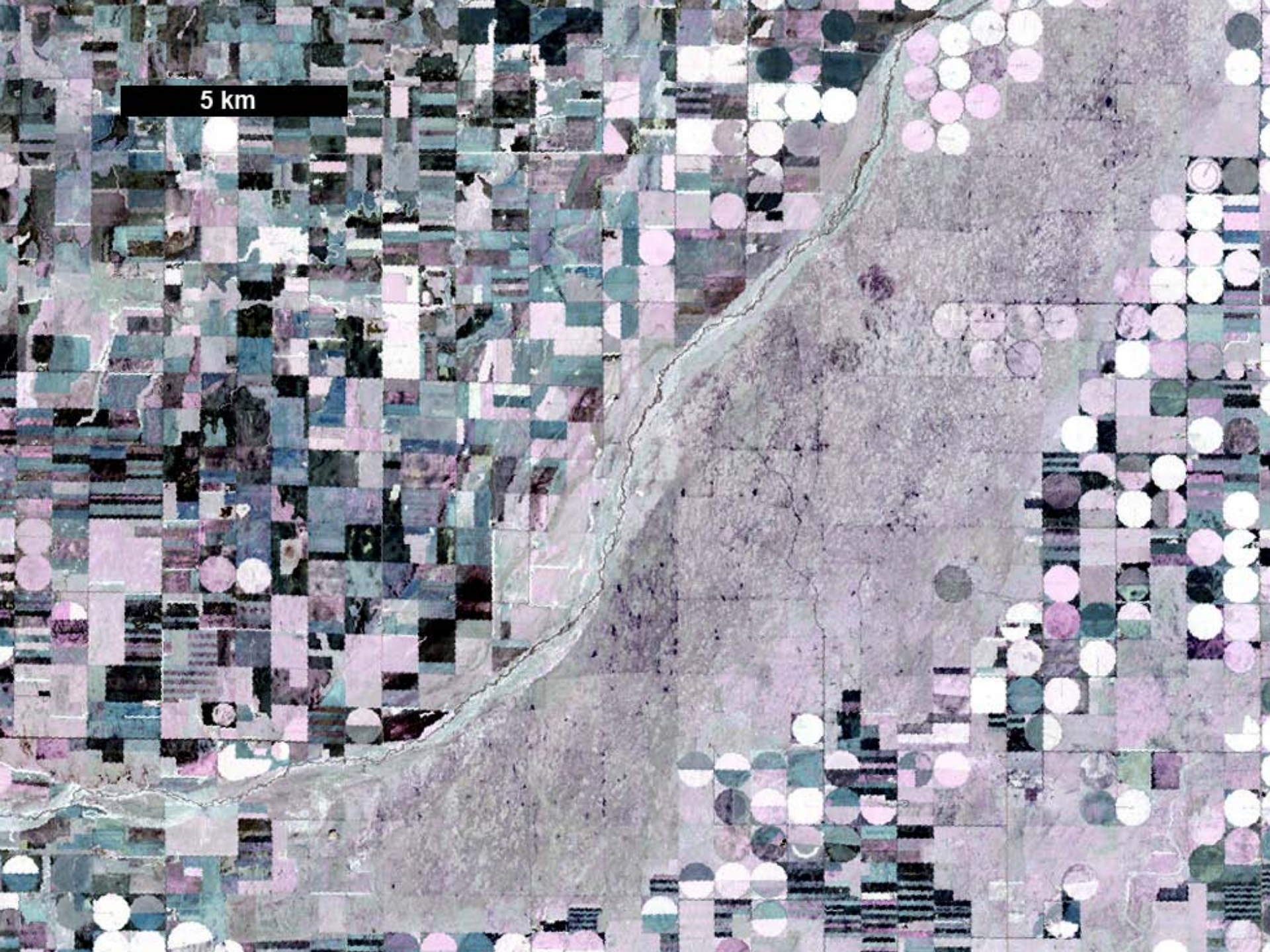
Synergistic Use of Optical Remote Sensing



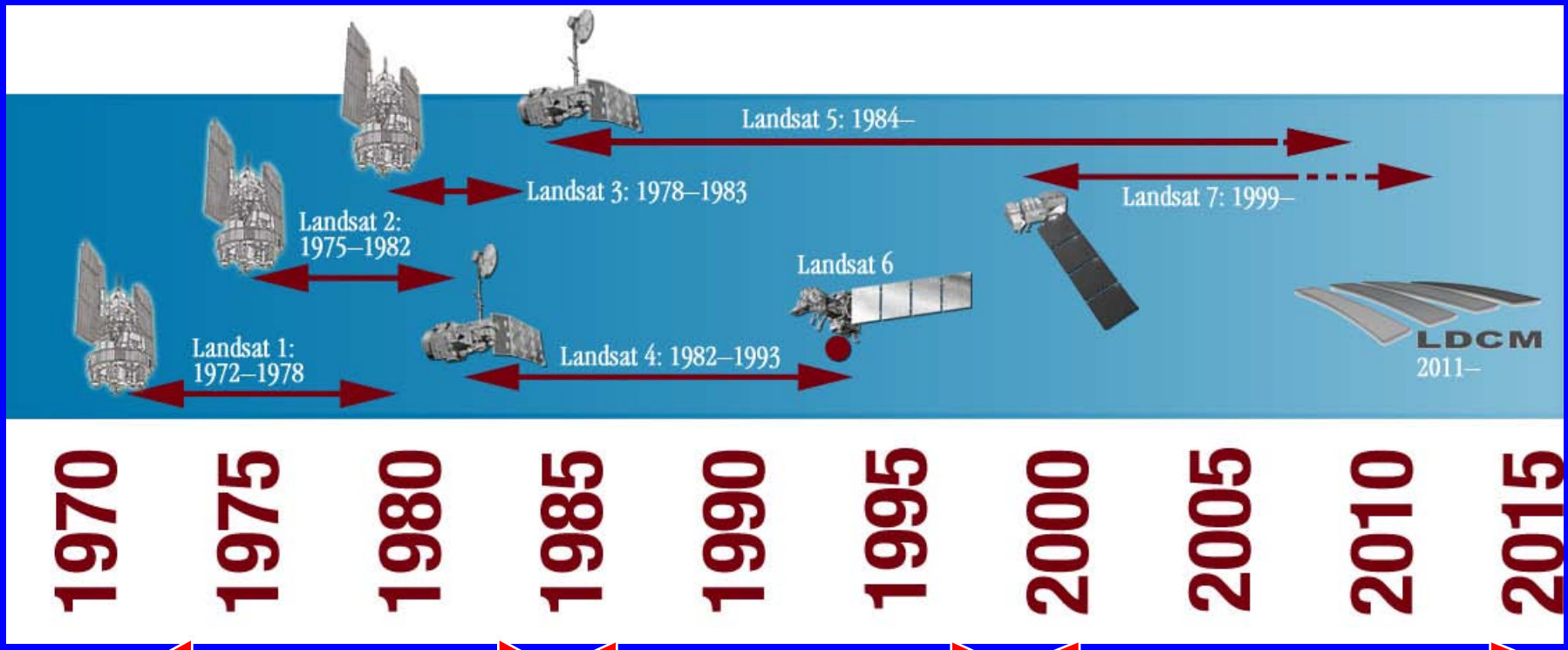





5 km


5 km

History of the Landsat Program



Need for Periodic Global Inventory

- The Integrated Global Observations of Land (IGOL) theme report calls for the generation of maps documenting global land cover at resolutions between 10m and 30m at least every five years
- Despite 35 years of Landsat observations, there has not been a unified global analysis of land-cover trends nor has there been a global assessment of land-cover change at Landsat-like resolution =>
- Periodic Global Land Surveys and assessments of land cover/land-cover change are needed

Global Land Survey Data Sets

Global cloud-free, orthorectified Landsat data sets

centered on 1975, 1990, 2000, 2005

- These data sets provide a consistent set of observations to assess land-cover changes at a decadal scale
- Recently, they have been reprocessed with a better geodetic correction to improve accuracy
- All are freely available via the Internet from the United States Geological Survey (USGS) EROS Center http://glovis.usgs.gov
- **Partnership between USGS and NASA, in support of CCSP**
- **Support global assessments of land cover, land-cover change, and ecosystem dynamics**

GEOSS Task AG-06-04

- Task
  - Initiate an international assessment effort on forests and forest changes utilizing ongoing land-cover mapping projects (e.g. GLOBCOVER)
  - Ensure application of standardized classifications and harmonization of existing datasets
- Deliverables
  - Up-to-date user needs assessment for forest/land cover observations for forestry at regional and global scales
  - Launch and progress for GEOSS implementation project on international forest assessments
  - Availability and adoption of land characterization standards and updated land cover data

Mid-Decadal Global Land Survey GLS-2005

- Develop a global orthorectified dataset from Landsat or Landsat-like observations based on measurements during 2004-2007
- Pilot project for routine global monitoring in LDCM era
- Use Landsat-7 composites as primary source, Landsat-5 ground stations data to complement, ASTER to fill the remaining gaps, EO-1/ALI over islands
- Processing for L-5 and -7 is completed
- Processing for EO-1 and ASTER yet TBD
- LCLUC products by community in 2009-2010

Anticipated Landsat Products During the Next Couple of Years Based on GLS-2005

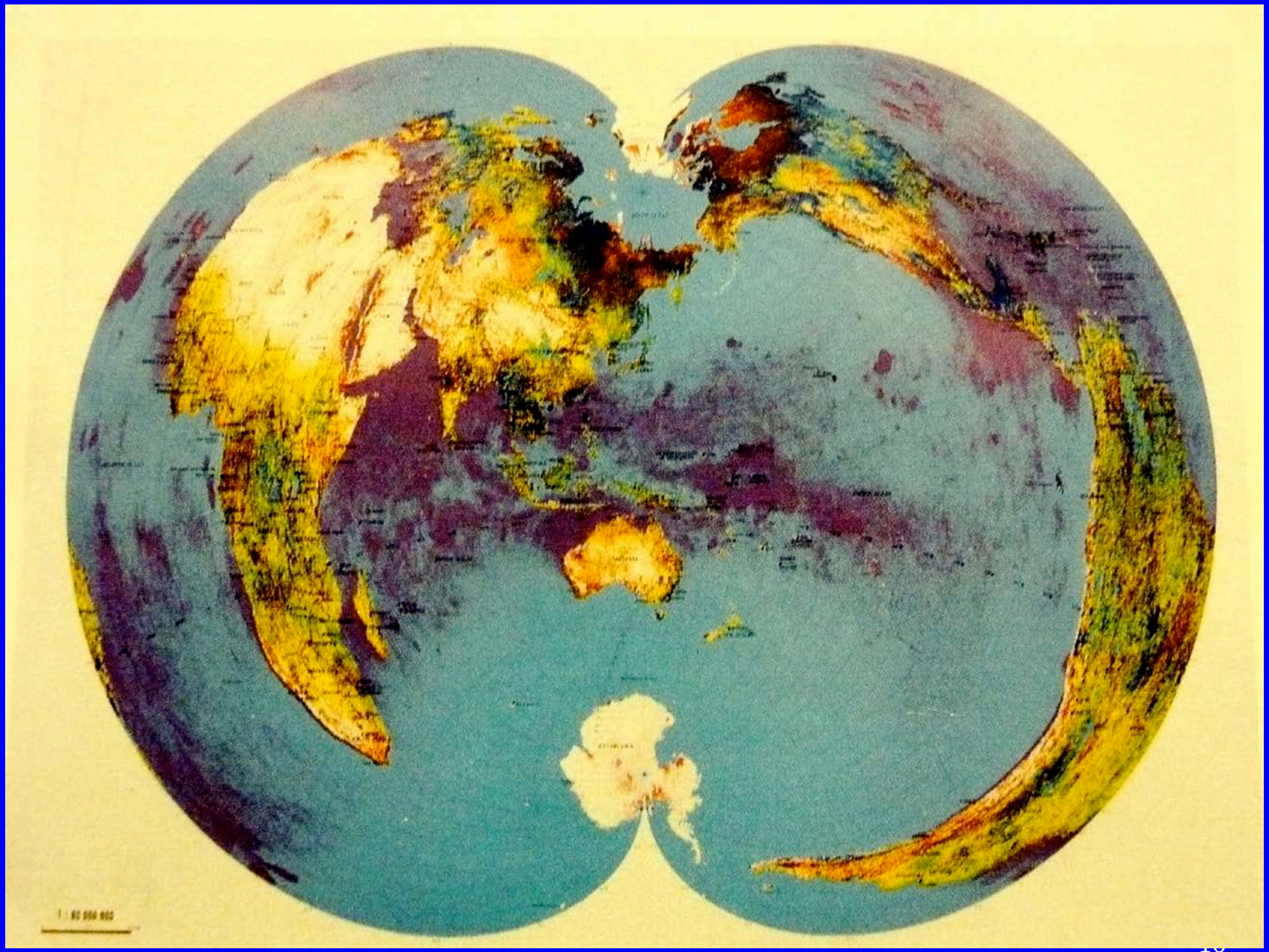
- Skole (Michigan State U.)
  - Amazon, **SE Asia** (forests)
- Hansen (South Dakota State U.)
  - Africa, Northern.Eurasia (forests)
- Chander (USGS)
  - Indian data exploration (focus on radiometry)
- Davis (NASA Stennis Center)
  - Indian data exploration (focus on viewing geometry)
- Giri (USGS)
  - Global **Tropical Mangrove Forests**
- Xiao (U. Oklahoma)
  - **SE Asia** (focus on non-forest cover; Landsat +ALOS/PALSAR)
- Townshend (U. Maryland)
  - Extratropical South America; complement MEASURES Three Decades of Forest Cover Change in the Americas

Towards GLS-2010: Background

- Successful GLS-2005 effort has stimulated interest in GLS-2010 dataset development
- The Group on Earth Observations (GEO) has defined three tasks that are complementary to GLS-2010:
  - Task DA-07-02, which includes a subtask to "Coordinate 2010 Dataset with Contributions from Available International Assets"
  - Task AG-07-03 "Global Mapping of Agricultural Areas at 30m…undertaken at 5-year intervals for 2005 and 2010"
  - Task DA-07-03 "Virtual Constellations," specifically the Land Surface Imaging (LSI) Constellation

Look Into the Near Future: LDCM

- LDCM is planned for 2012: data available in 2013
- GLS-2010 observational period starts in 2 months
- Both Landsats are still alive but high-risk, potentially:
  - One of the Landsats is dead
  - Both are dead
- Landsat TM and ETM+ would be the principal data sources and represent the U.S. contribution to the international effort
- International participation is strongly desired and encouraged – CEOS is a proper framework
- THEOS-1 contribution is under discussion



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Thank you!

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