

NASA Update on WGCV-Relevant Activities

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Washington DC

**CEOS Working Group on
Calibration and Validation**

Potomac, Maryland, USA, March 2010

Contribution to GEO Tasks:

Forest Carbon Tracking and others

- **NASA-USGS contribution through Global Land Surveys (GLS)**
 - GLS-2005 is complete and available at
 - <http://glovis.usgs.gov/>
 - GLS-1975, -1990, and -2000 have been reprocessed with a new geodetic correction
 - GLS-2010 is being collected; product anticipated in 2012
 - Reference for the description of the GLS work:
 - Gutman, G., R. Byrnes, J. Masek, S. Covington, C. Justice, S. Franks, and R. Headley, 2008. Towards monitoring land-cover and land-use changes at a global scale: The Global Land Survey 2005. Photogrammetric Engineering and Remote Sensing, 74, 1, 6-10.

Contribution to FCT (LCLUC Program)

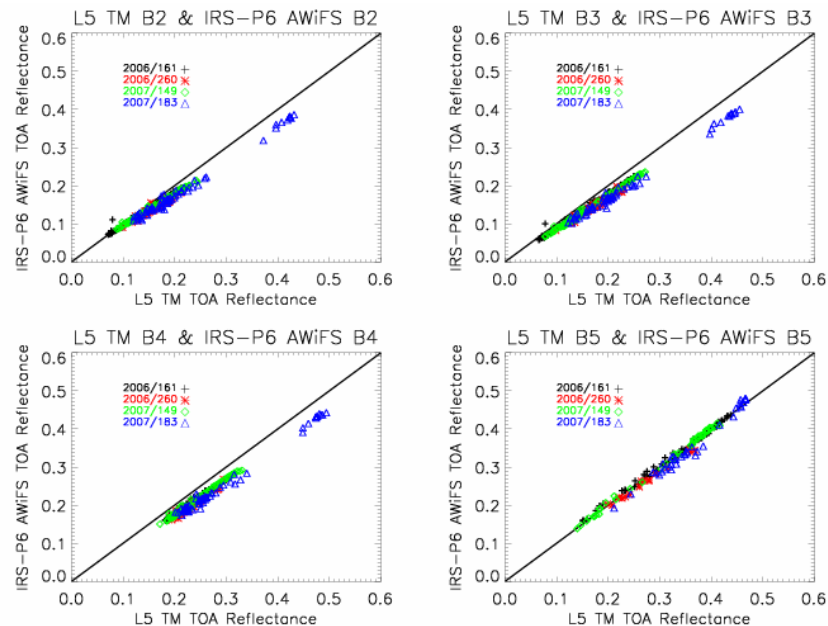
- **Forest cover and forest-cover change products based on the GLS datasets**
 - Developed under the NASA LCLUC program
 - Results are becoming available during this year
 - Funded projects that together will provide a global picture of the forest cover and its change during the last 30 years
 - **Chandra Giri (USGS) - tropical mangrove forest**
 - **Matt Hansen (South Dakota State University) - forest cover in boreal zone**
 - **Dave Skole (Michigan State University) - tropical forest cover change**
 - **John Townshend (University of Maryland) - global forest cover change**
 - These results will produce a synthesis of global forest cover change
 - Additionally, we have a couple of projects that characterize non-US Landsat-like sensors in terms of their radiometry and other specifics as compared to Landsat, including intercalibration between the sensors
 - These projects will facilitate the use of the non-US sensor data for deriving forest cover in lieu of Landsat observations if one or both Landsats become unavailable during the next couple of years, i.e. before the next Landsat is launched

Cal/val GLS Projects

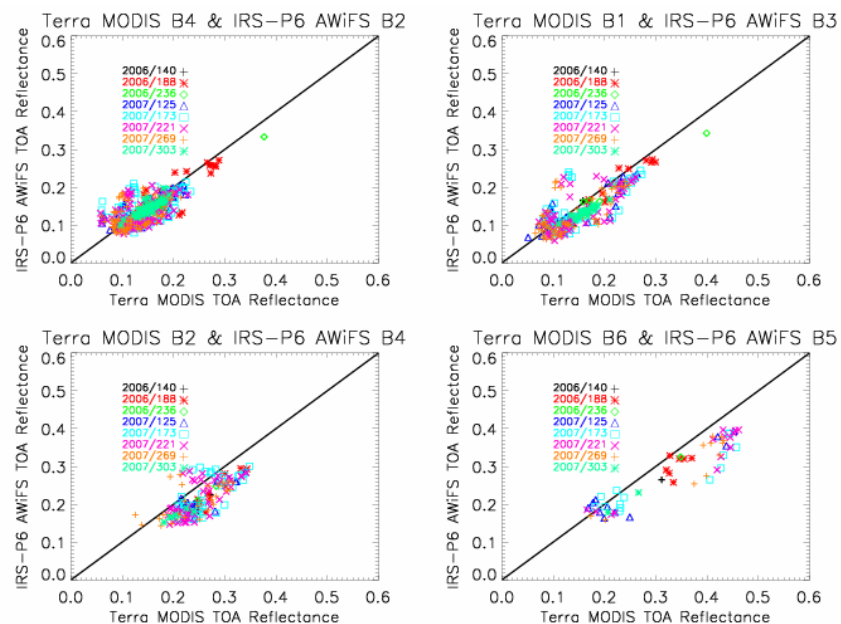
- **Chander, G. (USGS EROS) - Sensor cross-calibration**
- **Davis, B. (NASA SSC) – Sensor viewing effects**
 - Mary Pagnutti
 - Bob Ryan
 - Sam Goward (UMD)

AWiFS cross-cal with TM, ETM+, MODIS

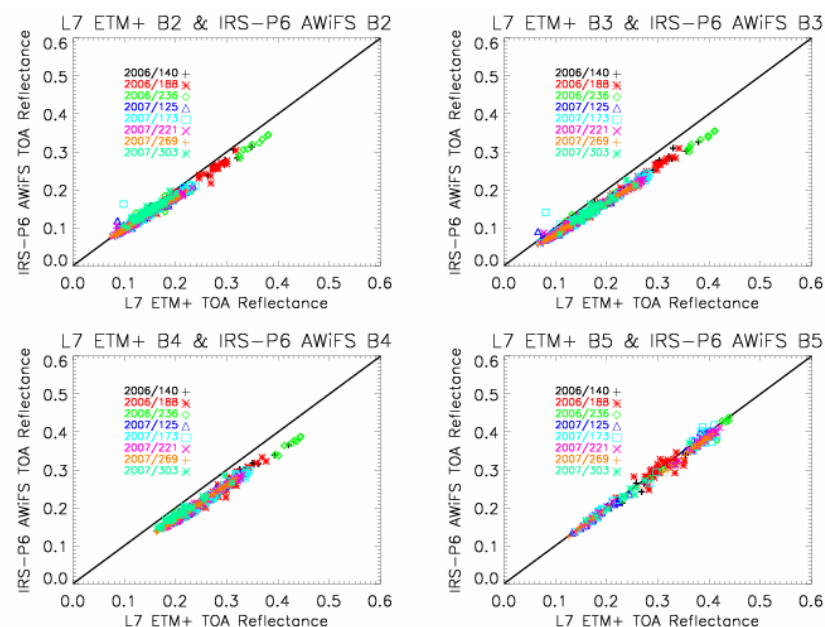
AWiFS versus TM



AWiFS versus MODIS



AWiFS versus ETM+

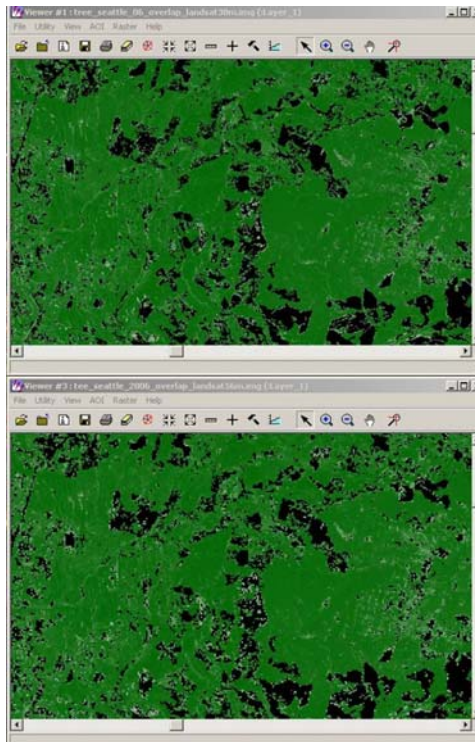


The cross-cal was performed using image statistics from large common areas observed by co-incident image pairs from the two sensors

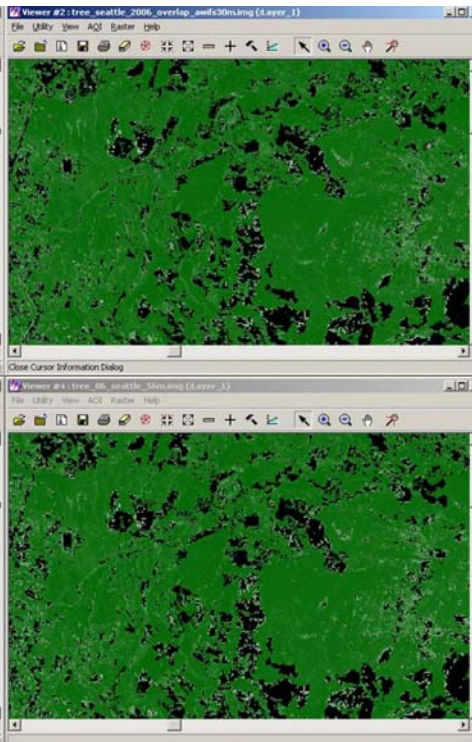
The results indicate that the IRS-P6 AWiFS sensors can be cross-calibrated to the L5 TM sensor within an accuracy of 13%; L7 ETM+ within 16%; Terra MODIS within 23%

2006 Tree Canopy Changes in Seattle

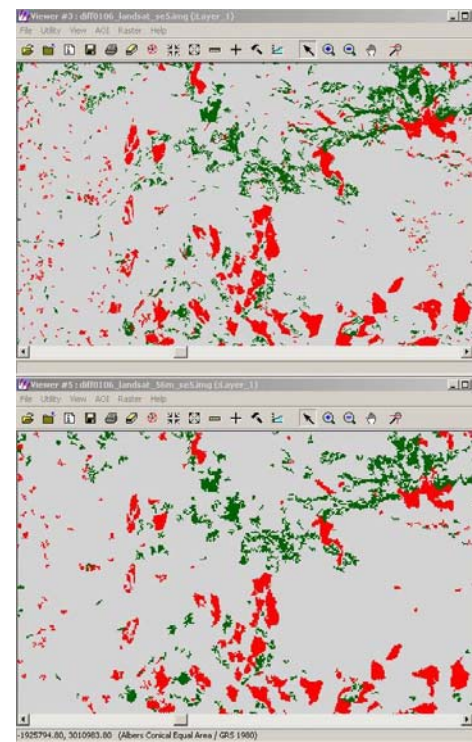
Landsat 30 m



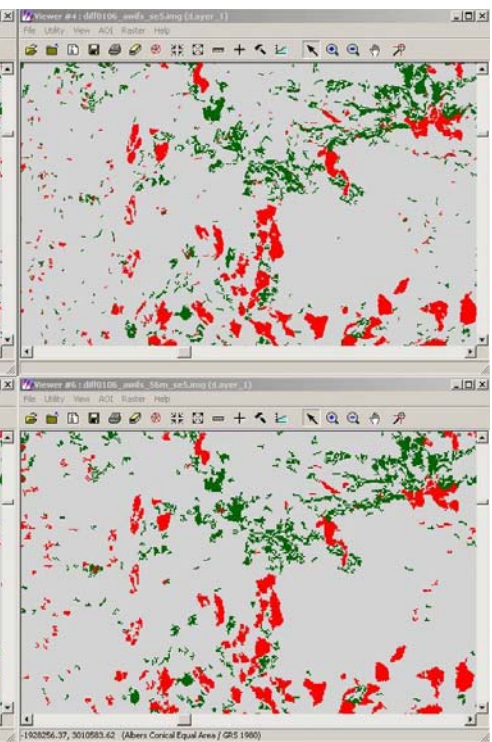
AWIFS 30 m



Change – Landsat 30 m



Change - AWIFS 30 m



Landsat 56 m

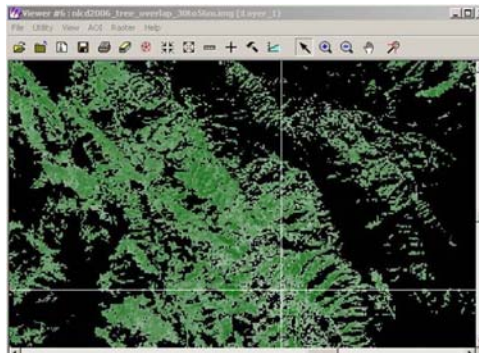
AWIFS 56 m

Change - Landsat 56 m

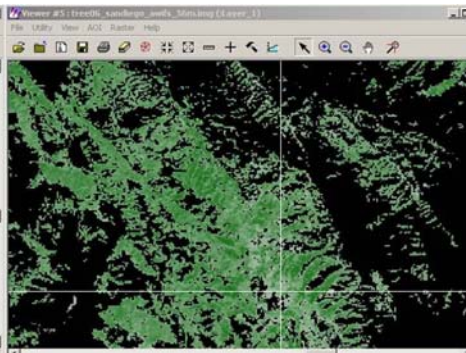
Change - AWIFS 56 m

2006 Tree Canopy Changes in San Diego

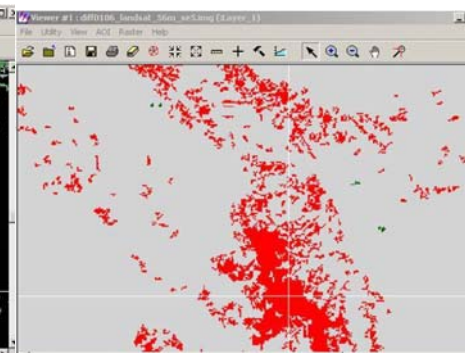
Landsat 30 m



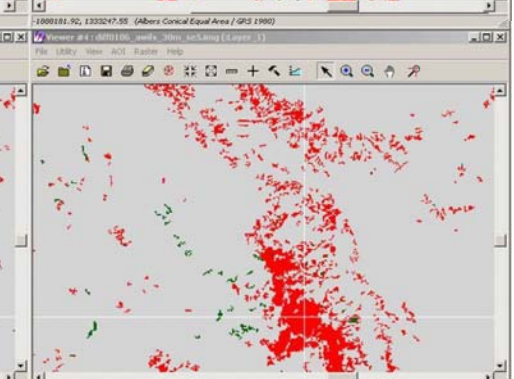
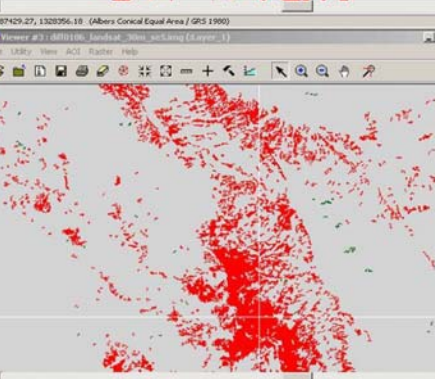
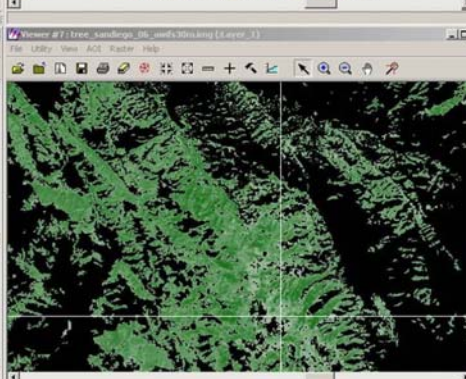
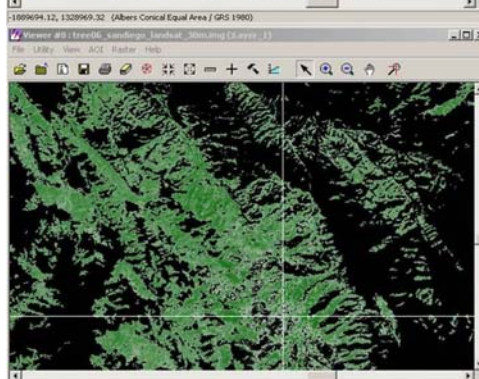
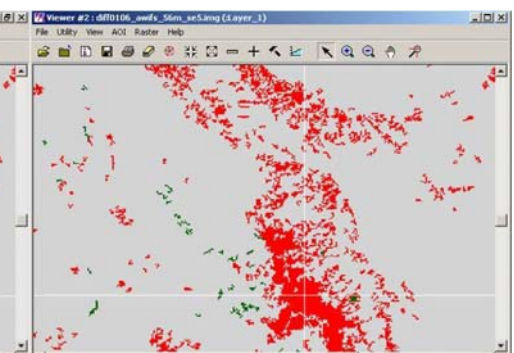
AWIFS 30 m



Change - Landsat 30 m



Change - AWIFS 30 m



Landsat 56 m

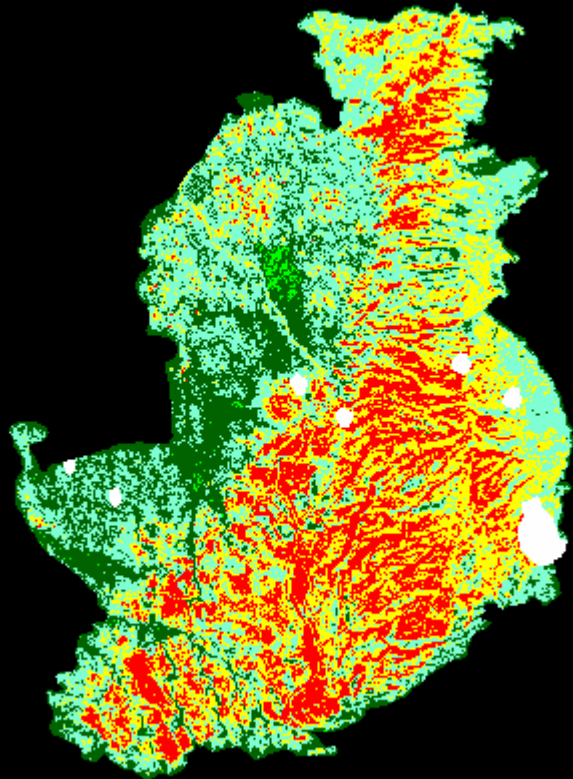
AWIFS 56 m

Change - Landsat 56 m

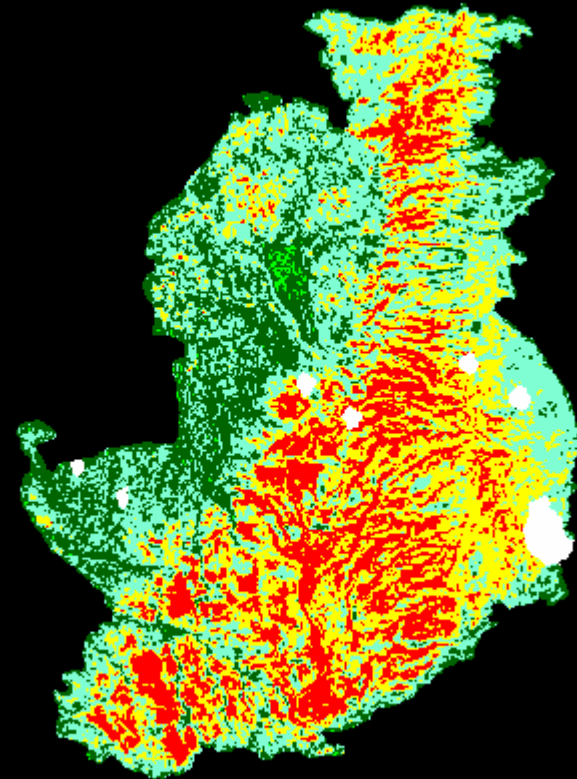
Change - AWIFS 56 m

Assessment of AWiFS data for Monitoring Trends in Burn Severity project (MTBS)

Arizona Warm Fire: July 06, 2006

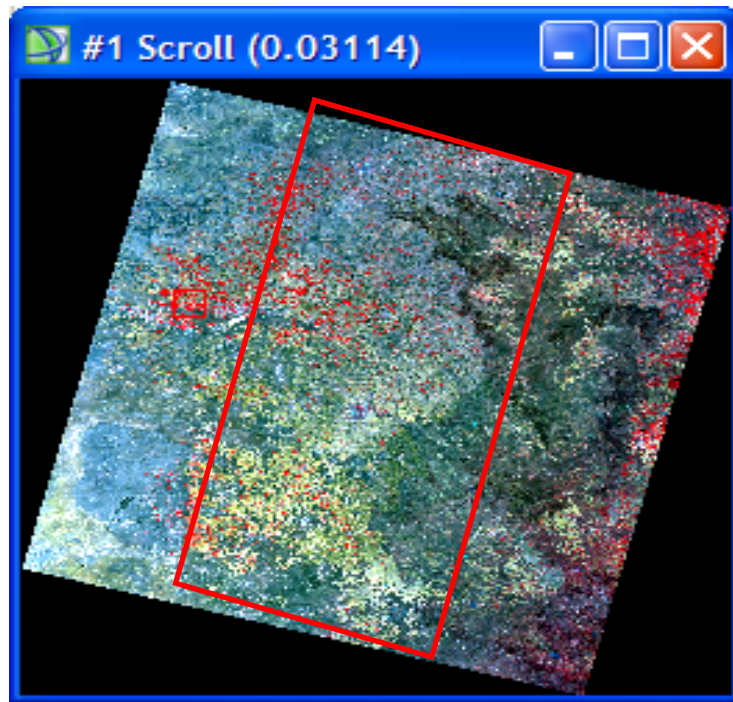


Official L5 TM MTBS dNBR

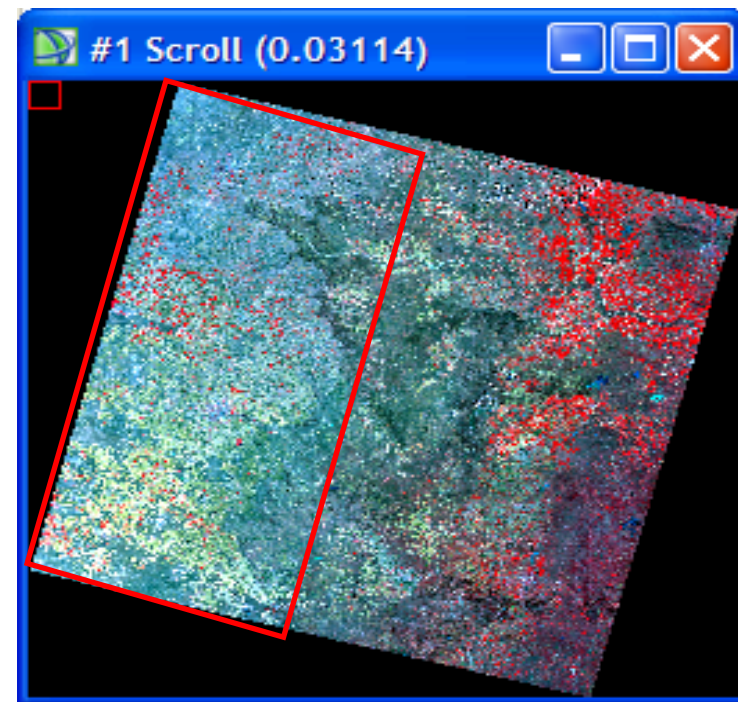


AWiFS dNBR

US Midwest AWiFS Scenes



4/13/08, 264/45/D

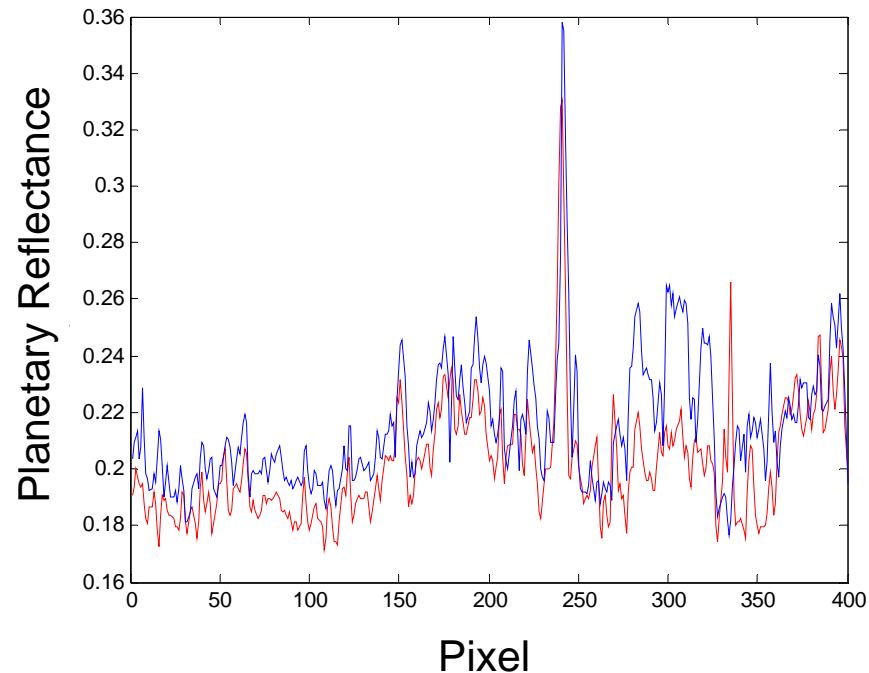


4/18/08, 265/45/D

Overlapping cloud free area highlighted

Preliminary Results

- Random horizontal profiles taken across a corresponding region of two adjacent scenes
 - Scenes acquired 4/13 and 4/18 (very similar solar azimuth and elevation)
 - NIR band
- Approximately .02 difference in reflectance due to viewing geometry differences



Sample
Profile Pair

On Collaboration Between Space Agencies

Looking Into the Near and Not-so-Near Future: glass half full or half empty?

- Half empty
 - I don't see any coordination in designing systems with the same technical specs, launching schedules and processing chains – this needs to start NOW for the post-LDCM era (2015-2020)
 - I am not aware of any coordination upon global acquisition strategy by the space agencies
 - I am not aware of any dataset with global coverage readily available free of charge from any international satellites or constellation
- Half full
 - I know about the progress on data policies for ESA Sentinel data (yet, to be approved by EC); good progress with INPE (no knowledge of any progress with India or China)
 - I see a good progress in ESA-USGS bilateral
 - LSI activities accelerated; high visibility portal; move in the right direction

Vision (Recommendations)

- Twofold objective
 - Move towards REAL constellation in the next 10 years while working on the VIRTUAL one (within 5 years)
- Short-term goal
 - Organize an international group of experts (scientists + engineers) on coordination
 - Develop compatibility in processing chains of products
- Long-term goal
 - Achieve compatibility in sensor specs and orbital characteristics
 - Develop agreements on coordinated launches
- Ultimate goal
 - A truly global, international system of moderate resolution satellites for daily coverage with compatible specs, protocols for reception, and free data policy

Thank You