

Summary of the Boston Landsat Science Team Products and Processing Meeting

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**Landsat Science Team Meeting
January 19-21, 2010**

**Computer History Museum
1401 N Shoreline Boulevard,
Mountain View, CA 94043**

Landsat Data Products Workshop - Plan

- Boston University, October 27-29, 2009
- Workshop Goals:
 - (1) Define a set of Landsat-based products of general use and interest to the community,
 - (2) determine "best practices" (algorithms and such) for production,
 - (3) determine "best practices" for their testing and validation, and
 - (4) pursue support for product implementation.
- Potential data and science products that will be discussed include:
 - SLC-off gap filled products
 - Cloud- and shadow-screened images
 - Temporal composites, data cubes
 - Regional mosaics
 - Surface reflectance

Land cover products: land cover, land cover change, disturbance, fire, deforestation

Biophysical products: LAI, FPAR, etc

Agenda

- Opening
- Presentations
 - Product background and support experiences
- Discussions
 - What can be done, precedents, needed, relate to other products, how, planned for, ...
- Prioritization
- Breakouts
- Reconvened
- Integrated findings and planning

Trends from presentations and discussions

- Cloud screening
 - Critical in support of all applications
- Compositing
 - Gap filling and wide-area coverage; custom tiling
- Time series analysis (and verification)
- Operational nature of product development
 - Data blending
- Identification and Definition of products
 - Relate to national / international info needs

Product discussions

Product	Operational Near-ready Future	Priority (H, M, L)	Type	Team	Comment
L1T	O	H	Standard		Improvements to L1T (i.e., geometry)
- Action: USGS to develop feed back template to communicate geolocation issues					
Surface reflectance	N	H	Standard	John, Eric, Feng, David, Jennifer, Dennis,	Need to determine the level of correction
<p>Running LEDAPS in routine way. Can add to standard processing stream, can implement. There is a series of levels of correction that can be considered.</p> <ul style="list-style-type: none"> - Action: Cloud folks to compare approaches. - *** this needs to be done right away. See Thursday AM notes for emerging work plan. - ACTION: team to develop work plan. Started, see notes from Thursday AM break out session. 					

Cloud product(s)

Clouds (shadows)	N	H	Standard	Curtis, Junchang, Eric, Lazaros, Pat, Mike (map comparison)	Masks and screened images (and snow, water)
<ul style="list-style-type: none"> -Goal to develop an improved science-supported depiction of cloud and shadow mask -Consider as two, operational (done), mask cloud and shadow (following exploration) -Need to define product, including cloud. -Possible to develop probability surfaces -ACTION for next meeting, test candidate cloud/shadow algorithms for Ames January meeting <ul style="list-style-type: none"> oResearch can be supported by community comparison to a common data set (need shadow, water, snow to be included in change control data set; possible to include a cloud score and a cirrus score) oCan prioritize non-cloud / shadow elements for later oTests with a cirrus band also encouraged (from Hyperion). oFocus initially on single image approaches oCompare to control, compare the developed cloud and shadow masks oWould need any data set for mid-November to be shared to those doing tests -Include how a product would be used and fit into project flow (operational fit, timeliness; ...) -Cloud count values should mate with the spatially explicit depictions -Initial image-dependant product may be useful on the short-term (on acquisition processing), with a goal to improve over time -** Action, Pat to create a list of scenes with issues / problems. Users to sent Pat information to support this. -USGS building a terrain occlusion mask (but not for application back through the archive) -Cloud-folks to share approaches, use each-others insights to developed a super-approach 					

Surface temperature product

Surface temperature	Water: O, Land: N	M	Standard	Schott, Martha, Barsi, Rick, Simon Hook	Need to survey community to determine acceptable error for land estimates
<ul style="list-style-type: none"> -Are we ready to implement? Yes. -Tools are also available. -Will currently get surface leaving temperature -Can now do apparent surface temp -Stepping stones possible from down-welled radiance -Longer term goal is to get to surface temp -Research required to compare approaches (split window and otherwise) -Additional corrections required, land cover can supplement process -Questions related to global coverage of emissivity -Note availability of MODIS based emissivity product for comparative efforts -A baseline using reanalysis would enable short term implementation (and methods) -** Action: begin development of work plan. Started. See notes from Thursday AM break out session. 					

Other possible products

Product	Operational Near-ready Future	Priority (H, M, L)	Type	Team	Comment
Land cover					
-Context statements: Goes back in time, global as possible, expect variability, ... -ECV requirements for 30 m LC every 5 years with annual 1 km update; can consider other requirements -Expect USGS to remain active in this endeavour, including intent to pursue ECVs					
Land cover change					Type of change; definition required
Temporal composites					e.g., WELD
Data cubes			Experimental		
Regional mosaics			Towards Std.		
Biophysical products			Experimental		e.g., LAI, fPAR
Synthetic data and products					Modeled based upon actual observations

Land cover needs/goals

- Discussion:
 - Land cover (annual)
 - Global forest change (annual goal)
 - Global land cover change (annual goal)
 - Hot-spots of change with higher temporal change
- ECVs
 - land cover (30m and 1km; timing TBD)
 - land cover change (30m and 1km; timing TBD)
 - biomass
- Forest carbon tracking
- Agricultural lands focus
- Normalized reflectance product

Closing thoughts

- Policy and protocol support with science based products
- Multi-sensor LTAP
- MODIS-izing of Landsat :
 - ... turning data into knowledge using standard science based products
 - What products need be produced at 30 m?
 - Notions of scope of effort from MODIS experience
- Determine which products are applicable for the archive and which are for MODIS, LDCM, eras
- Prioritize: Do what is needed and can be done well