Project Scientist Perspective

Land Use is central to a number of international and national policy issues

- Sustainable Development
- Adaption to Climate Change
- Food Security
- Biodiversity and Conservation

Land Use science is societally relevant and can inform policy

- An opportunity for high profile science publications

Land Use Science (GLP Open Science Meeting, April 24-26)

- **Three Conference Themes**
  - **Land as a nexus for addressing global challenges (climate change, biodiversity, food security)**
  - **Navigating the trade-offs and fostering synergies in land systems**
  - **New frontiers in studying and governing land systems supporting transformations**

- **Sessions Led/Co-Led by LCLUCers**
  - Multi-source Land Imaging – Garik Gutman
  - Land Use Transitions – Jeff Fox
  - Land Rent and Markets – Jinwei Dong
  - Land Use and Human Health – Ruth Defries and Meha Jain
  - Date Ecosystems and SDGs- Ariane de Bremond

- **GLP Science Session Topics Pertinent to NASA LCLUC**
  - Land Use, Sustainability and Agricultural Land Use
  - Essential Land Use Variables (data products)
  - Trade-off between Agriculture and Biodiversity
  - Land Tenure and Land Use Change
  - Telecoupling and Land Use Change
  - Governance and Land Change
  - Land Use Modeling

Some Program Observations

- **An increasing international science reputation for NASA LCLUC (NEESPI, SARI)**
- **Flatline budgets for NASA ESS and LCLUC Research**
  - EU - Copernicus increased funding but a decreasing focus on Earth System Science (inc. land use science)
  - China - Increasing funding for technology research (inc. remote sensing)
- **LCLUC increasing use of non-NASA data**
  - LCLUC Harmonized Landsat Sentinel (HLS - High temporal resolution data) > Future plans and support for global production ?
  - Multi-use Data initiative - MuSLI 2nd Round
  - Fine resolution evaluation and possible future data buys ?
- **AVHRR 40 years (ESA living planet) - NASA EOS approaching 30 years - MODIS approaching 20 years**
  - Global science data products NASA MODIS > SNPP VIIRS>NOAA 20 (JPSS-1) > securing LT Data Continuity
- **LCLUC the major NASA science user of moderate resolution data inc. Landsat (USGS)**
  - USGS Applications Ready Data (ARD): TOA reflectance and B. Temp,, Surface Reflectance, Provisional Surface Temp., Pixel QA
  - Landsat 9 and 10 (scoping underway) – NASA LCLUC Program and USGS Landsat Science Team relationship ?
- **NASA Exploring Cloud Computing (inc. MuSLI Tier 1) – TBD**
  - Google Earth Engine also enabling product generation
- **Global periodic inventories of land cover and continuous global monitoring of within reach**
  - A major LCLUC program goals was to enable this
- **New NASA Land-related Missions (Ecostress, GEDI, NISAR, + Decadal Survey)**
  - Small Science Teams making some data products – but global data sets tbd

Ecostress Products

Summary Table

Level	Name	Version	Point of Contact	Description
L1a	FPA-CAL	1	Tom Logan/William Johnson	Radiometric Calibrated Data
L1b	GEO	1	Mike Smyth	Radiometric Calibrated and Geolocated
L2	LST&E	1	Glynn Hulley	Land Surface Temperature and Emissivity
L2	CLOUD	1	Glynn Hulley	Cloud Detection Algorithm
L3	ET_PT-JPL	1	Josh Fisher	Evapotranspiration, Priestley-Taylor Jet Propulsion Laboratory (PT-JPL) algorithm
L3	ET_ALEXI	1	Martha Anderson	Evapotranspiration based on the ALEXI/DisALEXI model
L4	WUE	1	Josh Fisher	Water Use Efficiency
L4	ESI_ALEXI	1	Martha Anderson	Evaporative Stress Index based on ALEXI
L4	ESI_PT-JPL	1	Josh Fisher	Evaporative Stress Index based on PT-JPL

GEDI Products

https://gedi.umd.edu/data/products/

ATBD #	Data products	Product leads	Resolution
L1A-2A	1A: Raw waveforms, 2A: Ground elevation, canopy top height, relative height (RH) metrics	Michelle Hofton Bryan Blair	25 m (~82 ft) diameter
L1B	Geolocated waveforms	Scott Luthcke Tim Rebold Taylor Thomas Teresa Pennington	25 m (~82 ft) diameter
L2B	Canopy Cover Fraction (CCF), CCF profile, Leaf Area Index (LAI), LAI profile	Hao Tang John Armston	25 m (~82 ft) diameter
L3	Gridded Level 2 metrics	Scott Luthcke Terence Sabaka Sandra Preaux	25 m (~82 ft) diameter
L4A	Footprint level above ground biomass	Jim Kellner Laura Duncanson John Armston	25 m (~82 ft) diameter
L4B	Gridded Above Ground Biomass Density (AGBD)	Sean Healey Paul Patterson	1 km (~0.6 mi) grid
Demonstrative products	Prognostic ecosystem model outputs	George Hurtt	Grid size: Variable
Demonstrative products	Enhanced height/biomass using fusion with TanDEM-X	Lola Fatoyinbo Seung-Kuk Lee	Grid size: Variable
Demonstrative products	Enhanced height/biomass and biomass change using fusion with Landsat	Matt Hansen Chenquan Huang	Grid size: Variable
Demonstrative products	Biodiversity/habitat model outputs	Scott Goetz Patrick Jantz Pat Burns	Grid size: Variable

NISAR Science Products

- Level 3-4 processing (e.g. biomass) will be made by the NISAR science team only over selected regions of the world for calibration and validation purposes and delivered to the DAAC

Product Level	Product Name	Scope	Description
L0	Incoming Data (RAW)	Global	Raw downlinked data delivered to SDS with metadata added for archiving
	Radar Signal Data (RSD)	Global	Corrected, aligned, and time-ordered radar pulse data derived from RAW products and used for further processing
L1	Range-Doppler Single Look Complex (SLC)	Global	Standard L1 product that will be used to generate all higher-level products
	Multi-Look Detected (MLD)	Global	Multi-looked amplitude product in ground range coordinates.
	Nearest-Time Interferogram (IFG)	Antarctica and Greenland. Nearest pair in time and co-pol channels only.	Multi-looked flattened (WGS84 ellipsoid) Interferogram with topographic fringes in Range-Doppler coordinates.
	Nearest-Time Unwrapped Interferogram (UNW)	Global except Antarctica and Greenland. Nearest pair in time and co-pol channels only.	Multi-looked, unwrapped differential Interferogram in Range-Doppler coordinates.
	Polarimetric Covariance Matrix (COV)	Global and all channels. Single/Dual/Quad pol.	Polarimetric covariance matrix (1, 3, or 6 layers) in Range-Doppler coordinates.
L2	Geocoded SLC (GSLC)	Global and all channels.	Geocoded L1 SLC product using the MOE state vectors and a DEM.
	Geocoded Nearest-Time Unwrapped Interferogram (GUNW)	Global except Antarctica and Greenland. Nearest pair in time and co-pol channels only.	Geocoded multi-looked unwrapped differential Interferogram. Same as UNW but resampled onto a UTM grid.
	Geocoded Polarimetric Covariance Matrix (GCOV)	Global and all channels. Single/Dual/Quad pol.	Geocoded polarimetric covariance matrix (1, 3, or 6 layers) using the MOE state vectors and a DEM.

LCLUC Discussion Points for this Meeting

- Current Regional/Thematic Science Approach to LCLUC ROSES
  - Emerging LU Science Themes
  - New LCLUC data initiatives
  - Interdisciplinary Science Topics involving Land Use
  - Access to and management of LCLUC Project data products
- How to Increase Program Visibility (Web Site and Webinars)
  - Impactful Science
  - High Visibility Publications
  - Sharing Your Accomplishments – Papers, Press Releases Graduating Students
  - Project Highlight Slides to the Program Manager
  - Your Project Representation
- Role of new (NASA and Other) satellite data in LCLUC
- *The Future of NASA Land Data Products – Workshop Fall ‘19*

LCLUC Spring ‘19 Meeting Agenda

- Day 1. Tuesday April 9
  - **Session I. Introduction.**
  - **Session II. Prelimin. Results on Evaluating Fine Res’n data for LCLUC Science**

  Group Photo
  Lunch 12.15 – 1.30

  - **Session III. LCLUC in Southeast Asia.**
  - **Session IV. Posters Lightning Talks (1.5 minutes)**
  - **Poster Viewing** and Sponsored Reception. KBRwyle Govt. Services

  Adjourn 7.30

Meeting Agenda Cont'd

- Day 2. Wednesday April 10
  - **Session V. International Linkages and Capacity Building in Southeast Asia**
    Session VI. Synthesis Projects Over the Globe

  Lunch 12.20 – 1.30

  - **Session VII. LCLUC in Northern Eurasia (Caucasus Projects Prelim. Results)**
  - **Session VIII. MuSLI Preliminary Results (LCLUC-2017 Round)**

  Adjourn 5pm

Meeting Agenda Cont'd

- Day 3. Thursday April 11th
  - **Session VIII Cont'd. MuSLI Preliminary Results (LCLUC-2017 Round)**

  Lunch 12.00 – 1.00

  - **Session IX. Program Direction and Wrap Up Session**

  Adjourn 2.30