Land Product Validation (LPV) Sub-group Meeting

Fernando Camacho – (EOLab/U. Valencia) – Chair
Michael Cosh – (USDA) – Vice Chair
Subgroup meeting
09 Nov 2021

NEXT LPV TELECON 01 Feb 2022
**Attendance**

**Participants**
Fernando Camacho  
Michael Cosh  
Jaime Nickeson  
Zhuosen Wang  
Gareth Roberts  
John Bolten  
Carsten Montzka  
Tomoaki Miura  
Hongliang Fang  
Louis Giglio  
Sylvain Leblanc  
Frank Göttsche  
Sasha Tyukavina  
Dominique Carrer

**Not attending**
Else Swinnen  
Marie Weiss  
Victor Rodríguez-Galiano  
Glynn Hulley  
Laura Duncanson  
John Armston  
Mat Disney  
Chris Crawford  
Joshua Gray  
Sophie Bontemps
Proposed agenda items

• Welcome
• SALVAL tool and validation paper
• Seeking LPV Vice Chair nominations
• Focus Area Web Status
• Focus Area Reporting
SALVAL tool and validation paper

LPV Action Plan: 19-LPV-10

- SALVAL migrated to online platform
LPV Action Plan: 19-LPV-10

- SALVAL ground database

Ground Database:

- 99 candidate sites (ICOS, TERN, NEON, FLUXNET, SURFRAD, BSRN, GBOV) : 23 LPV SuperSites
- Period: 2000-2020
- 67/99 spatial representativeness analyzed (in progress)
SALVAL tool and validation paper

LPV Action Plan: 19-LPV-10

- Spatial representativeness analysis

DRAK (36.6242,-116.0199)

TALL (32.9504,-87.3933)

\[
ST_{score} = \left( \frac{|R_{CV}| + |R_{ST}| + |R_{SV}| + R_{SE}}{3} \right)^{-1}
\]

Rcv : Relative coefficient of variation
Rst: Relative strength of the spatial correlation
Rsv: Relative proportion of structural variation
Rse: Scale requirement index

\[
RAW_{score} = \left| 2R_{CV} \right|^{-1}
\]

LPV Action Plan: 19-LPV-10

- Spatial representativeness analysis

ST=2 good compromise
SALVAL tool and validation paper

LPV Action Plan: 19-LPV-10

- Spatial representativeness analysis

Validation paper in progress including 4 datasets

- C3S VGT V1, ESA GLOBALBEDO, NASA MODIS C6.1 & GLASS
Seeking LPV Vice Chair nominations

LPV Vice Chair

March of 2022 is the end of the term for Fernando and in April Mike will take over for him as the new LPV Chair.

This means we are seeking nominations for a new vice chair NOW.

If any WG members are interested, please let us know.

If you have any good candidates in mind, please pass them on. We will be seeking a candidate that is not from North America.

I am not aware of any candidates as a result of the Newsletter distribution.
Focus Area Review/Update Status

Status of updates by focus area.

Some only need a review, changes are not required, just assure all is current!

Good news is that most Product lists are now up to date.

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Focus Area Reports

- Biophysical (LAI/FAPAR)
- Fire/Disturbance
- LST&E
- Surface radiation
- Phenology
- Soil Moisture
- Vegetation Indices
- Biomass
- Snow
- Land Cover
Website review

– Product list reviewed and updated
– Product table: removed L2 but retain L3 products for MISR, added GEDI LAI profile link
– New references added

Proposed two datasets to DIRECT 2.1 (Curator: Fernando Camacho)

– NECC: Field and upscaled biophysical data (from HJ-1, L7/L8 & S2) for 2 sites (30 ESUs) in NE China crops (LAI, CI, FAPAR, and FVC), 2012-13, 2016, 2019.


– ValLAI_Crop: Corresponding 80 upscaled reference data (3 km * 3 km, from Landsat) (http://www.nature.com/articles/s41597-021-01024-4)

Conferences


Field campaigns

– Vertical LAI measurement (DNF, 42.41°N, 117.31 ° E, China), Apr, Jun, & Sep, 2021
Biophysical reference datasets in NE China croplands (NECC)

S2 (Aug 2, 2016)
(maize, soybean, sorghum)

MOD09 (Jul 19, 2016)

HJ-1 (Jun 24, 2013)
Honghe (rice)

Fang et al. (2019, RSE)
ValLAI_Crop sites
b) Beijing,
c) Youyi, Heilongjiang
d) Longkang, Anhui
e) Zhoukou, Henan
f) Jiaozuo, Henan
Recent Publications


Fire Disturbance (2/3)

Conferences

AGU 2021 (13 - 17 December 2021)

• Remote Sensing of Fire Processes and Biomass Burning (BB) – 17th December [A52F]

• Themes
  • Verification of satellite and airborne retrieval of fuels, fires, and smoke using field measurements;
  • Modeling capabilities including machine learning tools synergetic with remote sensing for fire behavior and smoke monitoring;
  • Comparison of fuels, fire and smoke observations at multiple scales;
  • Characterization of fire behaviours and conditions in relation to smoke properties
Fire Disturbance (3/3)

Products

Burned area

Small Fire Database (SFD) Burned Area pixel product (V2)

- Sub-Saharan Africa for 2019
- Sentinel-2A,B MSI imagery + VIIRS active fire data
- preliminary validation
  - commission and omission errors of 7.8 and 13.5%

COVID-19 and conferences

• 6th Recent Advances on Quantitative Remote Sensing (RAQRS) Conference, postponed further: **Sep 19-23, 2022, Valencia (Torrent), Spain**


Project news

• LSA SAF (EUMETSAT): in Oct 2021 KIT completely overhauled LST validation stations at Gobabeb, Namibia – good to go for another 10 years!

• CCI_lst **Phase 2** proposal has been submitted to ESA (end Oct 2021)

• Copernicus LAW: four LST stations are now running (KIT Forest, Svartberget, Hyytiälä, Puechabon). Robson Creek (Australia) end 2021

• LST component of LAW project has been formally extended to Dec 2022

• Landsat 9 TIR checkout and validation activities scheduled for Oct-Nov 2021

• ECOSTRESS collection 2 (build 7) improved LST&E products in early 2022.
LST & Emissivity (2/3)

LST Validation, Gobabeb (Namibia)
Recent LST&E publications


- P. Reiners et al. (2021), Validation of AVHRR Land Surface Temperature with MODIS and In Situ LST - A TIMELINE Thematic Processor, Remote Sensing, doi: 10.3390/rs13173473.


- Chen et al. (2021), Land Surface Temperature from GOES-East and GOES-West, Journal of Atmospheric and Oceanic Technology, DOI: 10.1175/JTECH-D-20-0086.1
• Update albedo products listed in the LPV website

• *In-situ* albedo measurements
  Coordinate with scientists from China to share the *in-situ* albedo measurements for albedo products evaluation.

• SALVAL
  The SALVAL tool is almost ready to be online, and Fernando is leading a paper on albedo products validation with SALVAL

• Conference/workshop
  ➢ Workshop: "Towards a EUMETSAT roadmap on AI and Machine Learning" 9 December 2021 (more information in the next days)
Land Surface Phenology

Protocol

- Work has continued on the protocol. Have invited initial input from select folks in the community prior to seeking feedback from the broader community.
- Hoping to plan a review meeting in-line with either EGU, LPS, or the recently announced Phenology conference in France.
- No luck reaching out to the LPS organizers to arrange a side meeting to discuss the protocol with the broader community.

Other

- Have continued to work on figuring out how to use eddy covariance data as independent validation data.
- Have undertaken a project to download all Planet data over NEON sites with phenology observations. Will expand to PhenoCam sites and other eddy covariance sites depending on the outcome. Hoping the transect direct observations, along with fine scale phenology from Planet data will be useful for scaling across various LSP datasets.
Soil Moisture

News:
• The Soil Moisture and Ocean Salinity (SMOS) mission running now for 12 years is a great success. The formal SMOS mission extension review is currently prepared by Yann Kerr (CESBIO). Until November 15th it is possible to contact Yann (yann.kerr@cesbio.cnwes.fr) to co-sign the recommendation letter to support further years of data acquisition.
• How to handle minor errors in the Good Practices Documents? Submitting Version 1.1?

Workshops:
• 6th Satellite Soil Moisture Validation and Application Workshop, postponed to 7-9th June 2022, Perugia, Italy
• World Congress on Soil Science, 31 July - 5 August 2022, Glasgow (https://22wcss.org)
• 7th Satellite Soil Moisture Validation and Application Workshop, Fall 2024?, New Orleans, USA?
VI Focus Area Updates:

Updated the VI product list

**New!** GCOM-C SGLI NDVI, Level 3 Gridded@0.04 deg., Daily, 8-day, Monthly (2018-present)

**New!** GCOM-C SGLI EVI, Level 3 Gridded@0.04 deg., Daily, 8-day, Monthly (2018-present)

**New!** VIIRS Vegetation Health Product, Gridded 1 km, Daily, Weekly (2012-present)

LEO-GEO inter-comparison exercises:

MODIS vs. Himawari-8 AHI for NDVI and EVI (Borneo, Japan, & Australia)

VIIRS vs. GOES-R NDVI for NDVI (Southwest USA)
INARCH meeting held over October 18–20

• Review recent advances in modelling and combined use of modelling and observations at INARCH’s mountain research basins

• Define a collective vision and refined plans for a second phase of the program.

• we are planning to carry out a Common Observing Period Experiment (COPE), focusing on obtaining high-quality measurements to the extent possible, defining this as starting in 2022 to coincide with the start of the snow season in the southern hemisphere, and carrying on until 2024.
GEO-TREES: A forest biomass reference system from tree-by-tree inventory

Rationale
- Need to validate Forest Biomass products.
- Requires data that are usually not collected by ecologists.
- Collecting and sharing data requires funding and coordination

Goal
- Funding for an equitable and sustainable system of recurrent site measurements
- 100 core sites (+210 opportunity sites), 5 years
- In situ tree data + by 3D lidar data (ground, air, UAV)

1st yr Activities
- Writing governance & objectives, set up Project Secretariat,
- Reach out to potential funding partners and agencies
- Link to GFOI and GEOBON
Above Ground Biomass (2/3)

GEO-TREES will build on existing networks - accessible, equitable data

Forestplots, ForestGEO, Afritron etc
Above Ground Biomass (3/3)

This [Biomass Earthdata Dashboard](#) was created by the NASA-ESA Multi-mission algorithm and analysis platform ([MAAP](#)). The related biomass products are currently being analyzed through an open science [Biomass Harmonization Activity](#) that uses the MAAP.

The Biomass Harmonization Activity

Biomass, the living part of vegetation systems, plays a crucial role in climate. Around half of biomass is carbon, so destruction of vegetation, as in deforestation, releases carbon dioxide to the atmosphere. This carbon source is huge (about 6 billion tons of carbon dioxide per year). At the same time, vegetation growth pulls carbon dioxide out of the atmosphere and stores it as biomass. Hence biomass and its change, especially forest biomass, is a key part of both the climate problem and its solution.

Mapping aboveground biomass is therefore a priority of several ongoing, new and upcoming NASA, ESA and JAXA missions, including GEDI, ICESat-2, Sentinel-1, ALOS-2, ALOS-4, BIOMASS and NISAR.

A primary purpose of these missions is to provide biomass density maps that can be used in forest carbon estimation and reporting, and forest and land use management for climate mitigation purposes. Currently, national GHG estimation and reporting typically depends on either National Forest Inventories (NFIs) or other sparse forest plot data. While the 2019 Refinement to the 2006 IPCC Guidelines provides good practice guidance on using biomass density maps for country purposes, there are very few concrete country examples because it is only recently that space-based data have become available at the level of detail and quality useful for such purposes. There are, however, different space missions using different sensors and technologies (radar, lidar) and thus produce different estimates of biomass. Such disparities are a potential source of confusion for users, so it is highly desirable to produce a single most accurate biomass dataset by combining the strengths of the individual sensors. This dataset must have undergone rigorous, consistent and transparent validation if it is to be used with confidence by the policy community. This issue is pressing as the world moves towards United Nation Framework Convention on Climate Change.
Land Cover

ESA WorldCover – **New!** Global LC map at 10m spatial resolution

**ESA WorldCover 10 m 2020**

Released on 20 October

- 11 LC classes
- Overall accuracy is 74%

There is currently an ongoing exploration of the product and its validation

[https://viewer.esa-worldcover.org/worldcover/](https://viewer.esa-worldcover.org/worldcover/)