Land Product Validation (LPV) Sub-group Meeting

Fernando Camacho – (EOLab/U. Valencia) – Chair
Vice Chair – Michael Cosh (USDA)
Subgroup meeting
3 Nov 2020

NEXT LPV TELECON 05 Jan 2021
## Attendance

### Participants
- Fernando Camacho
- Michael Cosh
- Jaime Nickeson
- Zhuosen Wang
- Laura Duncanson
- Gareth Roberts
- John Bolten
- Sylvain Leblanc
- Carsten Montzka
- Tomoaki Miura
- Hongliang Fang
- Louis Giglio
- Pontus Olofsson

### Not attending
- Joshua Gray
- Marie Weiss
- Frank Göttzsche
- Victor Rodríguez-Galiano
- Else Swinnen
- Sophie Bontemps
- John Armston
- Glynn Hulley
- Mat Disney
- Chris Crawford
- Dominique Carrer
- Thomas Nagler
Proposed agenda items

• Welcome
• WGCV-48 Report
• WGCV and LPV next meetings
• ESA – Land Product Validation Strategy Workshop
• Focus Area review and update status
• Focus Area Reporting
WGCV-48 virtual report

• Very short virtual meeting on 28th October). First meeting chaired by Akihiko Kuze (JAXA), with Philippe Goryl (ESA) as vice chair.
• Akihiko acknowledges Cindy Ong (CSIRO) for her leadership over the two last years
• Chair special interest topics:
  – Carbon and biomass to contribute to the Paris Agreement (validation of retrieved products and fluxes),
  – CEOS Analysis Ready Data (in particular for atmospheric and ocean missions, as well as industry’s role),
  – Cal/Val Portal.
• LPV reported on the status of Soil Moisture and Biomass validation protocols and presented the proposed CEOS Forest Biomass Reference Network.
  – FRM for Soil Moisture project will kick-off in January
• Infrared and Visible Optical Sensors (IVOS)
  – The next round of sea surface temperature comparisons will kick-off soon. ESA has agreed to fund the next comparison. The target is Q2 2022
  – The commercial sector is keen to have an ‘analysis-ready’ standard to facilitate transparency with customers, and there is interest in using CARD4L as a basis. An IVOS sub-team is working on a strawman of an evolved CARD4L that fits the demands of IVOS’s industry contacts.
• Terrain Mapping (TMSG)
  – The DEMIX (Digital Elevation Models Intercomparison exercise) is the main focus of the TMSG. The first kick-off teleconference was held in June, about 30 active participants.
  – DEMIX delayed 3 months for the unusual year.

→ Copernicus DEM 30m resolution dataset is publicly available with a free & open licence.
  Further details available at: https://spacedata.copernicus.eu/fr/explore-more/news-archive/-/asset_publisher/Ye8egYeRPLEs/blog/id/434960

• Microwave sensors (MSSG)
  – Soil moisture and snow water equivalent by active and passive microwave products are being discussed related to a new mission for terrestrial water cycle monitoring, CFWSAT (China-France Water Satellite), where soil moisture and snow water are two of the main targets. Combined active and passive instruments will be flown for this mission.
WGCV-48 virtual report

Geoscience Australia report
- Committed to SRIX4Veg task

Validation of Surface Reflectance - Phase 2

Aim is to cover additional sites that are not easy to access (e.g. vegetated, relief, aquatic). Phase 2 of the SR validation has commenced, with planning and acquisition of equipment and calibration of instruments.

DJI Matrice 600 drone, smaller multi-rotors, Flame mini Spectrometer, Spectral Evolution SR-3500 compact full range spectrometer are being used to collect data using similar protocols from Phase 1.

Validation with Flame Spectrometer mounted on Drone

Local drone based spectrometer trials were done
Example shown for synchronous data takes with Sentinel 2B
ASD + Flame spectrometers used in tandem
Results for data takes at 10m and 2m spacing
Drone based BRDF characterisation is also being planned
WGCV and LPV next meetings

• WGCV meetings
  - WGCV-49 July 2021 Virtual
  - WGCV-50 Early 2022 Tokyo
  - WGCV-51 Joint F to F meeting with WIGISS 2022

• LPV next plenary – May 2021 Virtual
  - 2 days * 2-3 hrs.
    • First day invited speakers (agency and networks reports).
    • Second day, FA reports / update LPV action plan.
ESA – Land Product Validation Strategy Workshop

- Virtual, 30 November and 1 December 2020. Invited EU experts.
  1) Land validation in a metrological context
  2) Future operational validation needs
  3) Land validation in an operational context
     - “CEOS LPV Supersites and Pathways towards an Operational Validation System for Land ECVs” (F. Camacho, 30 min)
  4) Recent advances in land validation
  5) Final discussion and recommendations
     - Discussion around key topics:
       - Critical spatio/temporal/thematic data gaps in current Land Cal/Val systems
       - Readiness of current networks in terms of protocols, traceability, uncertainty
       - State of play and prospect for a sustained global Land Cal/Val system
       - Synergies among current and future Land Cal/Val activities at European level
     - Recommendations and needs for the ESA Land Cal/Val strategy

Please, send to me your inputs and comments by 20th November!
Status of updates by focus area.

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

Action needed!!

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<tr>
<th>Focus Area</th>
<th>Letter sent to leads</th>
<th>Home Page Review / Update</th>
<th>Products Reviewed / Updated</th>
<th>Collaboration Review / Update</th>
<th>References Updated</th>
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<td>Fire/Burn</td>
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Focus Area Reports

- Soil Moisture
- Vegetation Indices
- Snow
- Biomass
- Land Cover
- Biophysical (LAI/FAPAR)
- Fire/Burn Area
- LST&E
- Surface radiation
- Phenology
Soil Moisture (1/2)

News:

- **Good Practices Protocol: After feedback from the community the final version has been published:**

News (con’t)

• A new proposal for the bistatic L-band fully polarimetric SAR mission Tandem-L is prepared for the German Helmholtz roadmap. Could become interesting also for other focus areas (e.g., snow, biomass).

• Plans for a German Monitoring network TerraNet: Multi-compartment real-time monitoring (in situ and remote) of hydrologic and bio-physical variables including their implementation in high performance computing simulations and forecasting.

Workshops:

• National Coordinated Soil Moisture Monitoring Network (NCSMMN) Town Hall at AGU is scheduled for December 14th 2020 at 1-2 pm ET / 10-11 am PT
• 6th Satellite Soil Moisture Validation and Application Workshop, postponed to autumn 2021, Perugia, Italy
• SMOS for Climate symposium, postponed to 9-11th March 2021 at the Eden project, UK
• 7th Satellite Soil Moisture Validation and Application Workshop, Fall 2022, New Orleans, USA
Began drafting an outline of the VI validation good practices document, referring to:

– The good practices documents of LAI and albedo
– The outcomes from the last VI focus area workshop (December 2018)

New publication on product inter-comparison:

Update on Snow Products:

ESA SNOW-CCI:

- New Snow Cover products V1: planned to be released by mid Nov., 2020
  - daily, global, ~1 km, Dec 2000- Dec 2019, from MODIS
  - daily, global, ~5 km, 1980- Dec 2019, from AVHRR

EEA Copernicus High Resolution Snow Extent Services:

- from Sentinel-2 (20m, near real time; Europe; planned for May 2020); released by Mid July 2020; User Consultation WS (via WEBEX), 15-16 October 2020
- Wet snow extent from S1 for HR FSC snow layer: development and implementation of service started (prototype planned by Q3/Q4 2021).
Snow 2/2

- Second Satellite Snow Product Validation and Intercomparison Exercise (SNOWPEX): Kickoff of by September 2020;
  - Extension of period with 2015-2020
  - New Satellite & Sensors
  - Improved Snow Algorithms and Products
  - Consolidation of trends of snow extent
  - ISSPI-3 planned for Q3 2021 (TBD; COVID status) (SnowPEx Partners informed by mid of Nov 2020).

- Upcoming relevant Workshops:
Above Ground Biomass

• Two presentations at October CEOS plenary: 1) Protocol update and 2) Proposed biomass reference network
  • Protocol draft complete and in public review (!!). Open for comments until December 15th
  • Scheduled for endorsement at SIT-35 (was to be endorsed at October 2020 plenary, but pushed for longer review period)
  • Proposed reference network presented to CEOS principals, but also now to GFOI and the World Bank (searching for large investment, if successful would be useful for other focus areas).
• A Biomass Change Workshop, hosted by the Biomass CCI (https://climate.esa.int/en/events/biomass-change-workshop-19-october-6-november-2020/)
The focus of the third week is on change, with a planned outcome to work toward a biomass change chapter for the protocol (V2)
• Multi-mission group still very active – constantly growing; quick mission updates
• JAXA, ISRO, CNES, NASA, ESA all contributing in some way to the reference network. Hoping to start small, and build. ESA requested a prioritization of sites. We are also working to breakdown the budget into separate data collection and curation activities (~50/50).
• BRIX2 activity launch in Feb, 2021
• ICESat-2 and GEDI products continue to flow, with early GEDI biomass products coming out early 2021.
Land Cover

• Sophie Bontemps has organized a special session that has been accepted for IGARSS 2021

  *CEOS Land Product Validation: Sampling-based estimation of area and accuracy for Land Cover products*

• The World Bank is sponsoring the development of tutorials that aim to take user reporting under REDD+ from pre-processing of data, to running algorithms in GoogleEarth Engine, to sampling-based approach to estimate of area and map accuracy. LC focus area involved in this effort, which is proposed to be called OpenMRV. This is an attempt to help users navigate the various tools and platforms and to help consolidate what is out there.
Fire Disturbance

Updated the website

Publications
- Active fire validation
- Burned area validation
- Product development

Available products
- Remove obsolete products

Landsat Level-3 burned area product over CONUS
- Analysis ready
- 1984 – present
  Burn Probability and burn classification


Biophysical (1/2)

- Website update

- GCOM-C LAI/FAPAR products (V2.0, 250 m, Jun 2020)

- Meetings
  - ISPRS, Nice, France, Jul 4-10, 2021.
  - EO for agriculture under pressure conclusions (5-9th October):
    - Need of establishing best practices and standards for data sharing
    - Lack of in situ data for agriculture, more validation needed
    - LAI/fAPAR recognized a essential agricultural variables (GEOGLAM)

- Special issues
    Editors: H. Fang, Z. Zhu, Y. Liu and Y. Zhou
  - “Remote Sensing of Biophysical Parameters” (deadline: Nov 27, 2020)
    Editors: J. GarcíaHaro (U. Valencia), H. Fang (CAS), and M. Campos-Taberner (U. Valencia)
    http://www.mdpi.com/journal/remotesensing/special_issues/Biophysical_Parameters
  - "Recent Advances in Satellite Derived Global Land Product Validation“ (Dec 31, 2020)
    Editors: F. Camacho (U. Valencia) and J. Dash (U. Southampton)
Recently published papers


COVID-19 and conferences

- AGU Fall meeting, **7-11 Dec 2020: Virtual**
  - Temperature Session: Taking the Temperature of the Earth

- 6th Sentinel-3 Val Team meeting: **moved to 14-17 Dec 2020**
  Virtual meeting, info at: [www.eventsforce.net/s3vt](http://www.eventsforce.net/s3vt)

- ECOSTRESS science and applications team meeting, **Dec 1, 2020, virtual**
  [https://ecostress.jpl.nasa.gov/events/ecostress-science-and-applications-team-meeting-1](https://ecostress.jpl.nasa.gov/events/ecostress-science-and-applications-team-meeting-1)

- EUMETSAT Conference 2020: **cancelled**
  (next: Bucharest, 20-24 Sep 2021)

- 6th Recent Advances on Quantitative Remote Sensing (RAQRS) Conference: **postponed** (Sep 2021)
Lake Constance inter-comparison

Inter-comparison of Heitronics KT15.85 IIP and ISAR (www.isar.org.uk) onboard BSB ferry Friedrichshafen (useful data from 07.09. to 23.09.2020).
First results to be presented at the 6th Sentinel-3 Val Team meeting.

Combined MODIS and ASTER Emissivity for Land (CAMEL) validation
Recent LST&E publications


Surface Radiation

Downward radiance validation best practices protocol
• Dr. Christian Lanconelli, Project Manager of Baseline Surface Radiation Network (BSRN), agreed to join as co-author of the protocol.

Workshop
• BSRN 2020 Virtual Workshop was held on October 1, 2020. Discussed to form albedo working group
Land Surface Phenology

- Cohrs et al. RS paper on HLS-LSP product in silviculture
  - is a unique independent assessment/validation of the new HLS-LSP product using ground observations in managed pine stands

- New approach to retrieving long-term LSP using a Bayesian approach
  - validation w/ existing long-term data at Hubbard Brook and Harvard Forest, and intercomparison with HLS-LSP

- Berra & Gaulton. FORECO review paper on the intercomparison of in-situ and satellite phenological metrics
  - advantages and drawbacks of ground, near-surface and aerial validation data