

Land Product Validation (LPV) Sub-group Meeting



Michael Cosh – (USDA) –Chair
Fabrizio Niro – (ESA/ESRIN) – Vice Chair
Subgroup meeting
06 Jun 2022

NEXT LPV TELECON 13 Sep 2022 ?

Attendance

Participants

Michael Cosh
Fabrizio Niro
Jaime Nickeson
Zhuosen Wang
Gareth Roberts
John Bolten
Louis Giglio
Sylvain Leblanc
Sasha Tyukavina
Hongliang Fang
Glynn Hulley
Dominique Carrer
Tomoaki Miura

Victor Rodríguez-Galiano

Not attending

John Armston
Mat Disney
Laura Duncanson
Chris Crawford
Marie Weiss
Else Swinnen
Simon Gascoin
Carsten Montzka
Joshua Gray
Frank Göttsche
Sophie Bontemps

Proposed Agenda Items

- Welcome
- WGCV 50 summary
- WGISS/WGCV, Oct 3-5, 2022, Toyko, Japan
- CEOS Plenary, Nov-Dec, 2022 Biarritz, France
- Focus Area review and update status
- Focus Area Reporting

WGCV 50

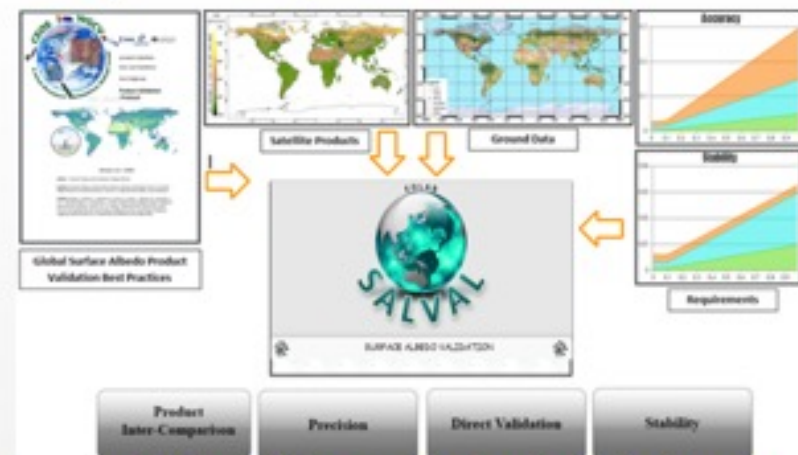
Vice Chair for WGCV, election in Oct, 2022
Cody Anderson, USGS
Matias Palomeque, CONAE

WGCV-50-ACT-02	LPV Chair to work with Paolo to update the WGCV Cal/Val Portal with information on the Direct 2.1 database (LAI and FAPAR sites) and the SALVAL tool.	ASAP
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SALVAL (via Fernando)

LPV Action Plan: 19-LPV-10 Surface Albedo Validation (SALVAL) tool

- Validation and intercomparison of Albedo products
- Online tool for validation of SA products, following principles of the previous CEOS OLIVE tool



<https://www.salval.eolab.es/>

SRIX4Veg: CEOS CV-20-01

- Surface Reflectance Intercomparison for Vegetation
- Testing UAV-based surface reflectance measurements
- Designing consensus protocols for measurement and validation
- Round-robin exercise, Barrax, Spain, July 2022 (<https://frm4veg.org/srix4veg/>)

Ground Reference Data

- LPV Direct 2.1 database of LAI and fAPAR - 44 new sites with multi-temporal sampling in China (valLAIcrop database, Chinese Academy of Science)
- Validation for Land S3 prodcuts – Copernicus LAW (LST, AOD, Water Vapor) Project
- GEO-TREES – Biomass Supersites moving into GEO framework.

Proposed LPV Plenary 2022

March 2018, Frascati, Italy

April 2019, Milan Italy

May 2021, Virtual

Sep-Nov 2022 Virtual

Upcoming Missions and Agency Reports

In situ Network Development and Maintenance

Field Campaign Reviews

Operational Validation Tools

Focus Area Reports

Reminder CEOS LPV Transitions

This info was shared late last year via email:

Below are the terms that are changing in 2021/2022.

Dominique and Glynn already into second term, and Josh's begins in Feb. (Extended)

Those in yellow have second term ending next year, so we can start to think about recruiting replacements, and we can also announce in next year's Fall newsletter.

Biophysical	Hongliang	Fang	CAS	China	Dec 2022 (2nd term)
Fire	Gareth	Roberts	Southampton	UK	Dec 2022 (2nd term)
Rad	Zhuosen	Wang	UMD/GSFC	USA	Dec 2022 (2nd term)
Rad	Dominique	Carrer	Météo-France	France	June 2021 (1st term)
LST	Glynn	Hulley	NASA/JPL	USA	July 2021 (1st term)
LST	Frank	Goettsche	KIT	Germany	Dec 2022 (2nd term)
Phenology	Joshua	Gray	North Carolina State	USA	Jan 2022 (1st term)
Veg Index	Tomoaki	Miura	University of Hawai'i	USA	Dec 2022 (2nd term)
Biomass	Laura	Duncanson	UMD/GSFC	USA	Dec 2022 (2nd term)
Biomass	John	Armston	UMD/GSFC	USA	Dec 2022 (2nd term)
Biomass	Mat	Disney	UCL	UK	Dec 2022 (2nd term)

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!

Product lists are now up to date.

Focus Area	Home Page	Product table	Collaboration Page	References	Listserv	Letters to Community
Land Cover	May 2021	Jan 2021	May 2021	Sep 2021	Oct 2019	
Biophysical LAI/Fpar	Nov 2021	Nov 2021	Nov 2021	Sep 2021	Oct 2019	Sept 2019
Surface Rad/Albedo	Mar 2021	Nov 2021	Mar 2021	Dec 2019	May 2020	May 2020
LST/Emissivity	Mar 2021	Nov 2021	Mar 2021	April 2019	April 2019	
Fire/Burn Area	May 2021	Dec 2020	Mar 2020	Jan 2022	Mar 2020	
Soil Moisture	Mar 2021	Feb 2019	Mar 2021	Mar 2021	Dec 2020	Dec 2020
Phenology	Apr 2021	July 2020	Apr 2021	April 2020		
Snow Cover	Oct 2021	Jan 2021	Oct 2021	Oct 2021	Oct 2019	
Vegetation Index	May 2021	Nov 2021	May 2021	May 2021	May 2019	
Biomass	Apr 2021	Oct 2021	Apr 2021	Apr 2021	Sep 2020	Sept 2020

Focus Area Reports

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

LST & Emissivity

Conferences

- LPS in Bonn:
very interesting sessions on the THRISHNA, LSTM and SBG missions

Surface Radiation

- Toward a Copernicus Calibration and Validation Solution (CCVS) Workshop hosted by European Union, May 9 -11
 - Presented Global Surface Albedo Product Validation Best Practices Protocol
- 17th BSRN Scientific Review and Workshop, June 27-30, 2022, Italy
- 10th International Spectroradiometer and Broadband Intercomparison (ISRC) 2022, June 13-17, Italy
 - The main goal of the intercomparison is the harmonization of measurements and calibration techniques within the community, especially in relation to the need for traceable broadband and spectral irradiance measurements.
- Recent Publications
 - Mullen, A., Sproles, E.A., Hendriks, J., Shaw, J.A., Gatebe, C.K., 2022. An Operational Methodology for Validating Satellite-Based Snow Albedo Measurements Using a UAV. *Front. Remote Sens.* 2. doi:10.3389/FRSEN.2021.767593

Land Surface Phenology (1/4)

Accomplishments

- New paper published on the calibration of “High Resolution Vegetation Phenology and Productivity” product
 - Tian et al., 2021. Calibrating vegetation phenology from Sentinel-2 using eddy covariance, PhenoCam, and PEP725 networks across Europe. RSE, 260, 112456
- Workshops and special sessions in conferences
 - New Developments and Applications of Land Surface Phenology (LSP) (A3.2). 44th COSPAR Scientific Assembly 2022



Remote Sensing of Environment
Volume 260, July 2021, 112456

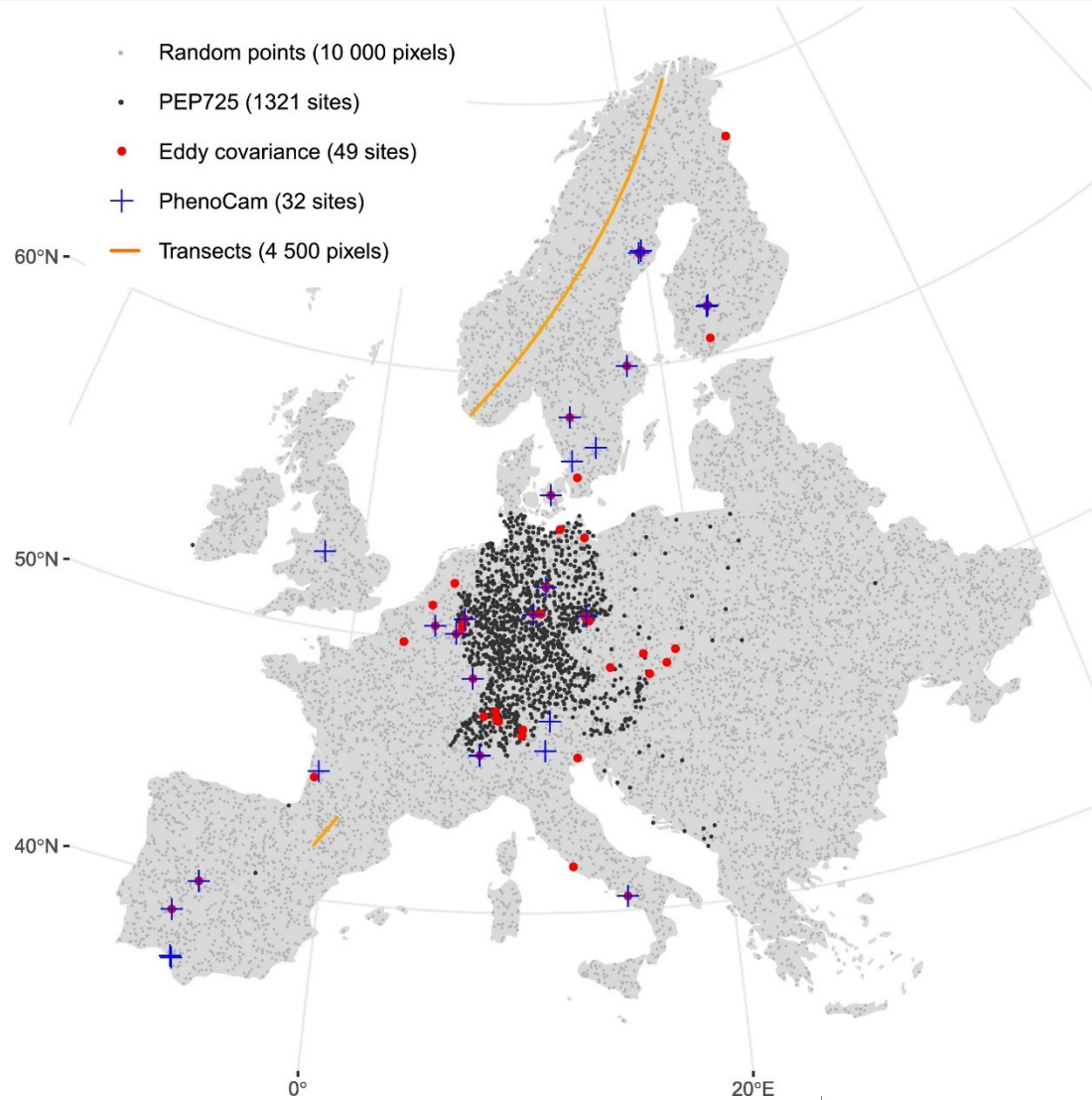


Calibrating vegetation phenology from Sentinel-2 using eddy covariance, PhenoCam, and PEP725 networks across Europe

Feng Tian ^{a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z}, Zhanzhang Cai ^b, Hongxiao Jin ^{b, c}, Koen Hufkens ^{d, e}, Helfried Scheifinger ^f, Torbern Tagesson ^{b, g}, Bruno Smets ^h, Roel Van Hoolst ^h, Kasper Bonte ^h, Eva Ivits ⁱ, Xiaoye Tong ^e, Jonas Ardö ^b, Lars Eklundh ^{b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z}

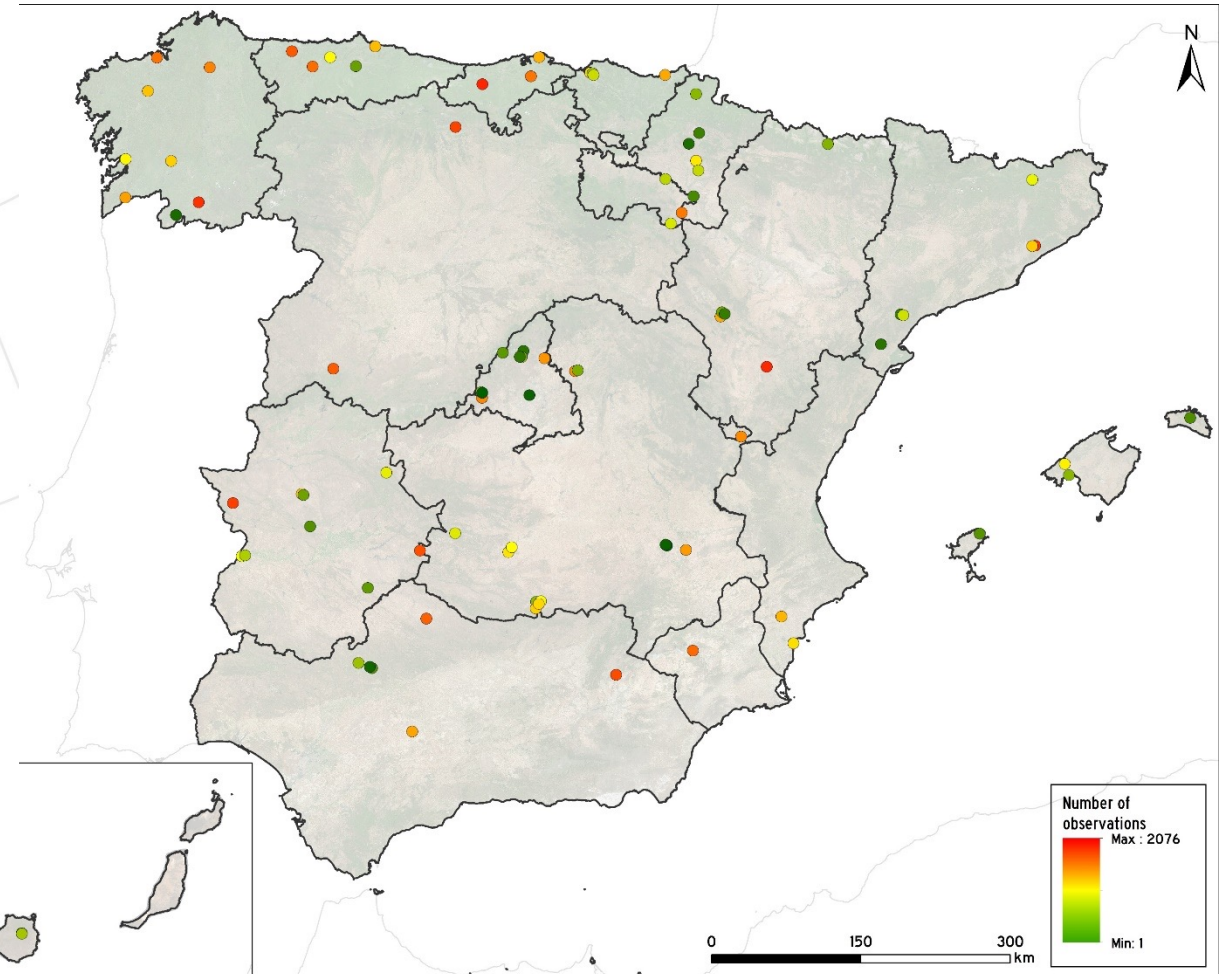
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Land Surface Phenology (2/4)



“New” observational network in Spain managed by the Spanish Meteorological Survey (AEMET)

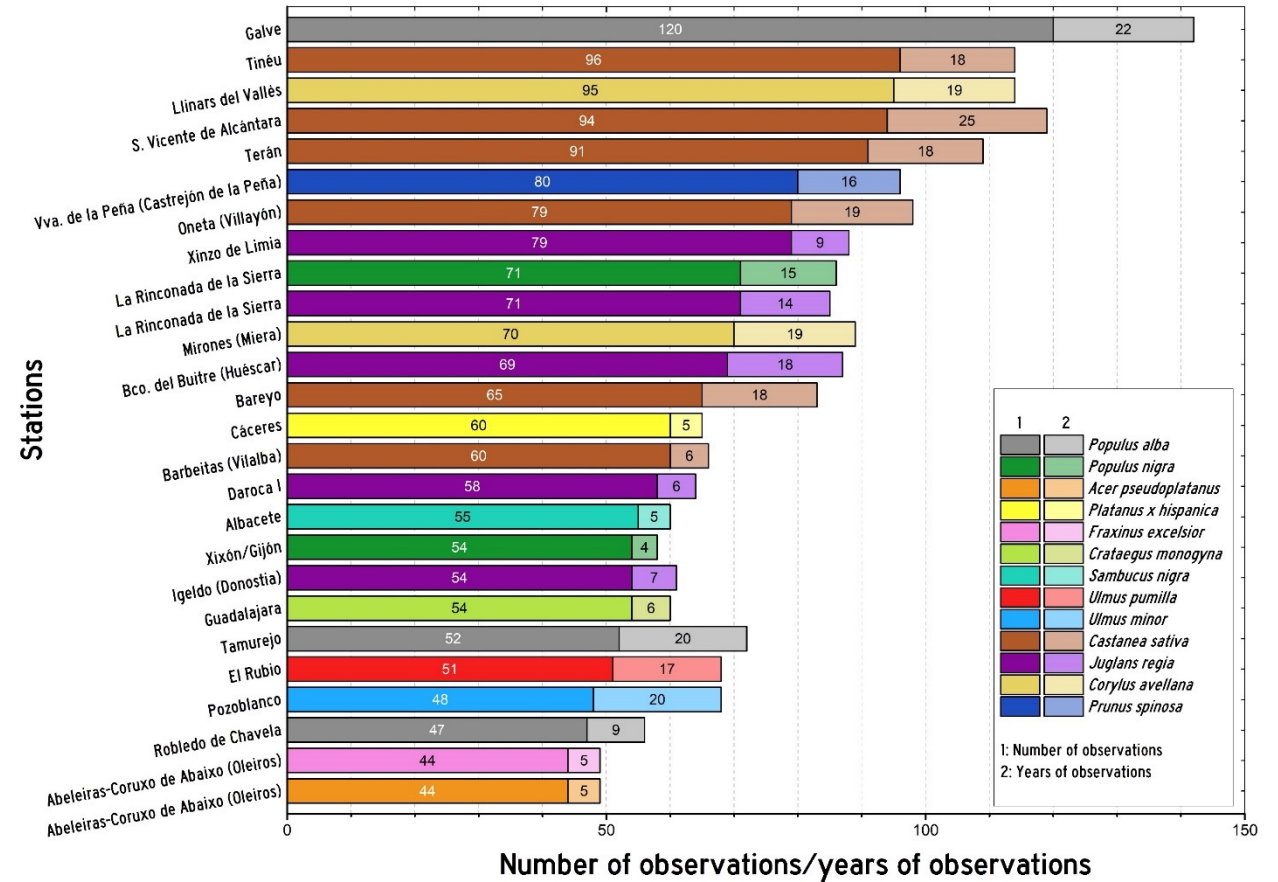
- 35,092 observations
- 92 stations, 96 species (31 croplands)
- Temporal coverage: 1990-2020



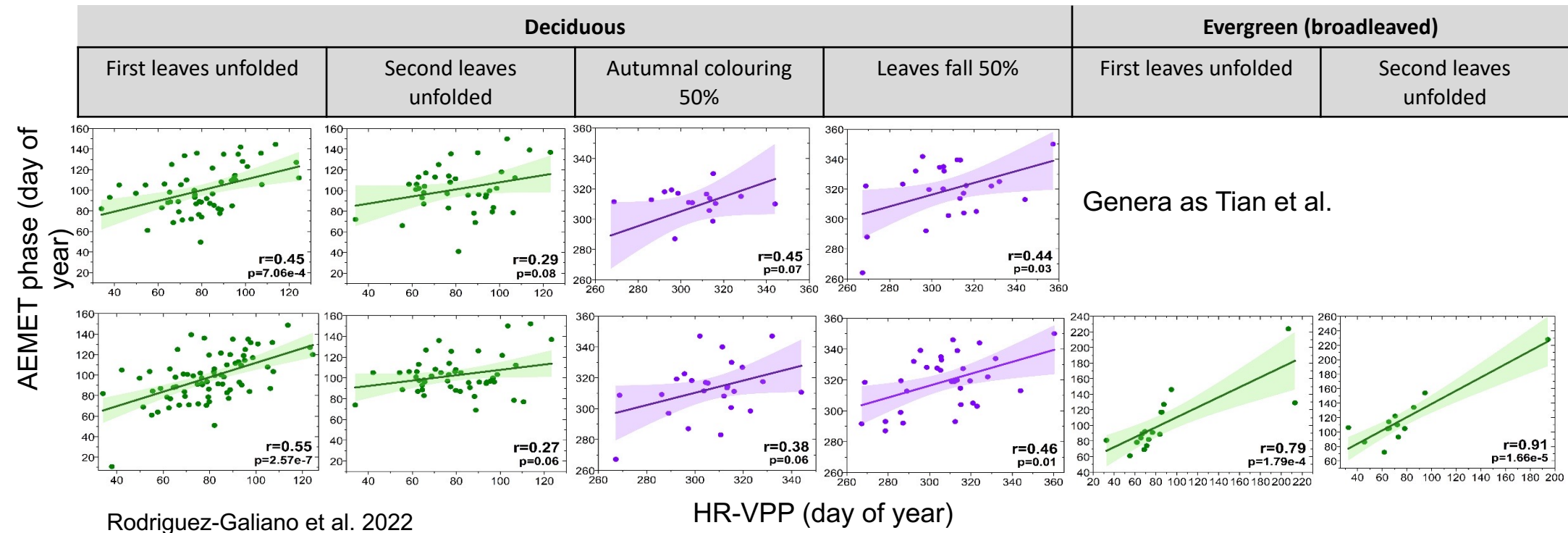
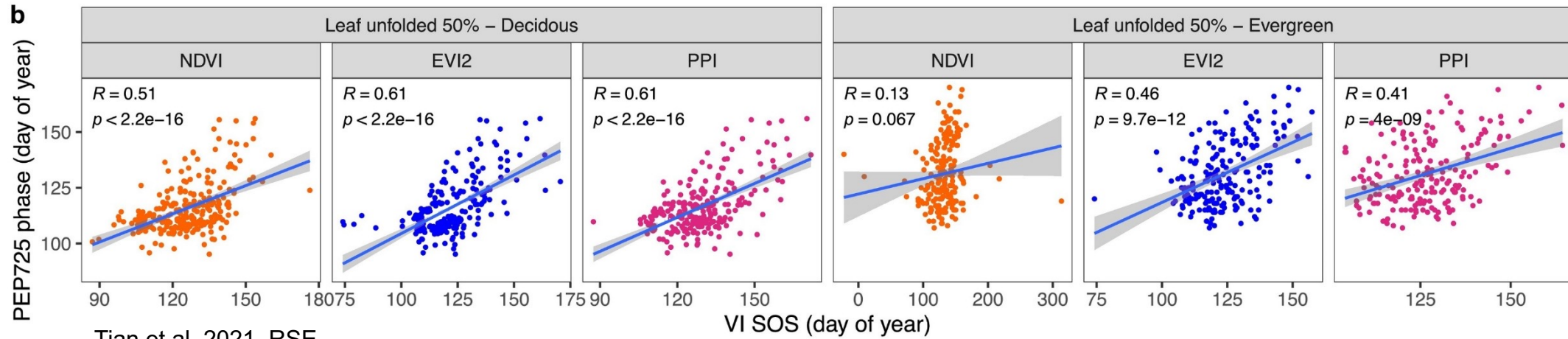
Tian et al. 2021 RSE

Land Surface Phenology (3/4)

Vegetation group	Genus	CORINE Land Cover Map (cover description and code)
Deciduous broad-leaved trees and shrubs	<i>Acer</i> (121/8), <i>Aesculus</i> (125/10), <i>Alnus</i> (61/10), <i>Betula</i> (115/11), <i>Castanea</i> (202/17), <i>Celtis</i> (7/3), <i>Corylus</i> (135/12), <i>Crataegus</i> (208/19), <i>Fagus</i> (47/5), <i>Fraxinus</i> (197/18), <i>Juglans</i> (318/29), <i>Morus</i> (67/9), <i>Pistacia</i> (33/4), <i>Platanus</i> (175/17), <i>Populus</i> (403/25), <i>Prunus</i> (63/6), <i>Pyrus</i> (14/3), <i>Quercus</i> (238/22), <i>Robinia</i> (111/10), <i>Rosa</i> (144/13), <i>Salix</i> (117/14), <i>Sambucus</i> (157/17), <i>Syringa</i> (35/8), <i>Sorbus</i> (50/5), <i>Tilia</i> (25/2), <i>Ulmus</i> (117/13)	Broad-leaved forest (311), mixed forest (313), transitional woodland-shrub (324), green urban areas (141)
Evergreen coniferous trees	<i>Juniperus</i> (10/5), <i>Pinus</i> (4/2),	Coniferous forest (312), mixed forest (313)
Evergreen broad-leaved trees and shrubs	<i>Arbutus</i> (36/8), <i>Cistus</i> (67/14), <i>Cytisus</i> (9/1), <i>Genista</i> (16/2), <i>Laurus</i> (53/8), <i>Lavandula</i> (42/9), <i>Nerium</i> (44/10), <i>Olea</i> (23/25), <i>Pistacia</i> (22/5), <i>Quercus</i> (144/22), <i>Retama</i> (33/8), <i>Rosmarinus</i> (23/10), <i>Ulex</i> (15/5)	Broad-leaved forest (311), mixed forest (313), sclerophyllous vegetation (323), transitional woodland-shrub (324)
Crops	<i>Avena</i> (113), <i>Cicer</i> (20/5), <i>Citrus</i> (39/6), <i>Cydonia</i> (105/9), <i>Eriobotrya</i> (21/3), <i>Ficus</i> (163/27), <i>Hordeum</i> (162/13), <i>Malus</i> (334), <i>Mespilus</i> (13), <i>Olea</i> (128/25), <i>Pisum</i> (9/2), <i>Prunus</i> (1211/47), <i>Punica</i> (34/6), <i>Pyrus</i> (327/27), <i>Secale</i> (33/3), <i>Solanum</i> (107/15), <i>Triticum</i> (214/17), <i>Vicia</i> (29/5), <i>Vitis</i> (268/22), <i>Zea</i> (81/11)	Fruit trees and berry plantations (222), vineyards (221), olive groves (223), annual crops associated with permanent crops (241), complex cultivation patterns (242), land principally occupied by agriculture with significant areas of natural vegetation (243), agro-forestry areas (244), non-irrigated arable land (211), permanently irrigated land (212).



Land Surface Phenology (4/4)



Soil Moisture

News:

- Soil Moisture School, funded by IEEE GRSS, aims at graduate students, young professionals and earth scientists to learn how to collect and utilize soil moisture resources from in situ and satellite sensors, schedule and content is currently prepared

Workshops:

- IEEE GRSS Soil Moisture School (ISMS), 6-7th July 2022, Amherst, USA (<https://ieee-grss-soil-school.rsvpify.com>)
- World Congress on Soil Science, 31 July - 5 August 2022, Glasgow (<https://22wcss.org>)
- 1st Summer School on advanced soil physics "Modeling Water Transport in the Soil-Plant System", 22 - 26 August 2022, UCLouvain, Belgium
- 6th International Symposium on Recent Advances in Quantitative Remote Sensing: RAQRS'VI, 19 - 23 September 2022, Torrent (Valencia), Spain
- 7th Satellite Soil Moisture Validation and Application Workshop, Fall 2024?, New Orleans, USA?

Vegetation Indices

Protocol

- Co-leads working to update a draft of the VI validation protocol document, having met twice since the last telecon (26 April 2022 and 19 May 2022).
- Co-leads identifying and contacting a small group of experts to review the first draft.
- New meeting planned on 21 June 2022 to discuss the first draft before sending it out for review by the small group of experts.

Snow

Above Ground Biomass

Land Cover

Meeting Status Update – notified today that the workshop has been marked as "selectable"

- Proposal submitted (NASA ROSES 21 under the F2.Topical Workshop call) to fund the joint workshop between CEOS LPV and GEOGLAM on the validation of agricultural land cover products/essential agricultural variables.

Updated in-person workshop date: early 2023

Location: University of Maryland

Workshop co-leads: Sasha Tyukavina (UMD/CEOS LPV), Sophie Bontemps (UCLouvain/CEOS LPV), Chris Justice (NASA Harvest), Alyssa Whitcraft (NASA Harvest), Jaime Nickeson (NASA/CEOS LPV)

Biophysical (1/2)

- Reference for the website
 - Song, B., Liu, L., Du, S., Zhang, X., Chen, X., & Zhang, H. (2021). ValLAI_Crop, a validation dataset for coarse-resolution satellite LAI products over Chinese cropland. *Scientific Data*, 8, 243. <https://doi.org/10.1038/s41597-021-01024-4>
- Database for vertical biophysical parameters, such as the vertical LAI profile from GEDI (DIRECT or DIRECT_3D)?
- Hongliang is responding to the MOST China funding call to participate in the retrieval of vertical forest structure, LAI, and biomass.
- Sylvain to procure drone with LiDAR for LAI estimation.
- Marie attended the Living Planet Symposium and talked to a potential candidate for one of the Biophysical focus area leads.

Biophysical (2/2)

Global LAI/FAPAR* products developed in China

Product	Institute	Spatial Res.	Temporal Res.	Period	Method	References
GLASS* (6.0) glass-product.bnu.edu.cn	Wuhan Univ.	250 m	8 days	2000+	Bi-LSTM deep learning	Ma and Liang (2022)
GLOBALBNU globalchange.bnu.edu.cn/	Beijing Normal Univ.	1000 m	8 days	2000-2016	Spatio-temporal filtering	Yuan et al. (2011)
GLOBMAP (V3.0) modis.cn/globalLAI/	IGSNRR, CAS	8 km (1981-1999)	Half-month (1981-1999)	1981+	VI-LAI relationship	Liu et al. (2012b)
		500 m (2000+)	8 days (2000+)			
MUSES	Beijing Normal Univ.	500 m	8 days	2000+	General regression neural network	Xiao et al. (2022)
MuSyQ* (V2.0) www.geodoi.ac.cn/	AIRCAS, CAS	500 m	4 days	2000-2020	Look-up table	Xu et al. (2020)

Fire Disturbance (1/1)

Meetings

- GOFC Fire Implementation Team meeting + thematic fire workshop
 - 21– 23 June 2022 in Stresa, Italy
 - Primary goal of validation session will be to reach consensus on unresolved issue(s) and solicit assistance with writing
 - Active Fire
 - Plan for first draft
 - Issues
 - Definition of “contemporaneous” observations (w/out formal protocol, threshold has ballooned from \pm minutes to \pm ~5 hours)
 - Burned Area
 - Plan update to Boschetti et al. (2010) draft protocol
 - Issues
 - FireCCI “long” validation units (no consensus)
 - BARD usage recommendations

Fire Disturbance (2/2)

Recent Publications (Burned Area)

- Smith, H., de Beurs, K. M., & Neeson, T. M. (2022). Evaluation of low-resolution remotely sensed datasets for burned area assessment within the wildland-urban interface. *Remote Sensing Applications: Society and Environment*, 100752.
- Zhang, S., Zhao, H., Wu, Z. and Tan, L., 2022. Comparing the Ability of Burned Area Products to Detect Crop Residue Burning in China. *Remote Sensing*, 14(3), p.693

Recent Publications (Active Fire)

- Chatzopoulos-Vouzoglani, K., Reinke, K.J., Soto-Berelov, M., Engel, C. and Jones, S.D., 2022. Comparing geostationary and polar-orbiting satellite sensor estimates of Fire Radiative Power (FRP) during the Black Summer Fires (2019–2020) in south-eastern Australia. *International Journal of Wildland Fire*.
- Chen, J., Yao, Q., Chen, Z., Li, M., Hao, Z., Liu, C., Zheng, W., Xu, M., Chen, X., Yang, J. and Lv, Q., 2022. The FY-3D Global Active Fire product: Principle, Methodology and Validation. *Earth System Science Data Discussions*, pp.1-32.