CEOS LPV Plenary

Land Surface Phenology Working Group

Systematic review on LSP

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Review Article

Land surface phenology as indicator of global terrestrial ecosystem dynamics: A systematic review

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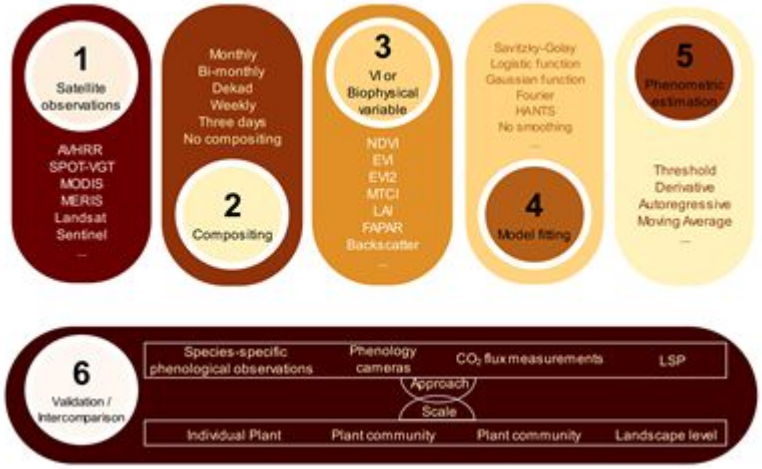
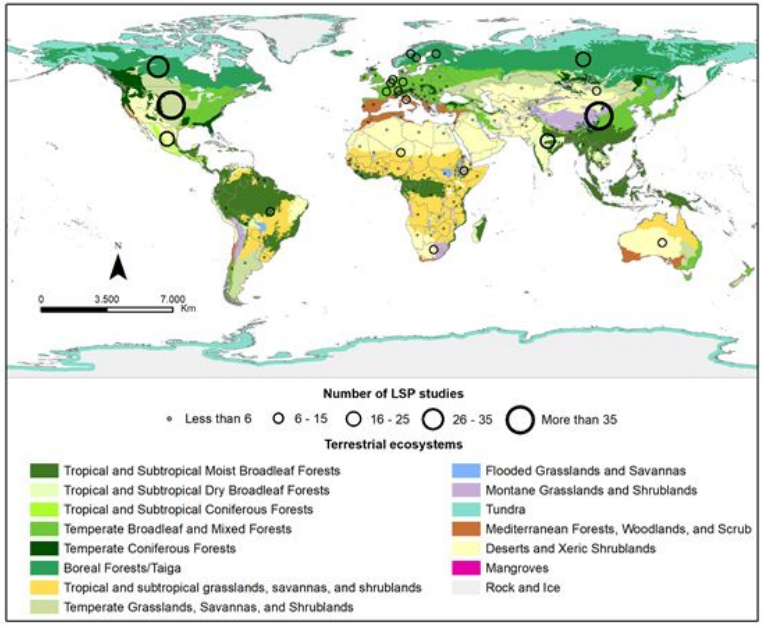
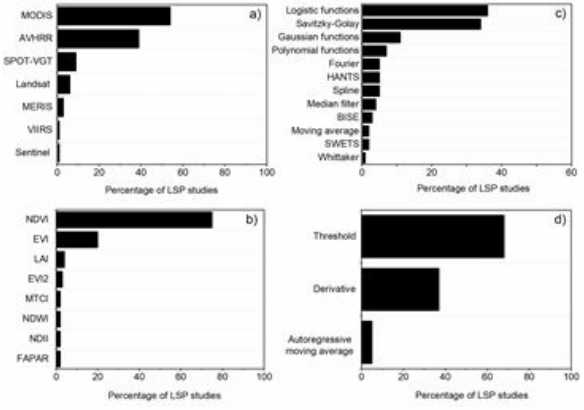
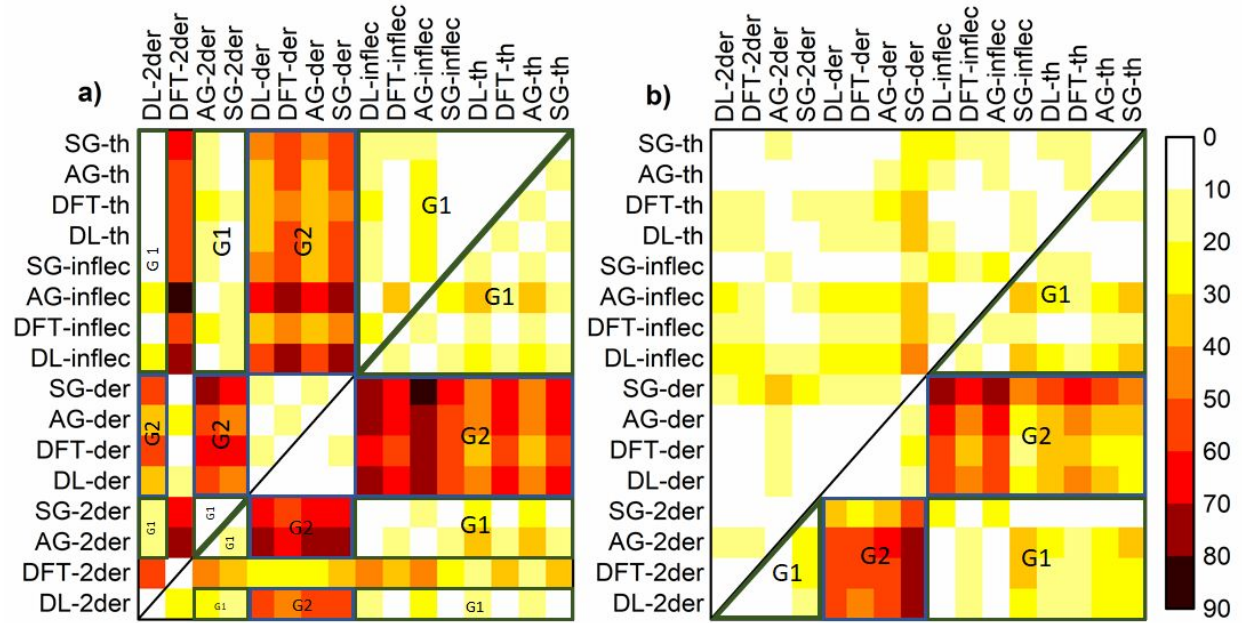






Sensitivity analysis of LSP to smoothing & extraction techniques and vegetation indices

Caparros-Santiago, J.A. & Rodriguez Galiano, V.

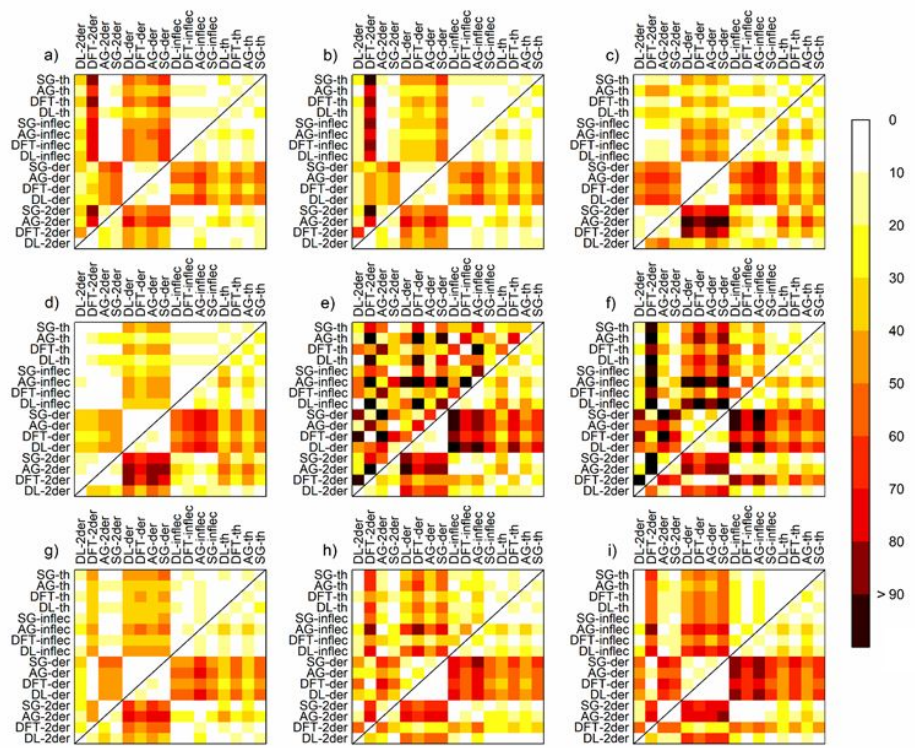


Differences in days between estimation methods (RMSE): a) SOS, and; b) EOS. NDVI is given in upper left corner and EVI2 in bottom right corner.

SG: Savitzky-Golay
AG: Asymmetric Gaussian function
DFT: Discrete Fourier Transform
DL: Double Logistic function

th: threshold
der: first derivative
2der: second derivative
inflec: inflection point

Sensitivity analysis of LSP to smoothing & extraction techniques and vegetation indices

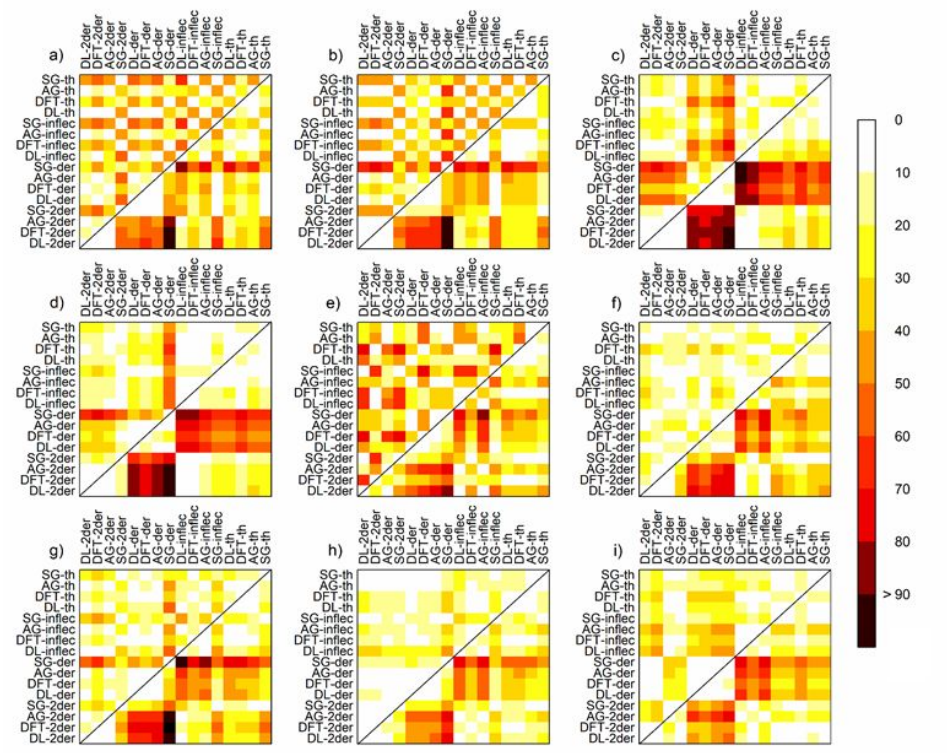


		NDVI	EVI2
		SOS	
ENF	G1	11.8	12.2
	G2	47.3	47.9
EBF	G1	9.3	13.5
	G2	37.7	46.9
DBF	G1	14	23
	G2	42.5	55
MF	G1	8.8	19.4
	G2	37.1	56.7
CS	G1	40.8	18.6
	G2	57.2	69.4
OP	G1	23.1	17.7
	G2	70.6	68.5
WS	G1	9.1	14.6
	G2	41	50
S	G1	15.5	12.6
	G2	45.7	59
G	G1	11.6	13.8
	G2	55	65.7

a) evergreen needleleaf forests (ENF), b) evergreen broadleaf forests (EBF), c) deciduous broadleaf forests (DBF), d) mixed forests (MF), e) closed scrublands (CS), f) open scrublands (OS), g) woody savannas (WS), h) savannas (S), i) grasslands (G). NDVI is given inn upper left corner and EVI2 in bottom right corner.

Differences in days in SOS between estimation methods (RMSE) by land covers

Sensitivity analysis of LSP to smoothing & extraction techniques and vegetation indices



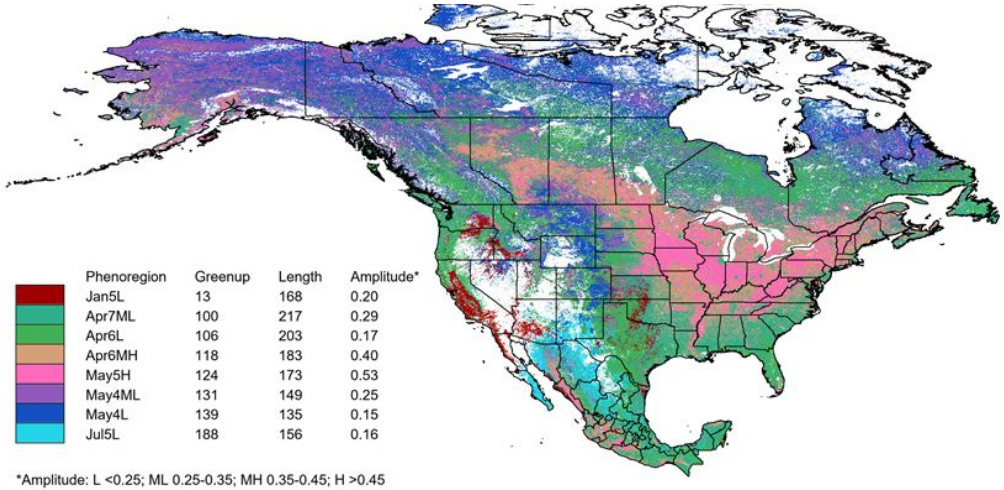
		NDVI	EVI2
		EOS	
ENF	G1	26.5	24.5
	G2	24.8	36.7
EBF	G1	24.3	20.9
	G2	27.1	43.3
DBF	G1	11.4	15.52
	G2	41.1	71.4
MF	G1	9.7	13
	G2	29	65.8
CS	G1	32.8	22.8
	G2	29	42.8
OP	G1	12.7	19.4
	G2	14.9	47
WS	G1	15.6	19.3
	G2	19	52
S	G1	12.5	16.4
	G2	12.4	43.4
G	G1	12.4	14.3
	G2	27	47

a) evergreen needleleaf forests (ENF), b) evergreen broadleaf forests (EBF), c) deciduous broadleaf forests (DBF), d) mixed forests (MF), e) closed scrublands (CS), f) open scrublands (OS), g) woody savannas (WS), h) savannas (S), i) grasslands (G). NDVI is given inn upper left corner and EVI2 in bottom right corner.

Differences in days in EOS between estimation methods (RMSE) by land covers

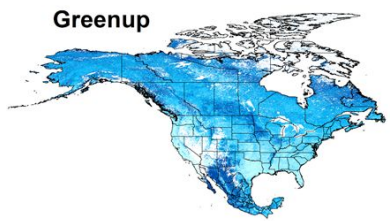
Stratification of phenoregions in North America

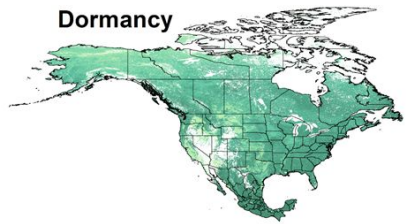
Rodriguez Galiano, V., Dash, J., Gray, J., Friedl, M.

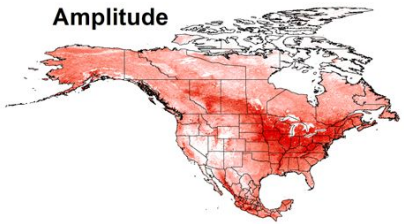


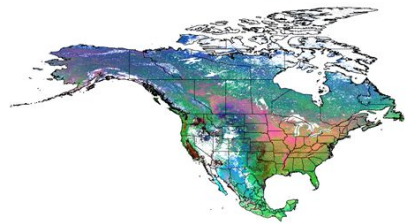
Phenoregion	Greenup	Length	Amplitude*
Jan5L	13	168	0.20
Apr7ML	100	217	0.29
Apr6L	106	203	0.17
Apr6MH	118	183	0.40
May5H	124	173	0.53
May4ML	131	149	0.25
May4L	139	135	0.15
Jul5L	188	156	0.16

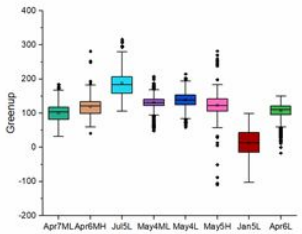
*Amplitude: L <0.25; ML 0.25-0.35; MH 0.35-0.45; H >0.45

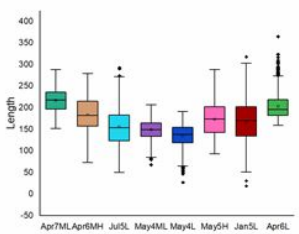


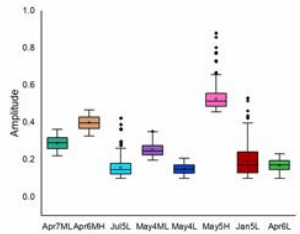


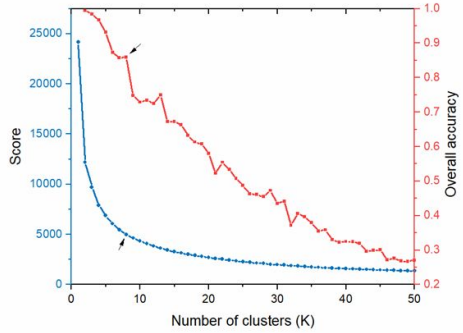






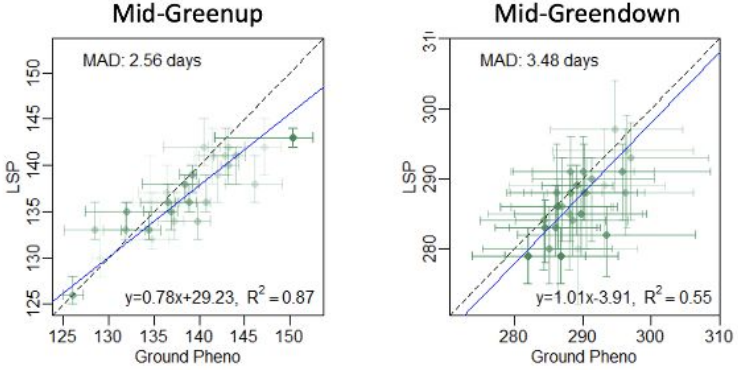




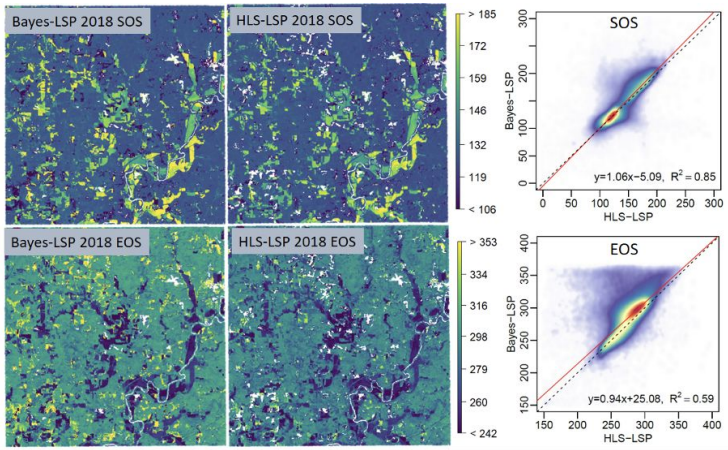


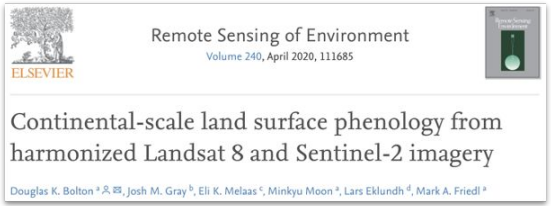
New Moderate Resolution LSP Products

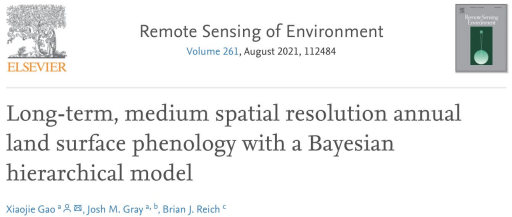
- Independent assessment with available long-term ground observations and intercomparison of new mod res LSP
- MSLSP30NA: first operationally produced moderate resolution LSP product
- BLSP approach to retrieve from long time series compares well; has robust estimation of uncertainty



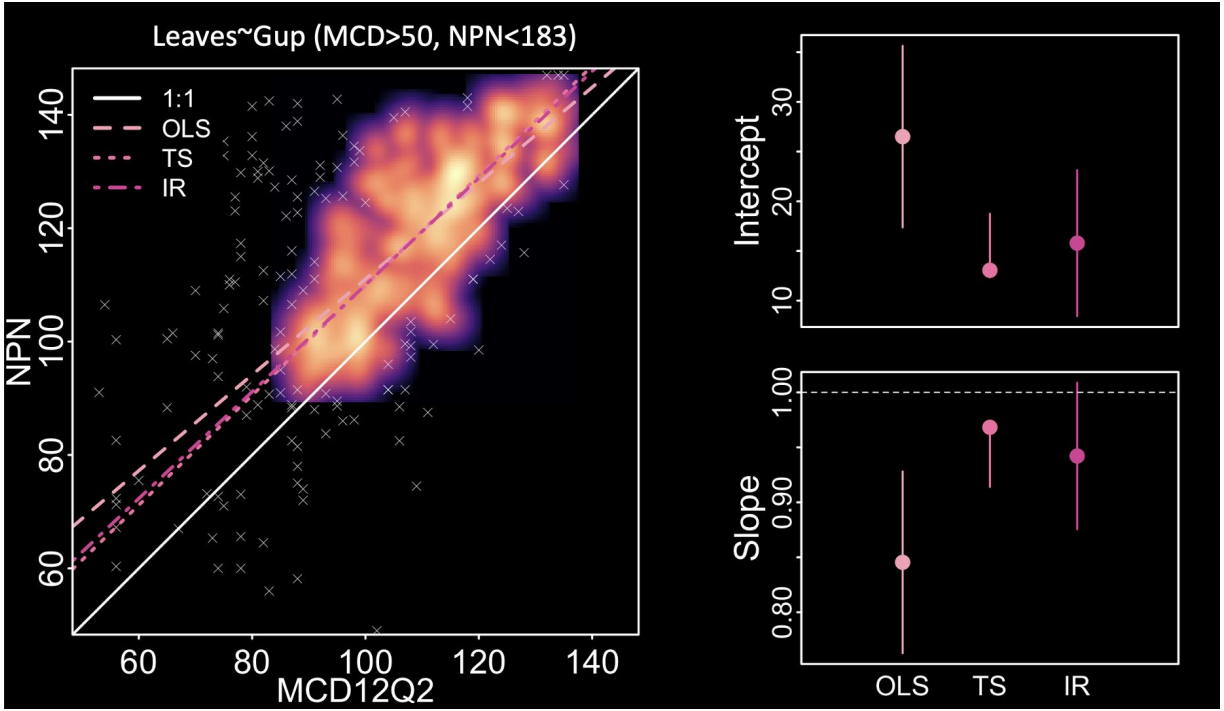
Model assessment in Harvard Forest from 1990 to 2019. Weighted regression based on uncertainty. MAD: mean absolute deviance





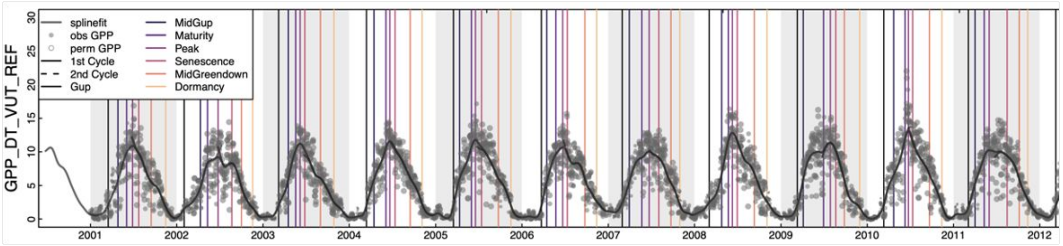


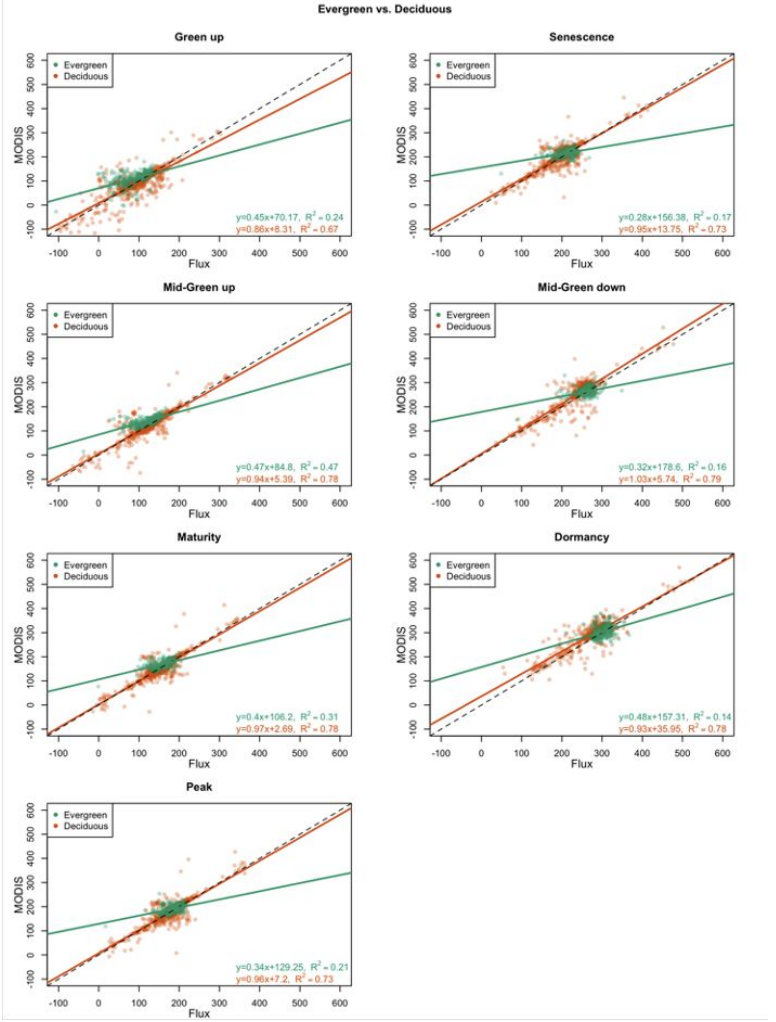
New statistical approaches to assessment with NPN and similar datasets: survival analysis



Independent assessment: FLUXNET2015

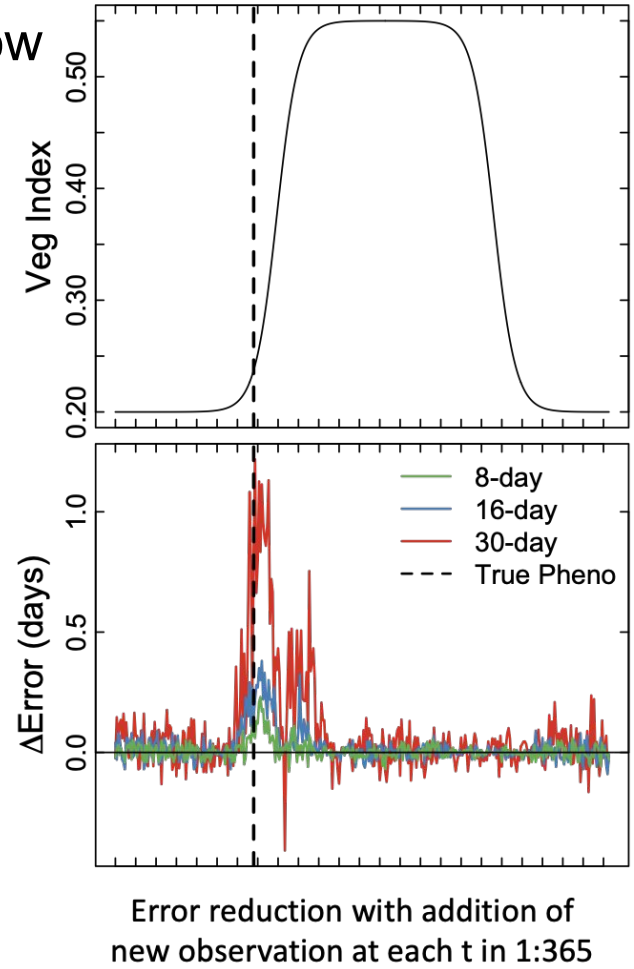
- Independent assessment with FLUXNET2015 dataset
- >1000 site-years of flux data compared with MCD12Q2 C6 phenometrics
- An alternative, and perhaps more broadly useful, way to interrogate the information content of LSP data compared to ground observations of plant life cycle events





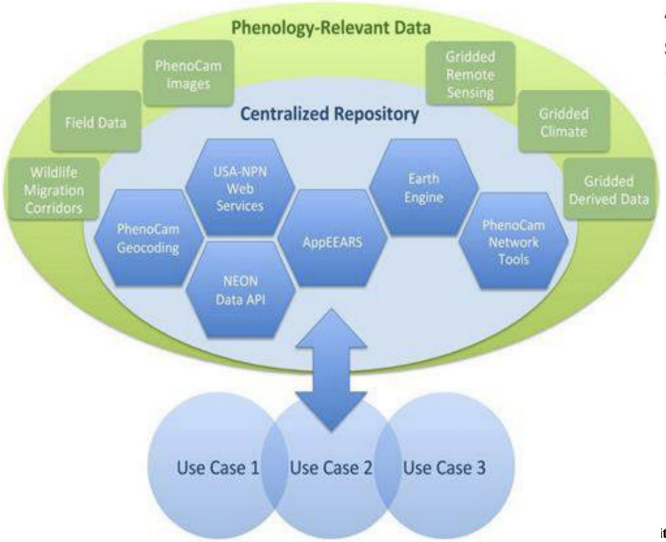
Temporal patterns of missing data: it's not just how much is missing, but *where*

- Quantitative uncertainty of LSP estimates are not typically provided; but errors vary considerably across space and time
- Among other things, related to the quantity of data used for fitting, as well as temporal patterns of missing data
- New work: statistical approach to the analyzing the effect of temporal patterns of missing data.
- We've related local missingness to phenometric uncertainty



New tools improve data accessibility

APIS Project



phenoSynth

An interactive tool to evaluate phenology data across data sources, spatial, and temporal scales

version v1.1.12 testing 100% License MIT

Welcome to dacqre!

Package 'rnpn'

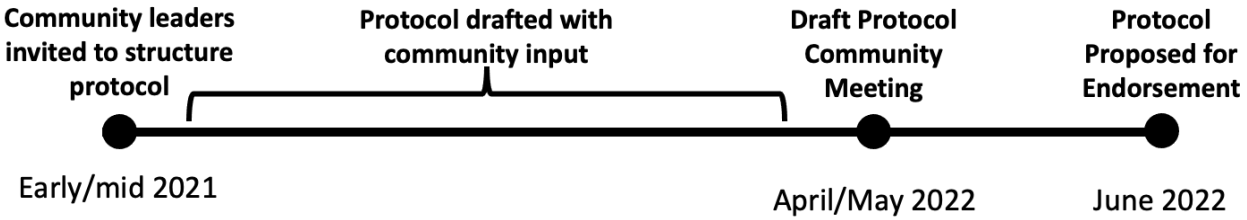
April 7, 2021

Title Interface to the National 'Phenology' Network 'API'

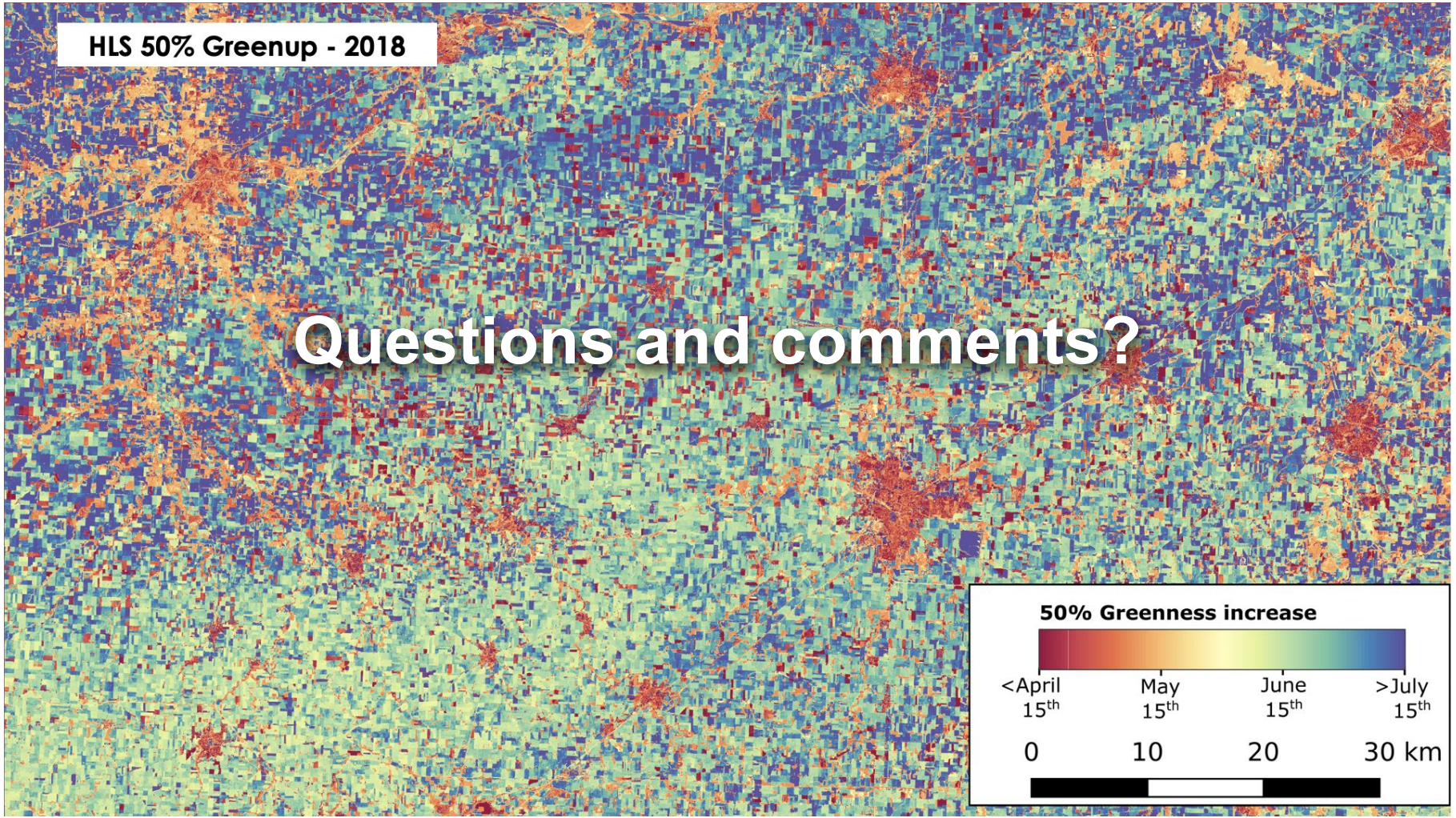
Description Programmatic interface to the Web Service methods provided by the National 'Phenology' Network (<https://usanpn.org/>), which includes data on various life history events that occur at specific times.

Version 1.2.1

Protocol Status



- Delayed from end of 2021 expectation, mid-2022 is new target
- Co-production model: Involvement from discipline leaders in protocol structure; more focused contributions from other community experts
- Draft protocol to be circulated to broad stakeholders 1-month prior to 2022 LPS/EGU meeting
- LSP community meeting at LPS/EGU to revise protocol
- Final delivery 2 months following community meeting


HLS 50% Greenup - 2018
Questions and comments?
50% Greenness increase
<April 15th
May 15th
June 15th
>July 15th
0
10
20
30 km