Background
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The various facets of digital repeat photography fully exploited with the phenopix R package

May 2020

EGU2020 - BG3.27





→ Digital repeat photography (aka phenocams) more and more used to complement flux data (e.g Phenocam dataset)

→ Softwares are being developed

→ They need to be flexible, reproducible, free and open source

In this context, the `phenopix` R package was developed in 2016

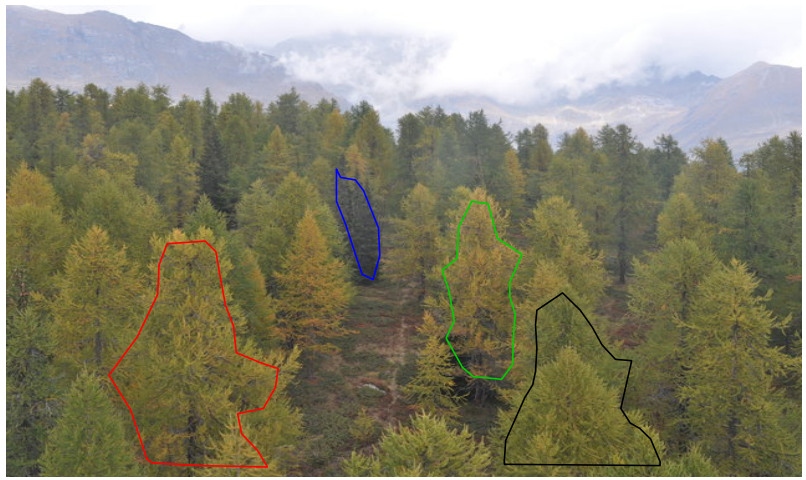
`phenopix` numbers

downloads: 40k since 2016
deployment: 20 + research projects
citations: 65

phenopix processing steps

- 1) Define one or more regions of interest (ROI)
- 2) Extract VIs
- 3) Extract phenology

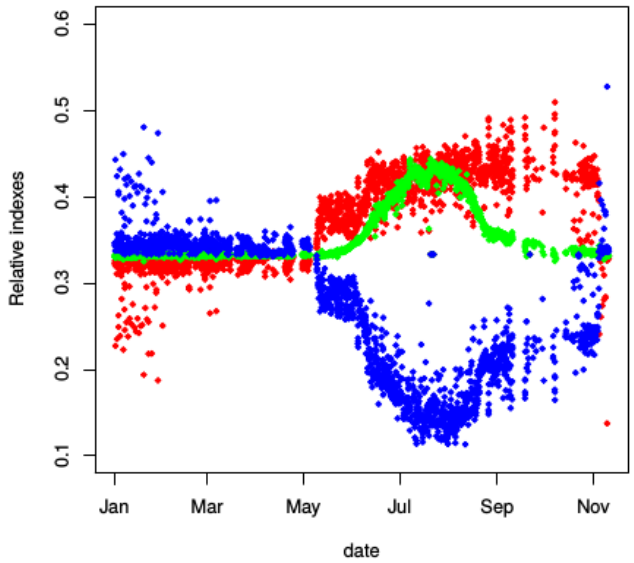
Multiple, polygonal regions of interest in the same scene

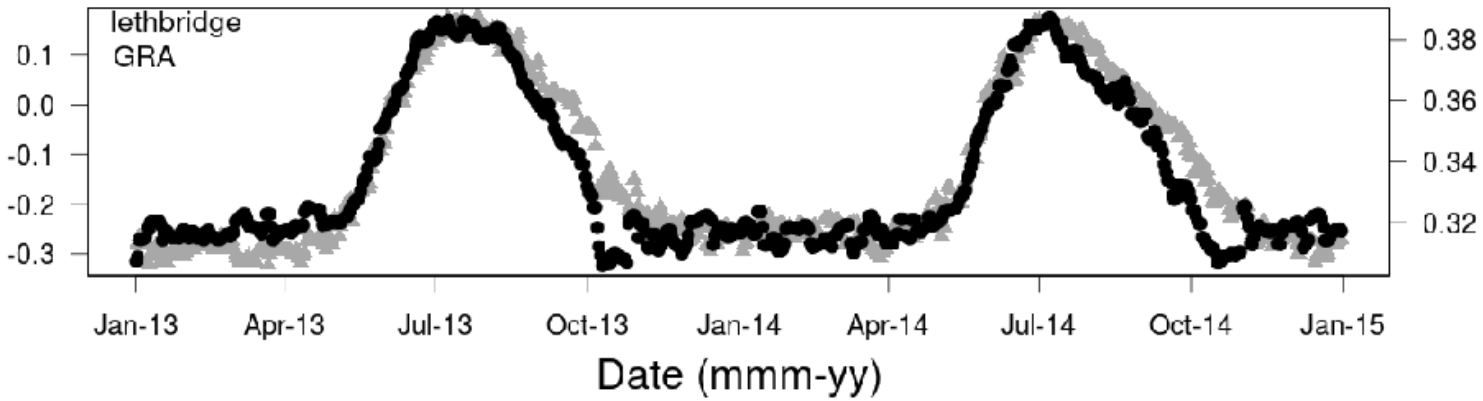


→ Allows e.g. tailoring specific rois in areas of interest of flux tower footprint

→ Factor out the contribution of individuals/groups in the ecosystem phenology

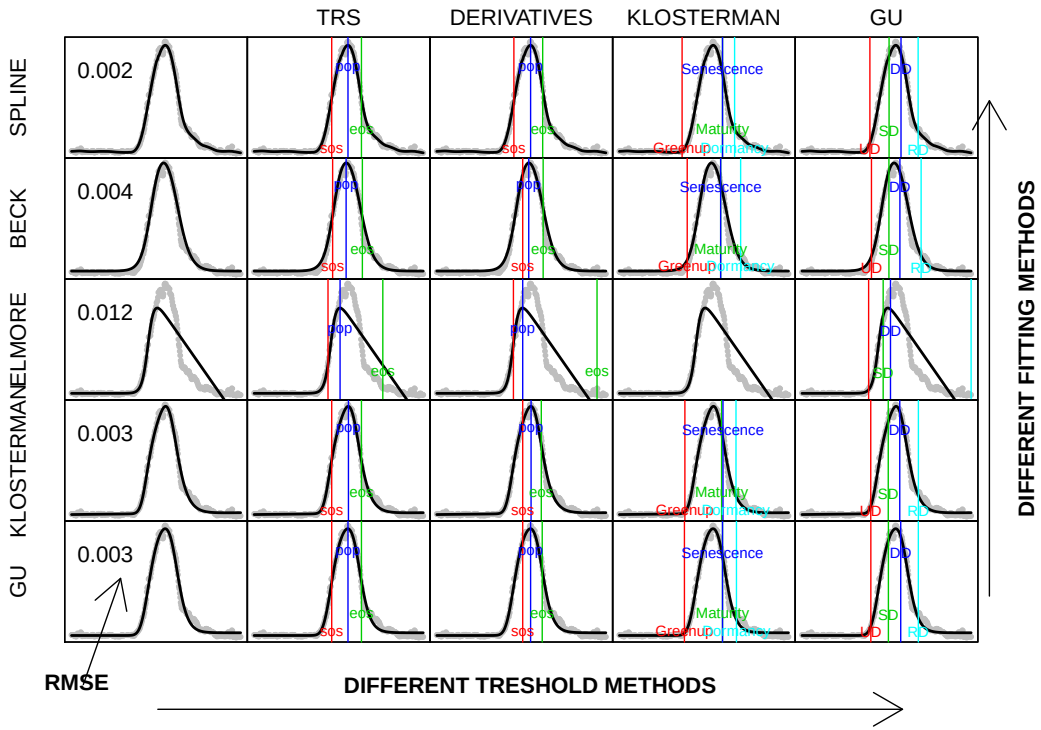
Classical red green and blue color indices extraction





But also camera NDVI (▲) from IR-enabled cameras

ROI-based phenology - a suite of 20 different method combinations to estimate phenology



5 fitting equations, 4 phenophase methods, + uncertainty estimation

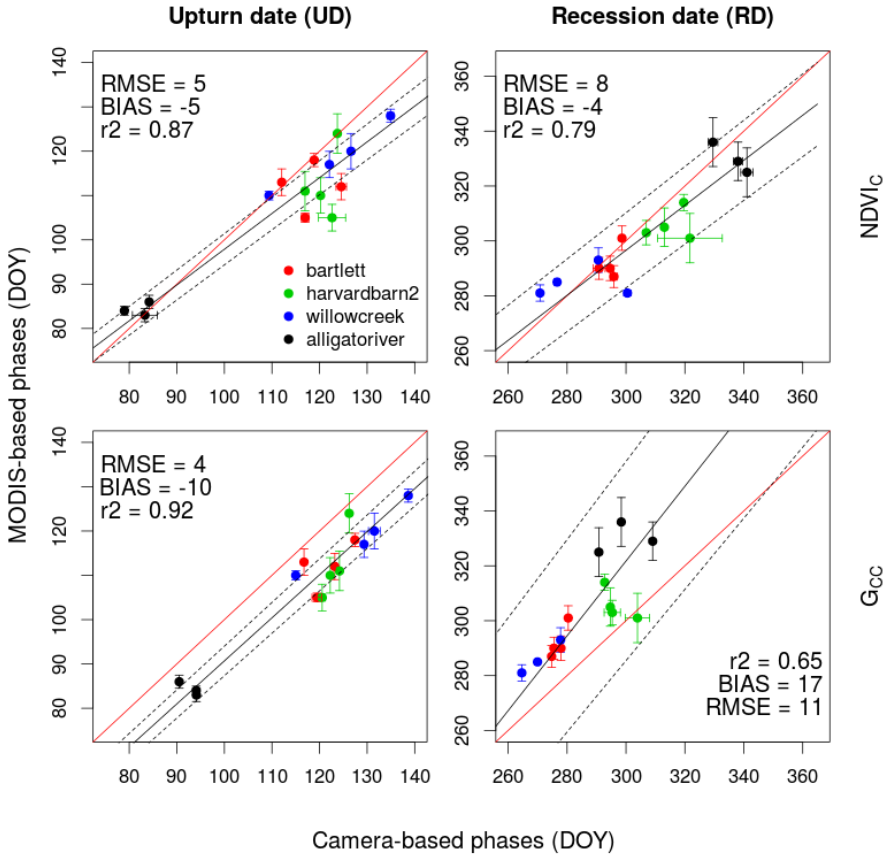
R package phenopix

Background

The steps

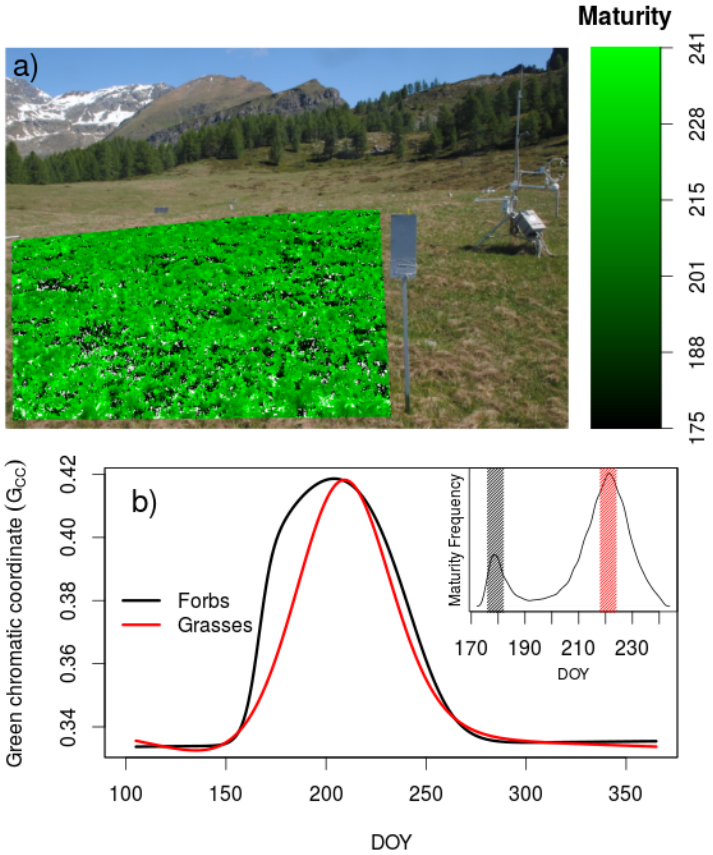
Learn more

Phenology at multiple scales



Integration of near and far remote sensing

Spatially explicit phenology



Phenomap of full development date (a) reflects functional types (b)

Learn more

All blue chunks in this presentation are links to further reading.

R installation:

```
> install.packages('phenopix')
```

Papers with relevant infos:

- Filippa et al. 2016 Phenopix: A R package for image-based vegetation phenology
- Filippa et al. 2018: NDVI derived from near-infrared-enabled digital cameras: Applicability across different plant functional types
- Snyder et al. 2016 Extracting plant phenology metrics in a great basin watershed: Methods and considerations for quantifying phenophases in a cold desert

More on-line material

- Phenopix help pages
- Getting started with phenopix
- phenopix for masters: Spatial analysis
- Install your own phenocam

For more help, contact me