GEONETC
International MSc Educational Programme in Environmental Management and Modelling

VEGETATION PHENOLOGY

5. PHENOLOGY FROM SATELLITES (1)

ITC UNIVERSITY OF TWENTE.
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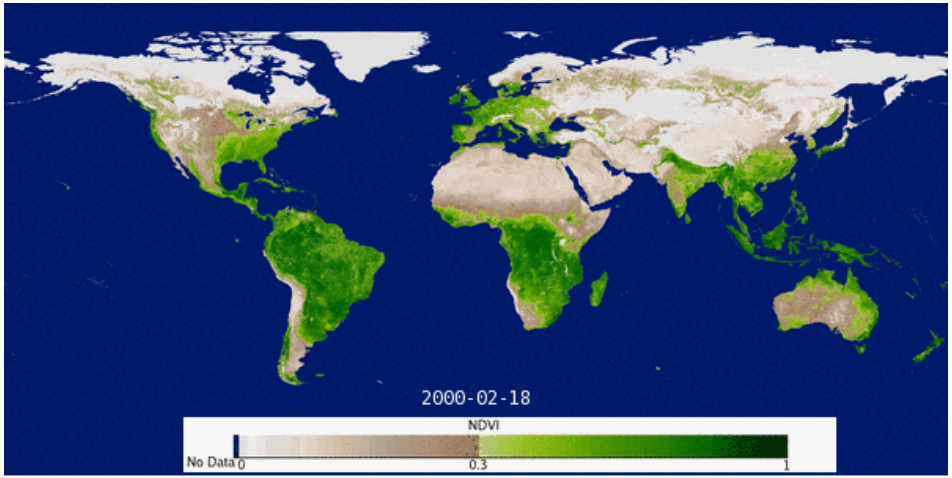
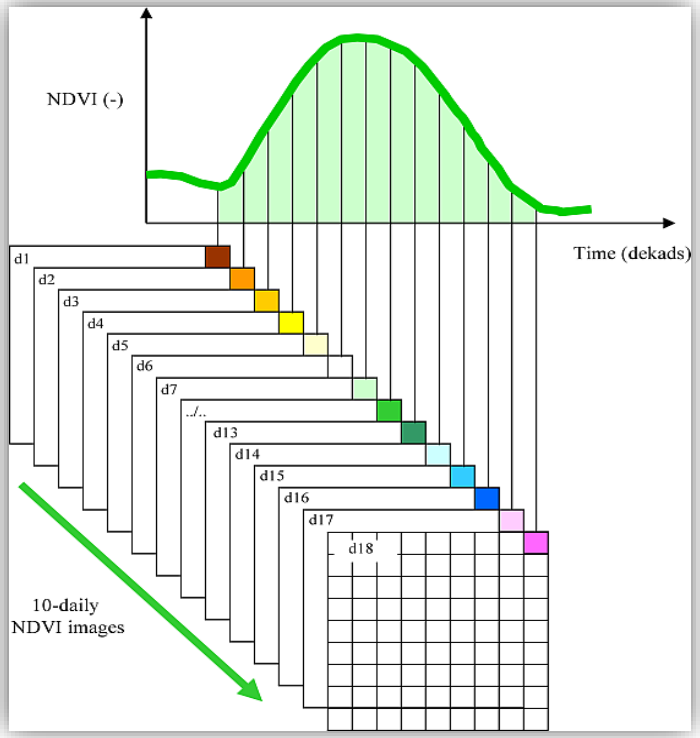
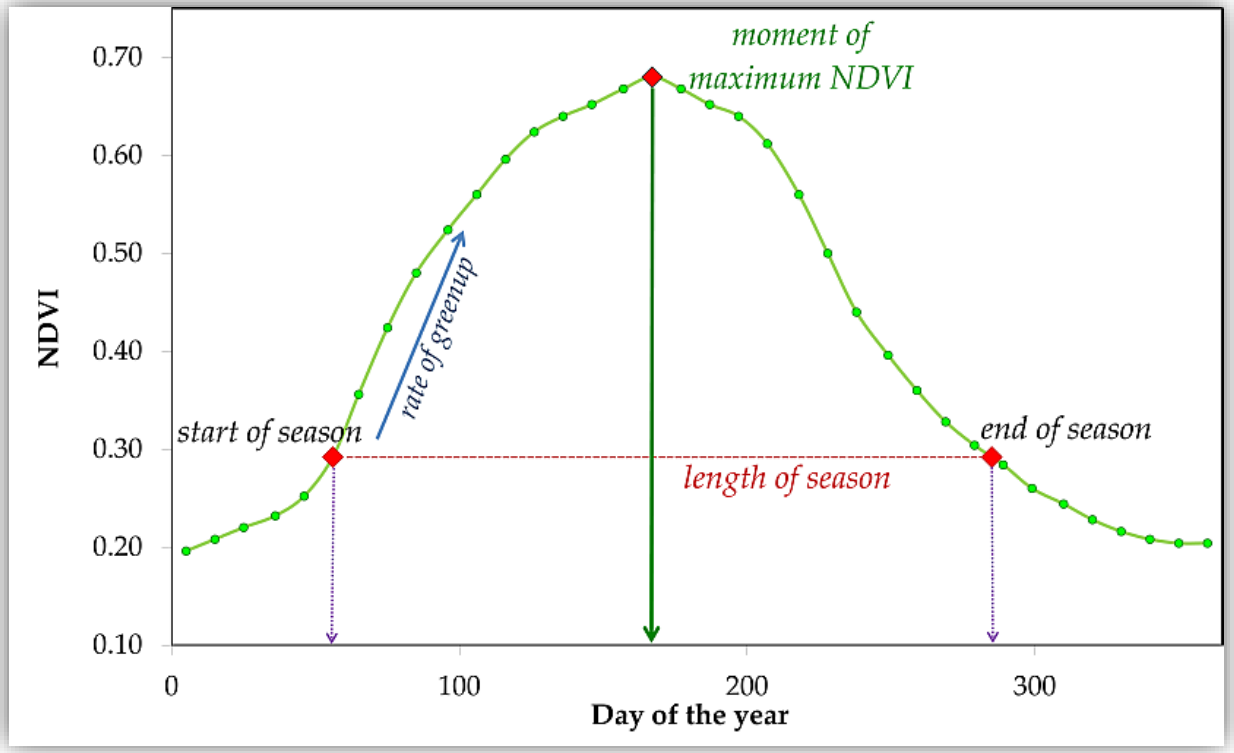
A SHORT RECAP





WHAT DO WE WANT TO EXTRACT?



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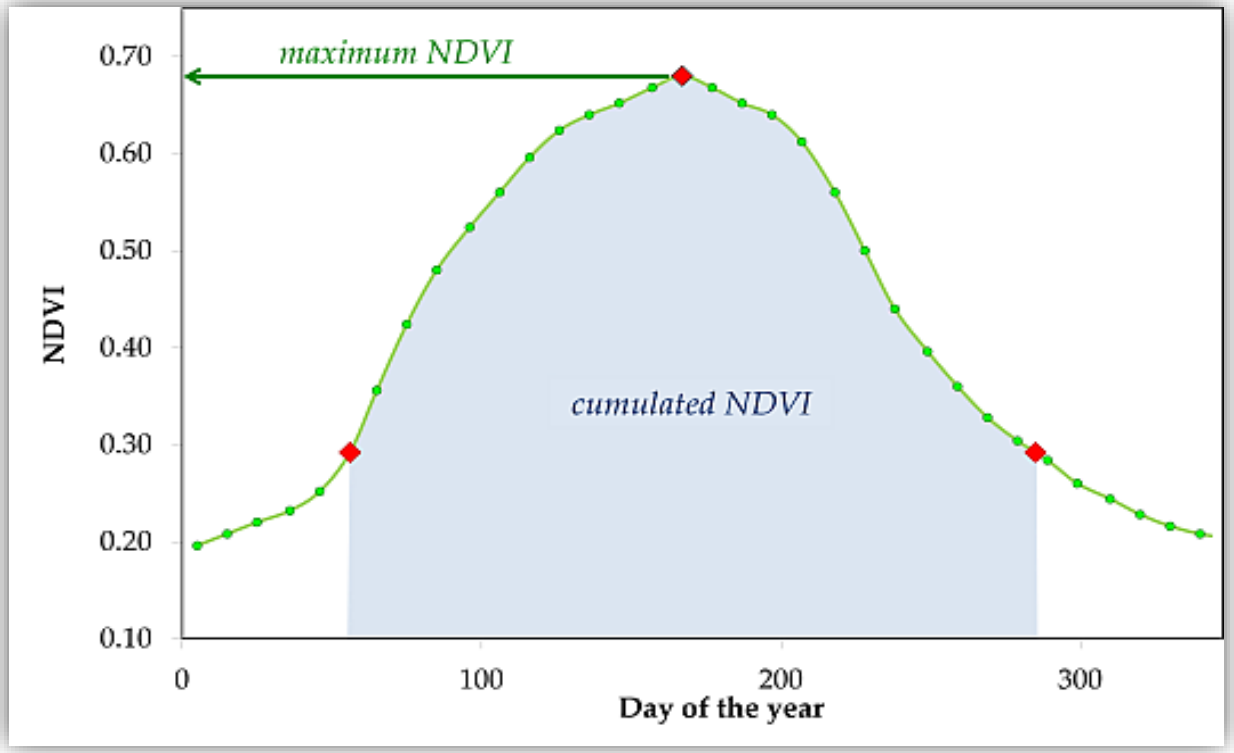


NAMES/PARAMETERS

Science data sets included in the MODIS Land Cover Dynamics Product (MCD12Q2).

Science data set name	Units
Onset_Greenness_Increase	Day of year
Onset_Greenness_Maximum	
Onset_Greenness_Decrease	
Onset_Greenness_Minimum	
EVI_Onset_Greenness_Increase	EVI units
EVI_Onset_Greenness_Maximum	
EVI_Growing_Season_Area	ΣEVI
Phenology_Quality	N/A

Ganguly et al. 2010. Land surface phenology from MODIS: Characterization of the Collection 5 global land cover dynamics product. Remote Sensing of Environment, 114: 1805-1816..

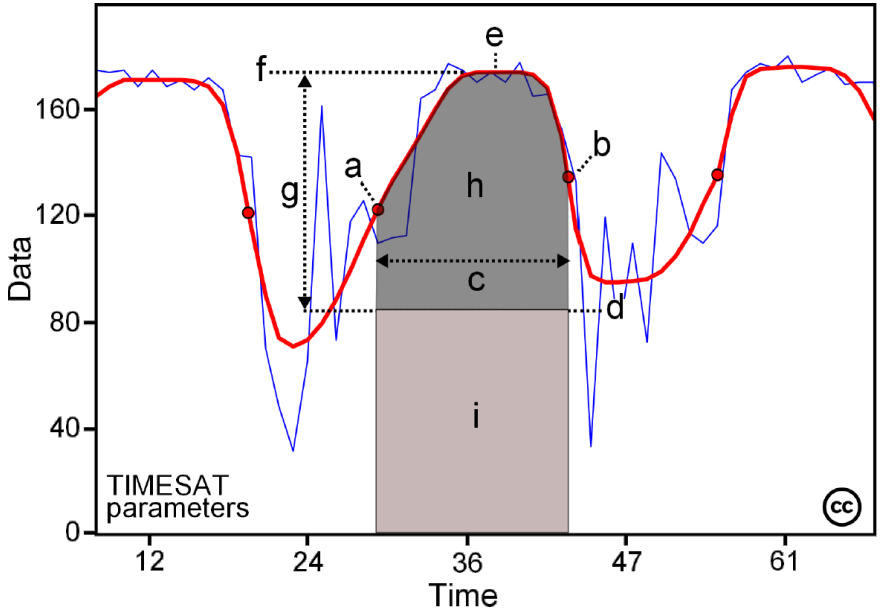
https://phenology.cr.usgs.gov/methods_metrics.php

Table 2. Remote sensing phenology data sets for the conterminous U.S.

RSP Data Set	Acronym	Phenological Interpretation	Description
Start of Season - Time	SOST	Beginning of measurable photosynthesis in the vegetation canopy	Day of year identified as having a consistent upward trend in time series NDVI
Start of Season - NDVI	SOSN	Level of photosynthetic activity at the beginning of measurable photosynthesis	NDVI value (or baseline) identified at the day of year identified as a consistent upward trend in time series NDVI
End of Season - Time	EOST	End of measurable photosynthesis in the vegetation canopy	Day of year identified at the end of a consistent downward trend in time series NDVI
End of Season - NDVI	EOSN	Level of photosynthetic activity at the end of measurable photosynthesis	NDVI value corresponding with the day of year identified at the end of a consistent downward trend in time series NDVI
Time of Maximum	MAXT	Time of maximum photosynthesis in the canopy	Day of year corresponding to the maximum NDVI in an annual time series
Maximum NDVI	MAXN	Maximum level of photosynthetic activity in the canopy	Maximum NDVI in an annual time series
Duration	DUR	Length of photosynthetic activity (the growing season)	Number of days from the SOST and EOST
Amplitude	AMP	Maximum increase in canopy photosynthetic activity above the baseline	Difference between MAXN and SOSN
Time Integrated NDVI	TIN	Canopy photosynthetic activity across the entire growing season	Daily (interpolated) integration of NDVI above the baseline for the entire duration of the growing season

MANY NAMES + MORE PARAMETERS…

- TIMESAT



(a) beginning of season
(b) end of season
(c) length of season
(d) base value
(e) time of middle of season
(f) maximum value
(g) amplitude
(h) small integrated value
(h+i) large integrated value.

SUMMARY

- Extraction of phenological parameters is done per location (pixel)
- First step is a (modelled) time series of a vegetation index
  - dense in time
  - good description of changes in greenness during season
- Based on rules we can derive parameters from such a series
- A great variety of parameters exist
  - Temporal: start- and end-of-season, …
  - VI: integrated NDVI, amplitude, …
- Different names are used, but can refer to the same parameter