

# Vitality measurement of forests in remote sensing

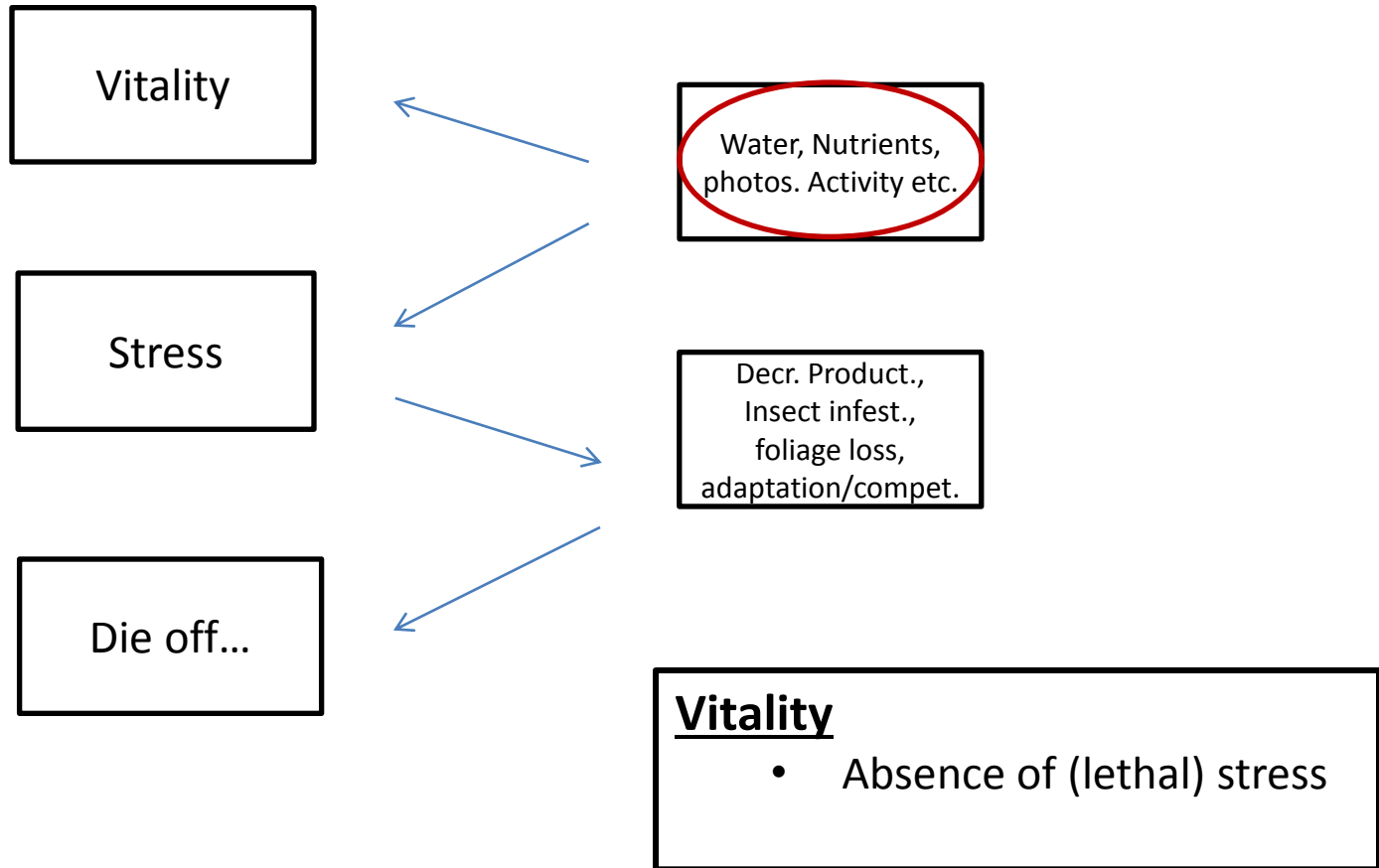
Literature review.



# Structure

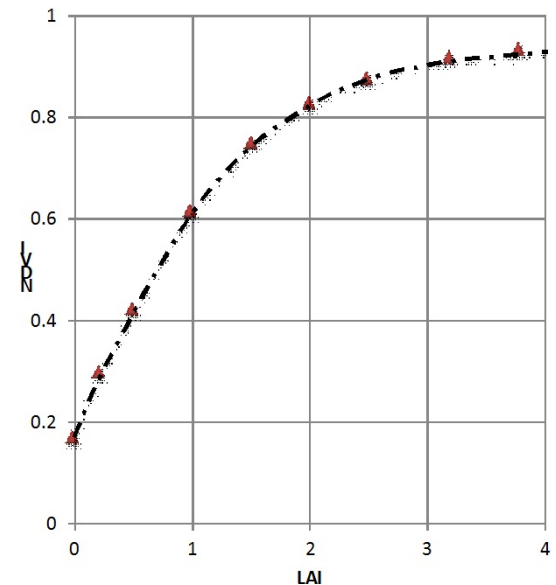
- Introduction
- Vitality detection in remote sensing
- Hyperspectral remote sensing
- First approach
- Outlook

# Introduction



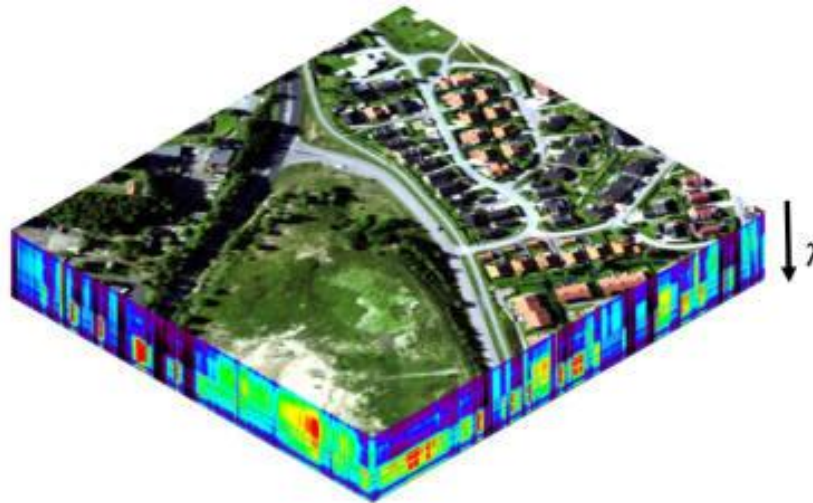
# Vitality detection in remote sensing

- Indices to describe canopy conditions
  - Ratios
  - Normalized ratios
- Saturation
- Influenced by multiple factors

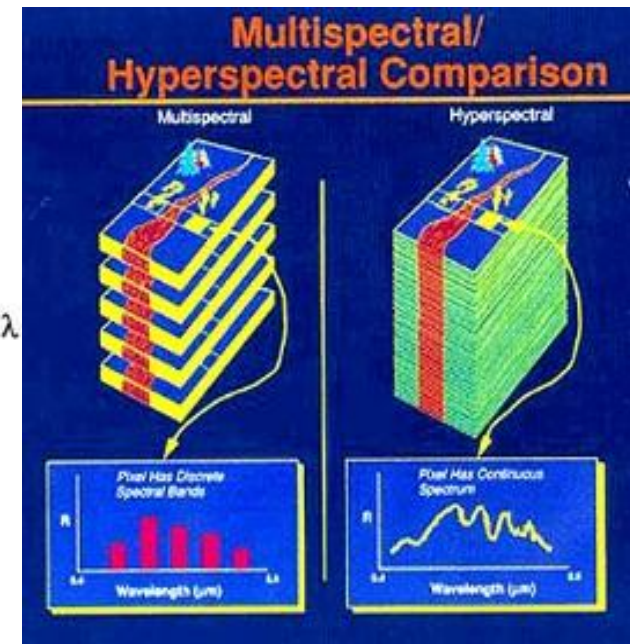


# Hyperspectral remote sensing

- Numerous and narrow bands
- Continuous information

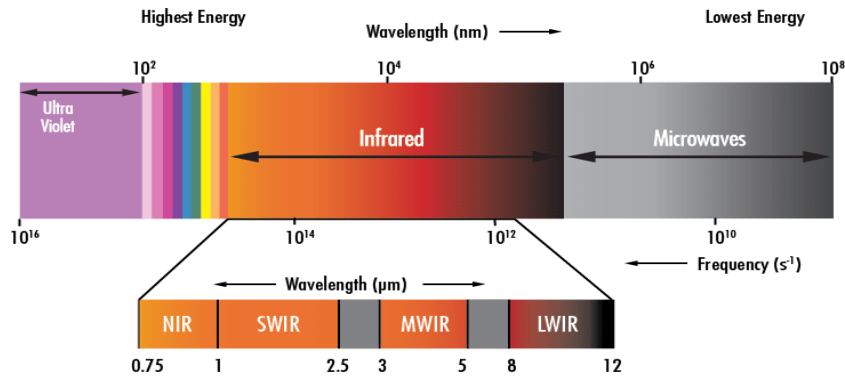


[http://www.hispex.no/hyperspectral\\_imaging/about.php](http://www.hispex.no/hyperspectral_imaging/about.php)



[http://www.fas.org/irp/imint/docs/rst/Sect13/Sect13\\_9.html](http://www.fas.org/irp/imint/docs/rst/Sect13/Sect13_9.html)

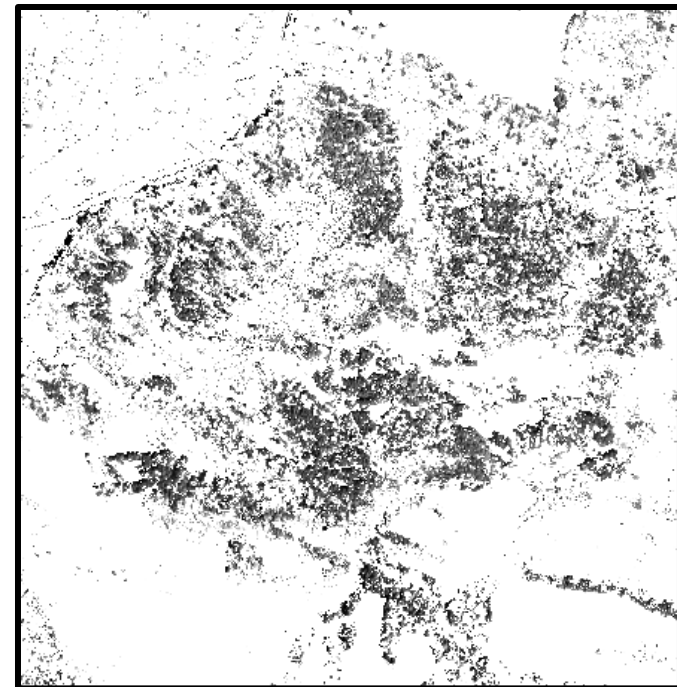
# First approach



<http://www.edmundoptics.de/learning-and-support/technical/learning-center/application-notes/imaging/what-is-swir/>

Location of short wave infrared

Subset of the given data set

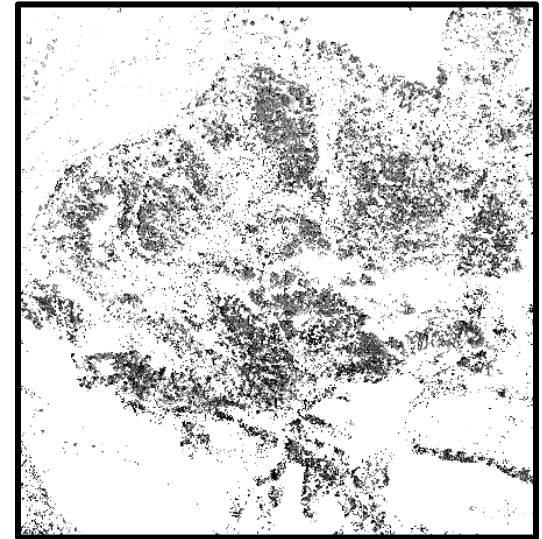


# First approach

Index calculation

Water  
Nitrogen  
Lignin

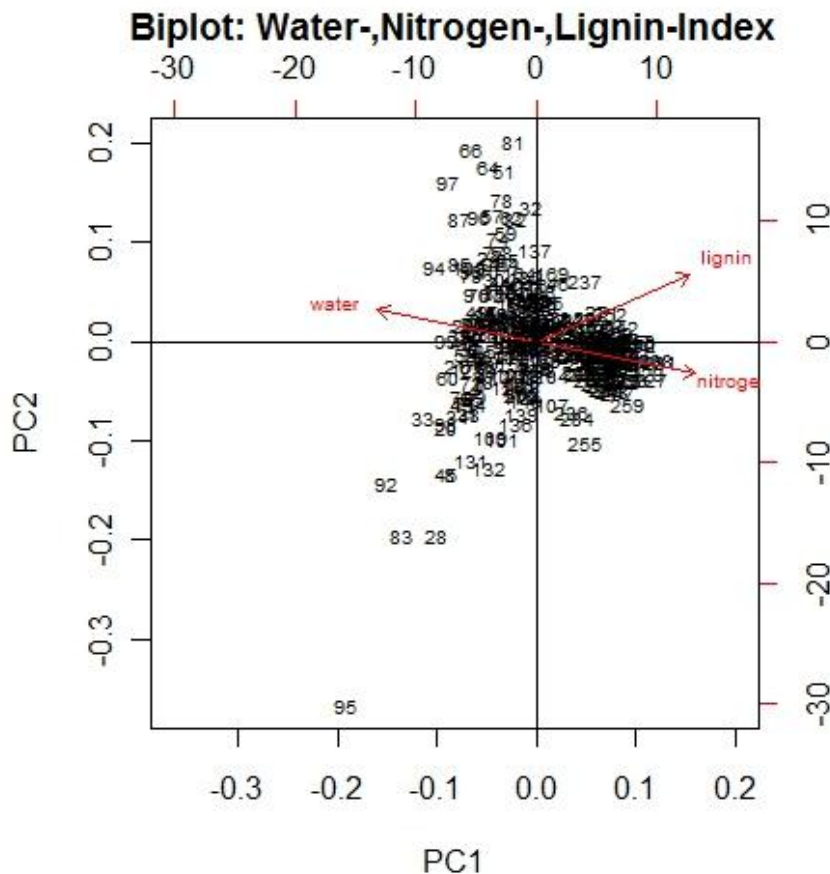
Data extraction



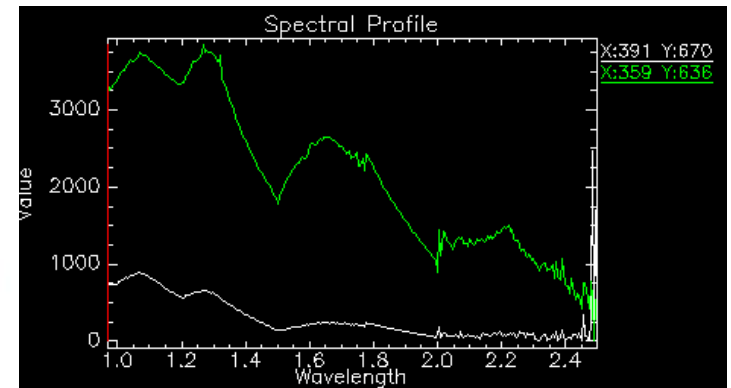
Class	Water	Nitr.	Lig.
3	xy	xy	xy
...	...	...	...
2	xy	xy	xy
...	...	...	...
1	xy	xy	xy
...	...	...	...

# First approach

- Dependency of indices



- Biplot of extracted data and example spectrum:
  - White line – high water index values
  - Green line – low water index values

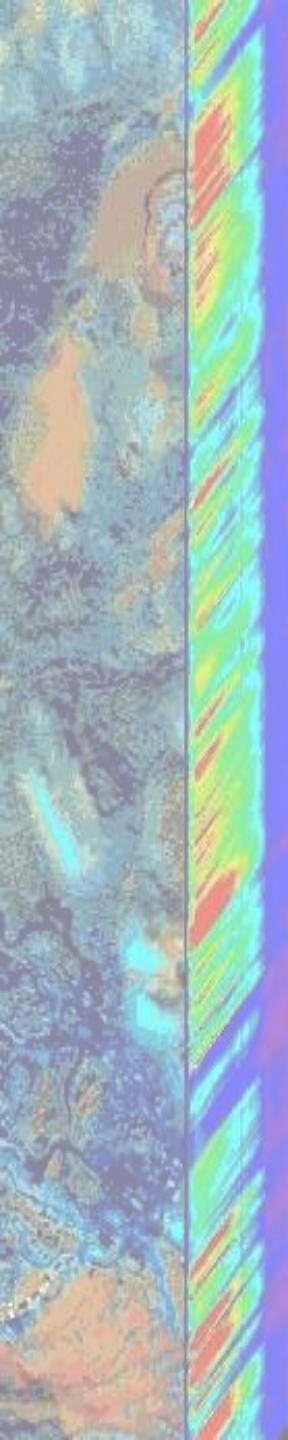






# Outlook

- Master thesis
  - Water as dominating factor
  - Spruce stand
  - 20 groups with 5 trees will be damaged
    - Overflight and ground truth data collection at the same time
  - Comparison of both data sets: Is it possible to detect water stress earlier with hyperspectral data and if yes, how much earlier?



To be continued...

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