

# Non-imaging (ground) and imaging (UAV) measurements differ due to different specific field of views

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# Motivation

- Ground measurements by field spectrometers are widely used as reference systems for imaging UAV, airborne and satellite data
- Several studies found differences between field spectrometer and imaging measurements
- It was hypothesized that these differences result from calibration issues\*

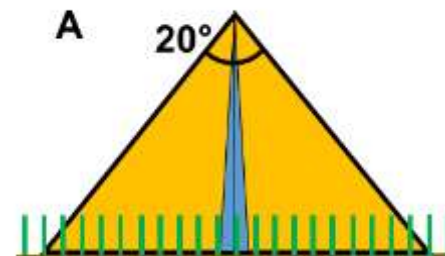
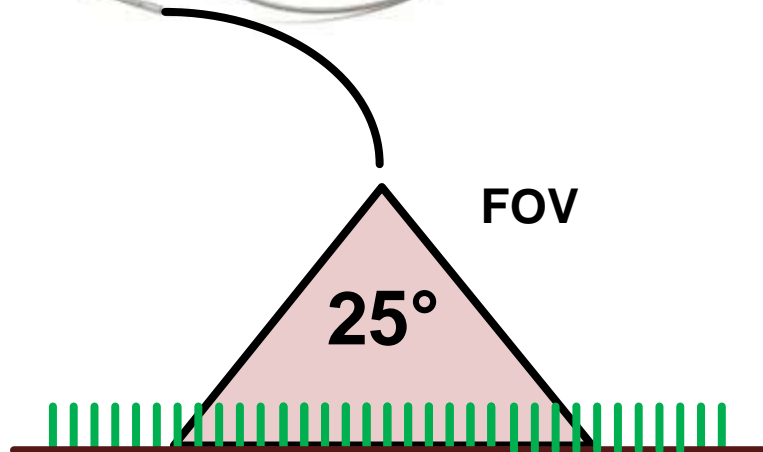
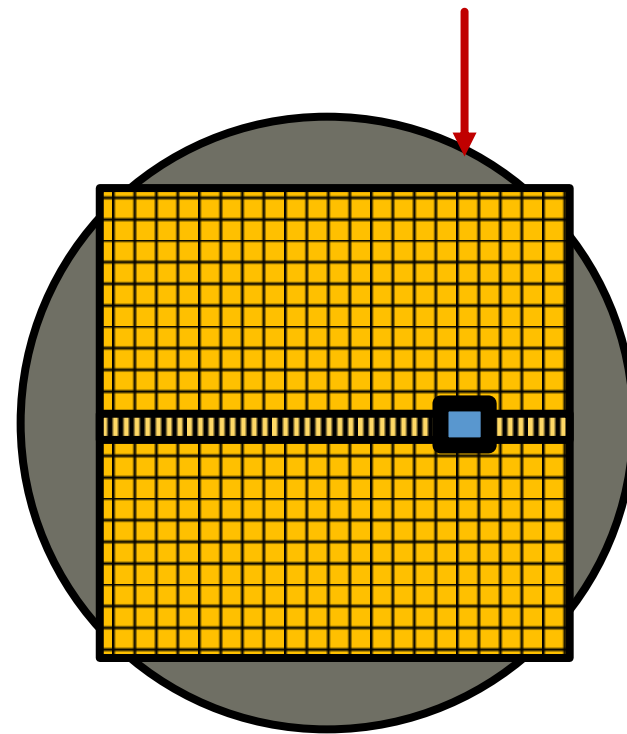
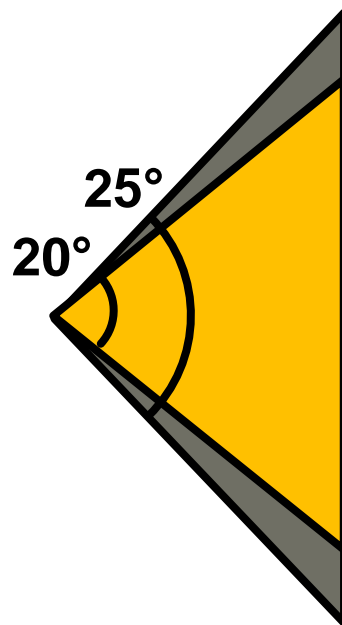
# Motivation

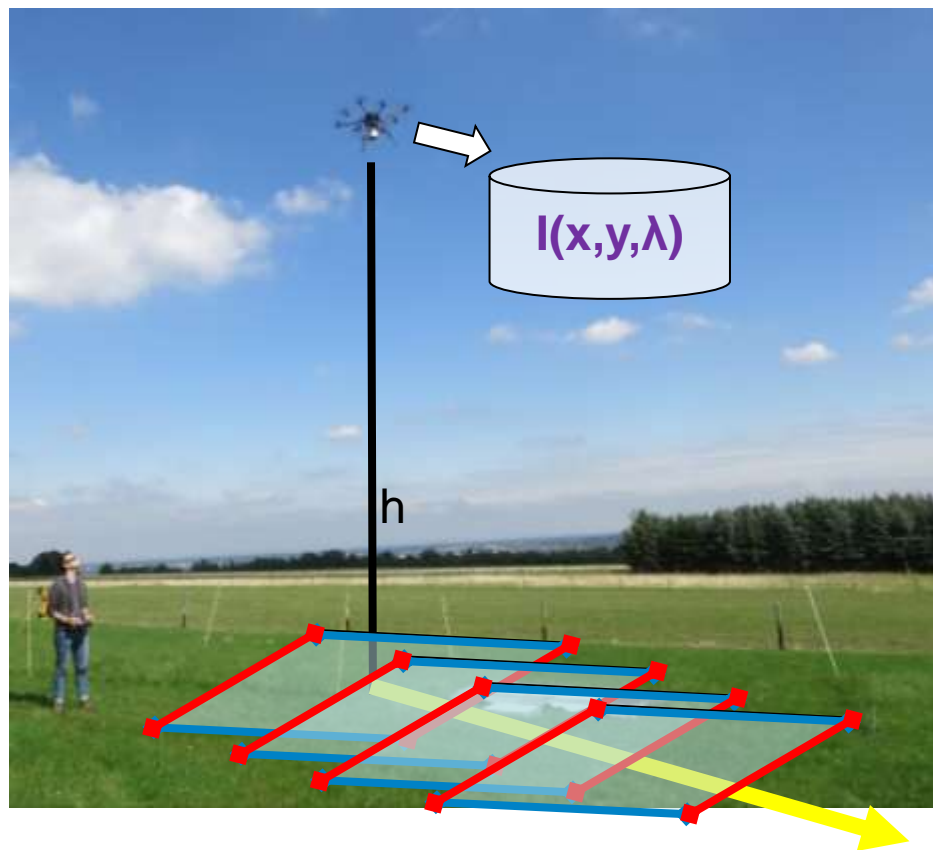
- But imaging and non-imaging data are inherently different when it comes to their angular properties
- Several studies have shown that angular properties (viewing geometry x anisotropy (BRDF)) impacts spectral data\*
- How comparable are these non-imaging ground observations and imaging airborne observations?
- What is the impact of the angular properties of the data?

# Field of View (FOV) and instantaneous FOV (IFOV)

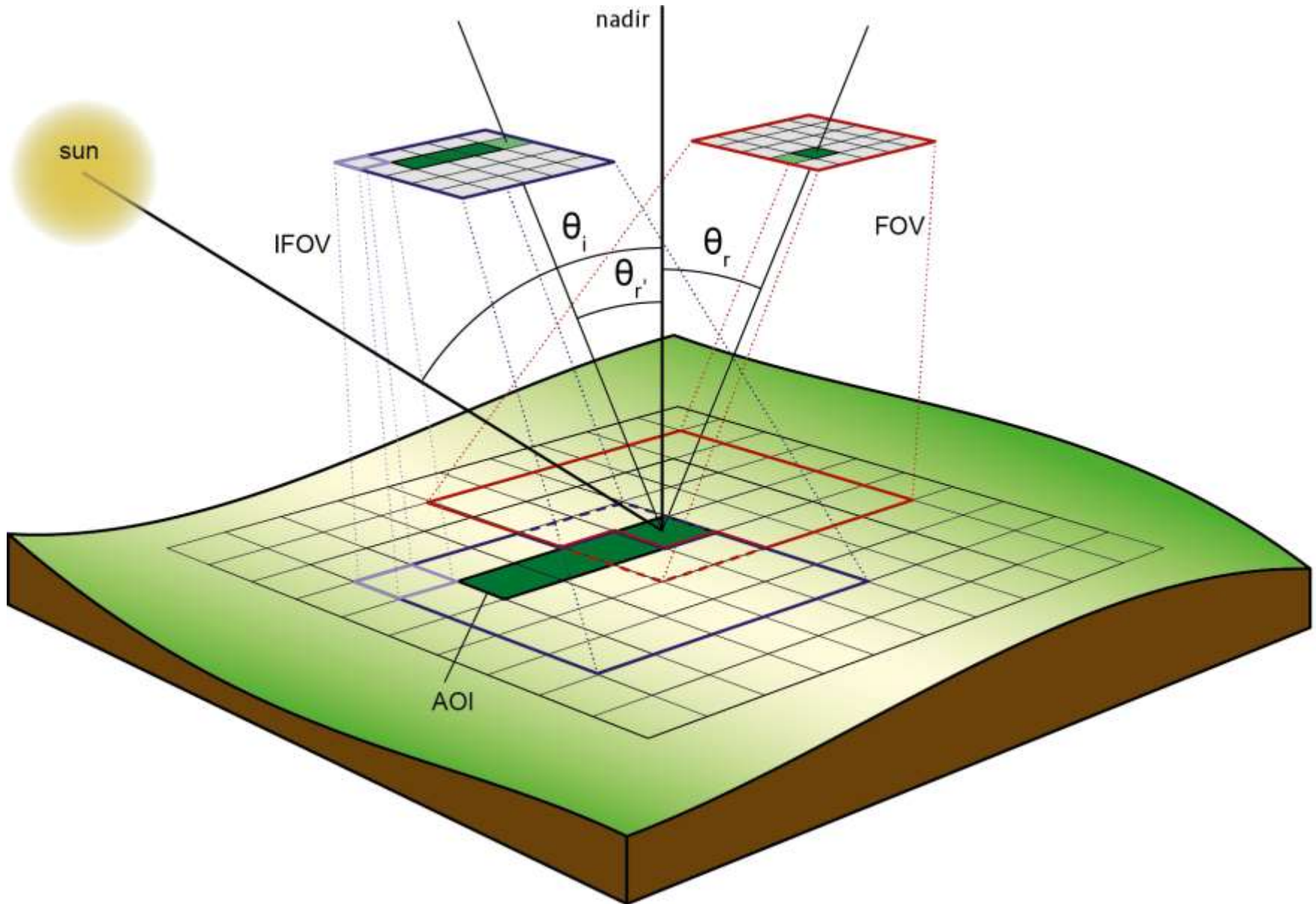
Side view  
FOV

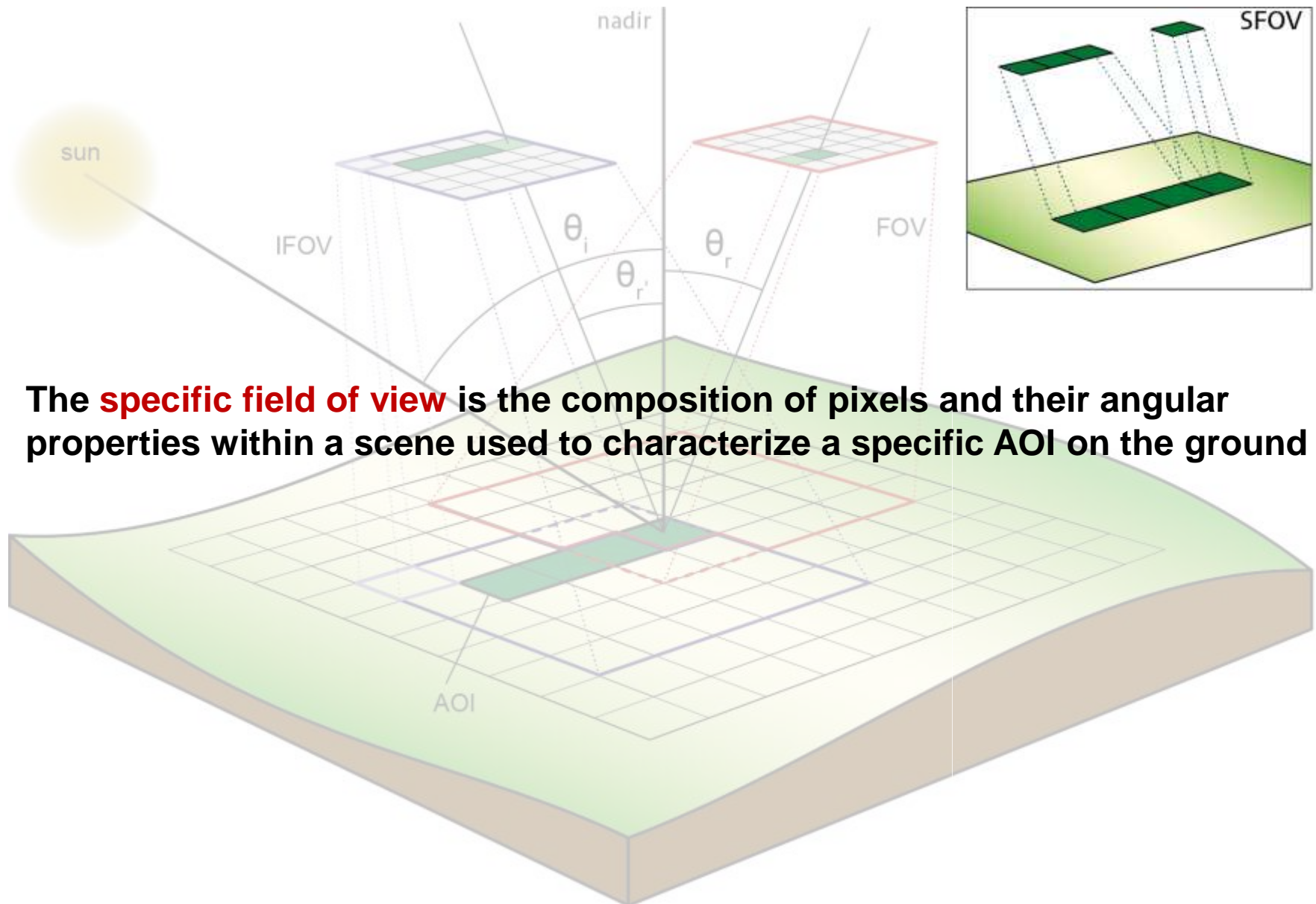
Top view  
IFOV





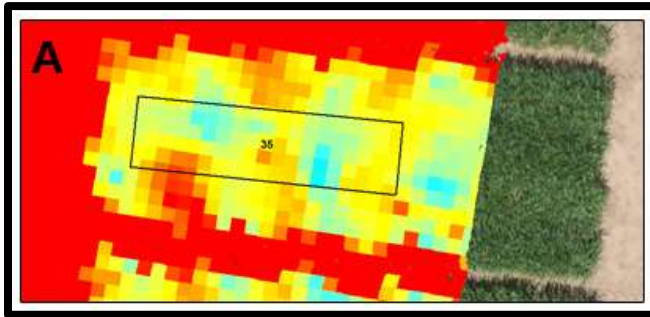
2D snapshot imager



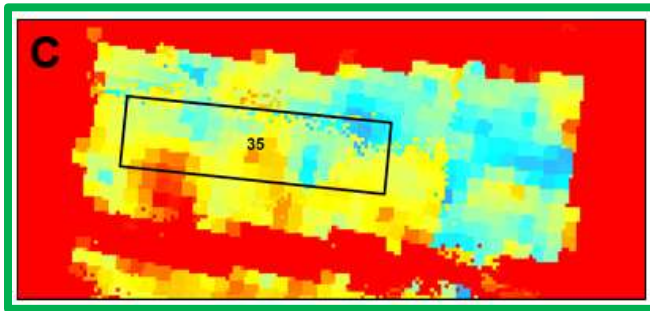


The **specific field of view** is the composition of pixels and their angular properties within a scene used to characterize a specific AOI on the ground

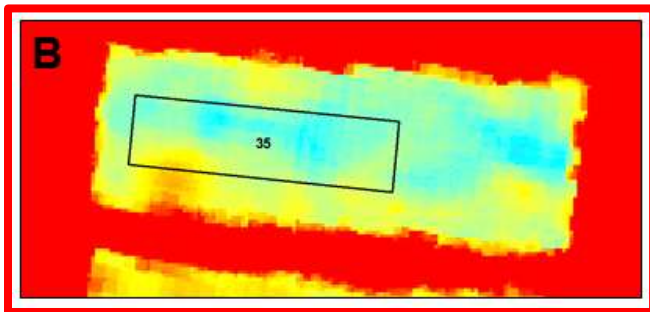
# Influence of the SFOV



Single image



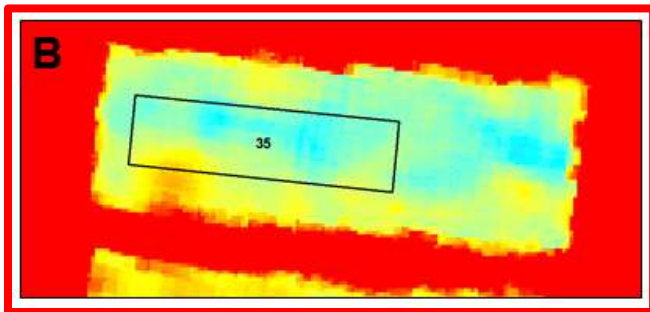
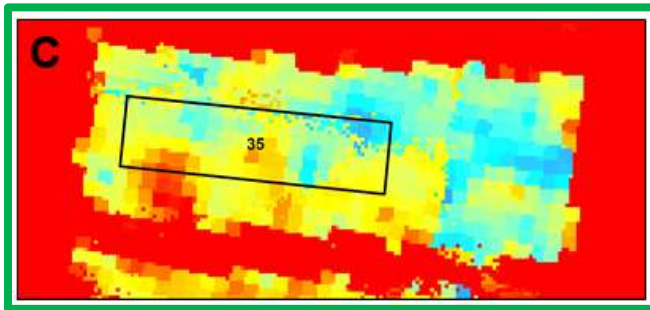
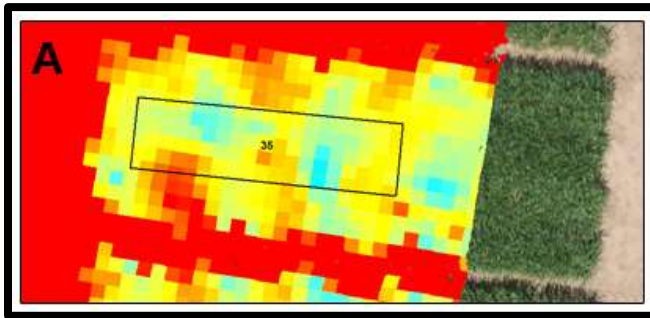
Mosaic, no blending



Mosaic, average blending



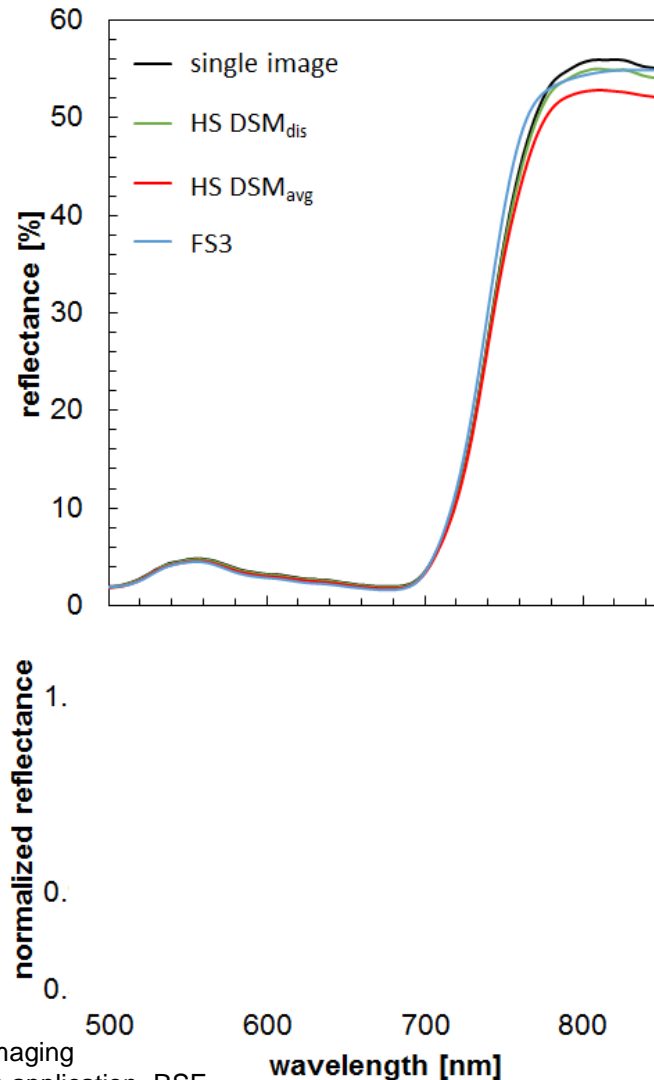
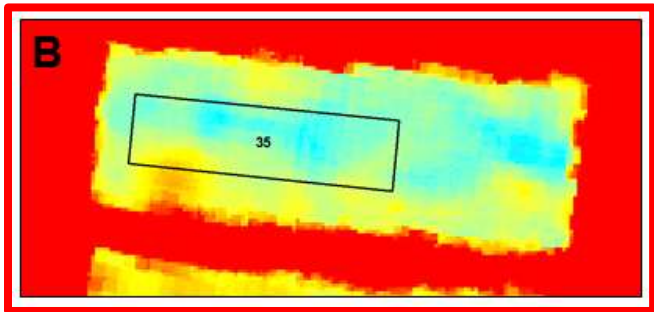
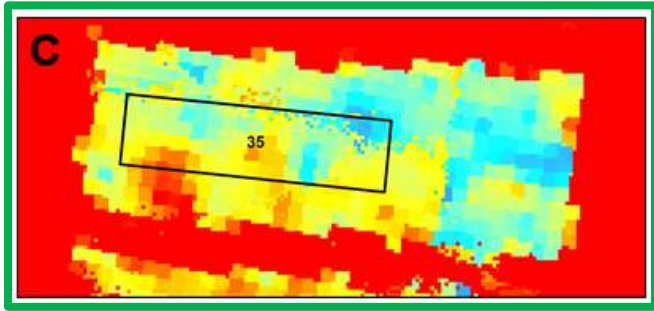
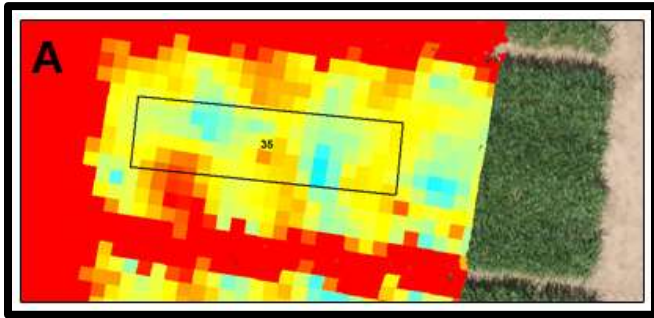
# Influence of the SFOV



Non-imaging



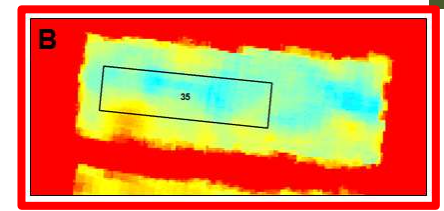
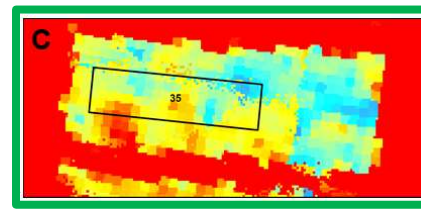
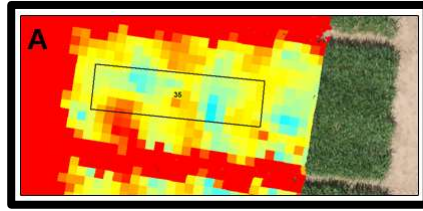
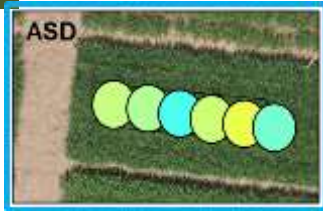
# Influence of the SFOV



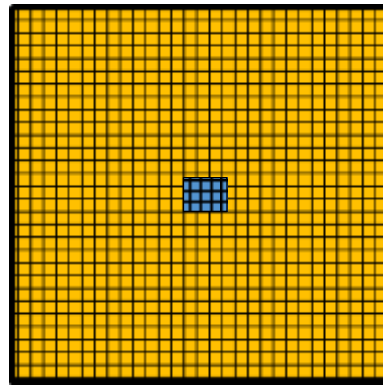
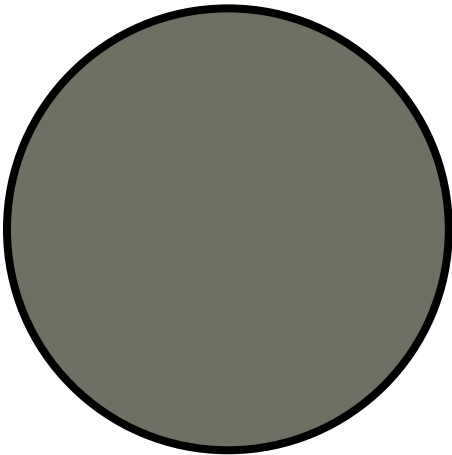
normalized reflectance

500 600 700 800

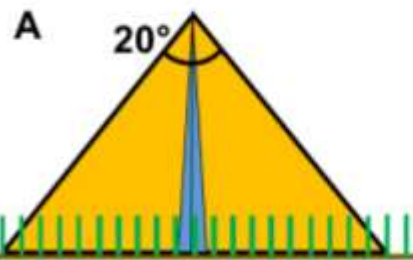
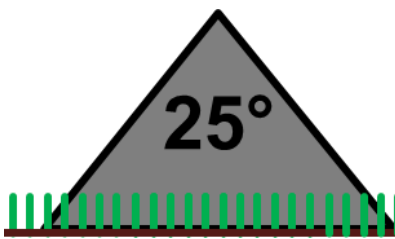
wavelength [nm]



SFOV for plot 35 at DAS 70




- 1
- 2
- 3
- 4
- 5
- 6
- 7



# Conclusions

- The concept of the specific field of view (SFOV) allows comprehending the complex composition of the signal extracted from a data product.
- The composition of the SFOV has an impact on the spectral signature
- The impact is growth stage and illumination condition depended (not shown here)
- Without tracing the origin of the spectral information, these effects can not be take into account and might lead to false conclusions
- *I am sure that the SFOV will also impact F results*

- 
- **Project PhenoFly**
- research gate
  - website (preliminary)

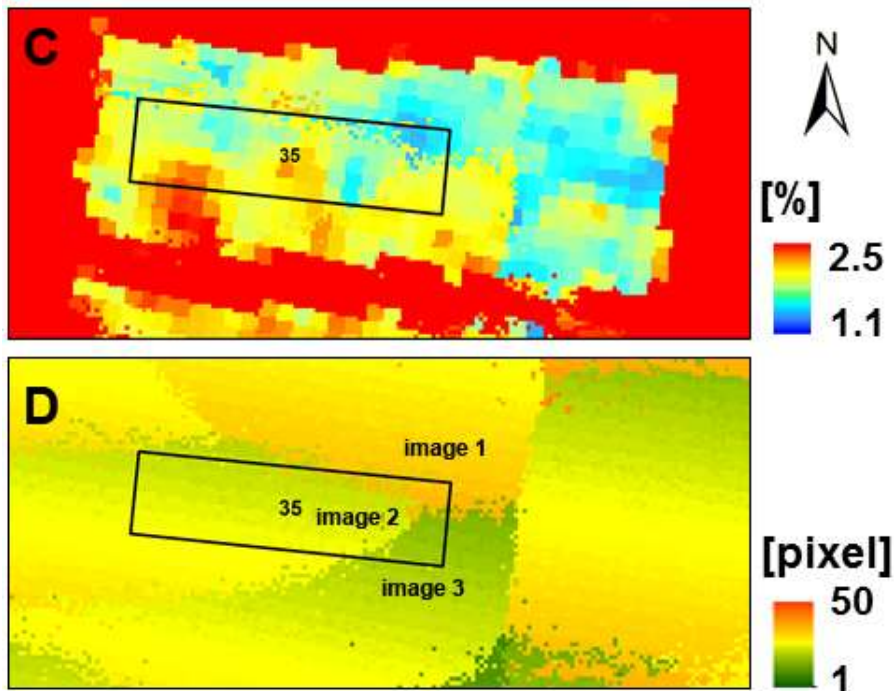
Thanks to GIS and RS group, University Cologne (Georg Bareth)

Thank you for your attention

Aasen, H., Bolten, A., 2018. Multi-temporal high-resolution imaging spectroscopy with hyperspectral 2D imagers – from theory to application. RSE

# SFOV depending on the blending mode

Blending disabled



# SFOV depending on the blending mode

