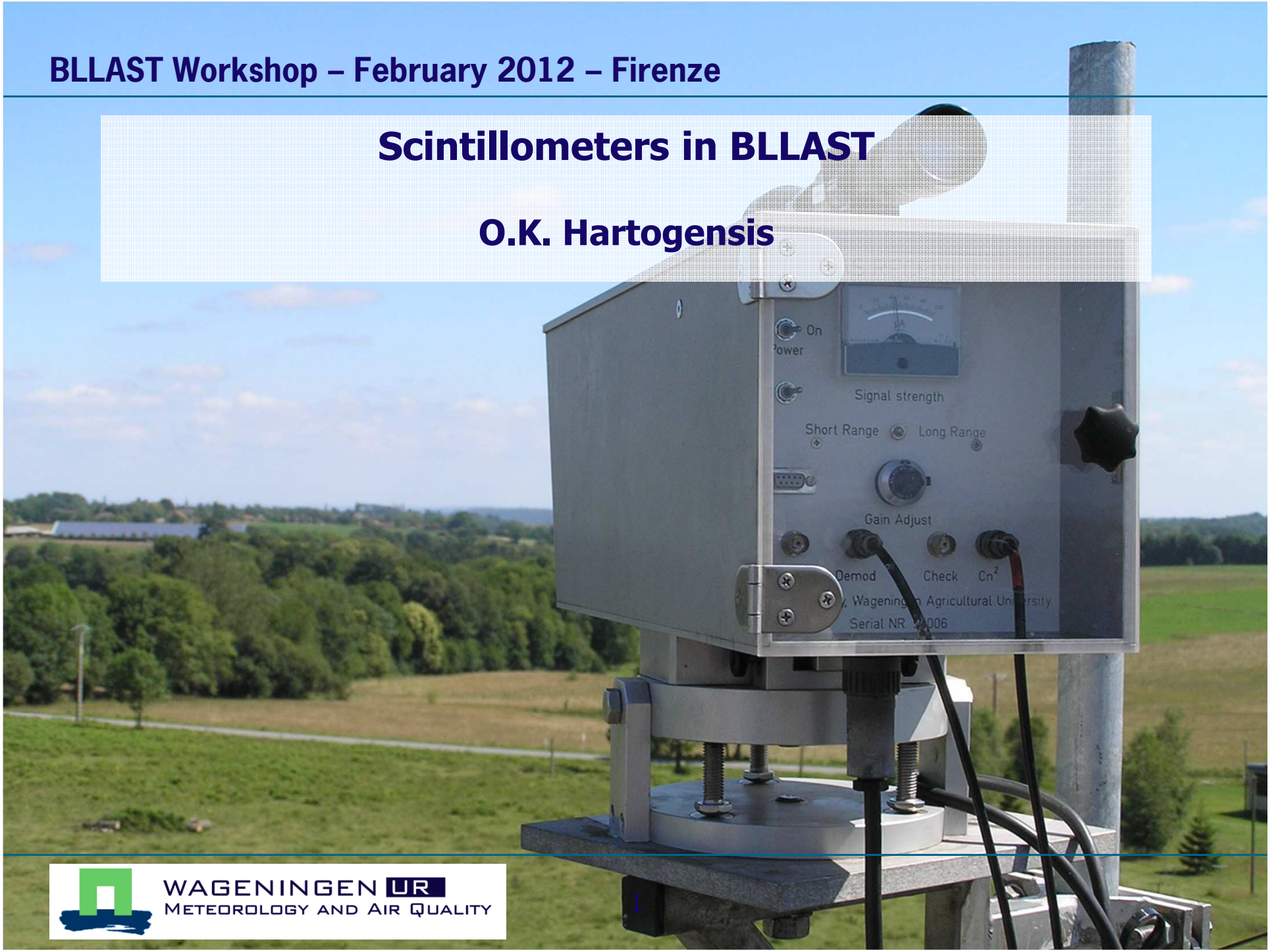
Scintillometers in BLLAST

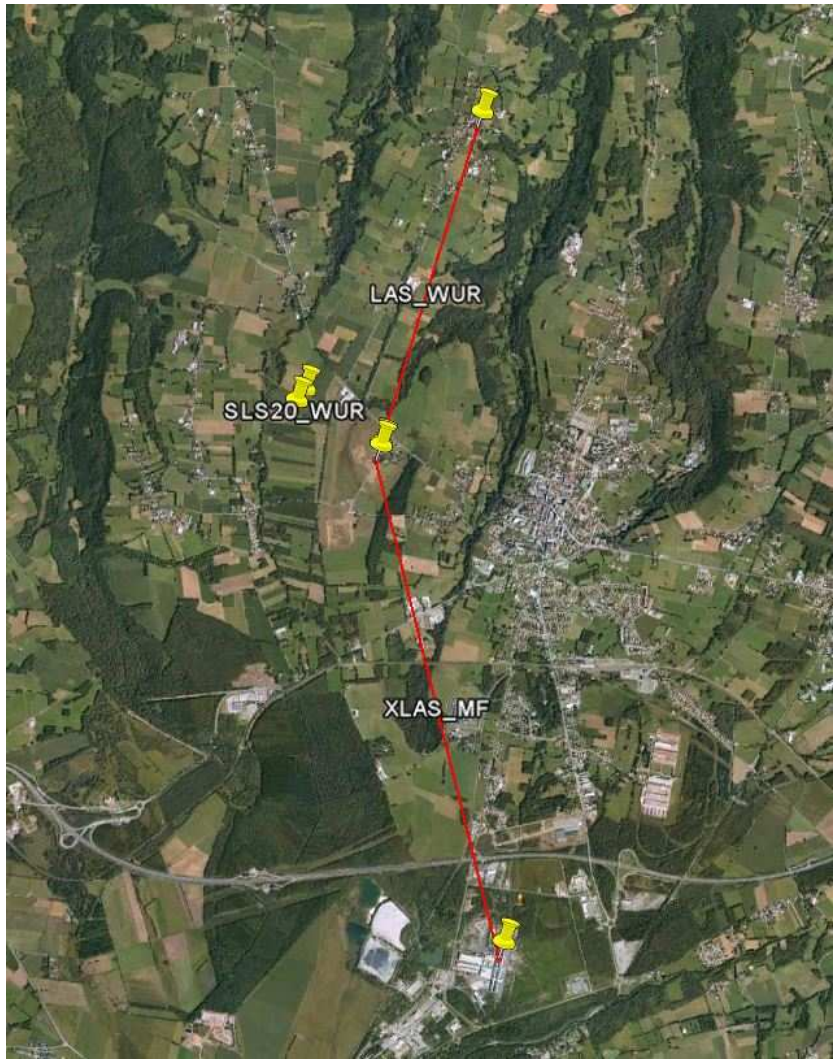
O.K. Hartogensis



WAGENINGEN UR
METEOROLOGY AND AIR QUALITY

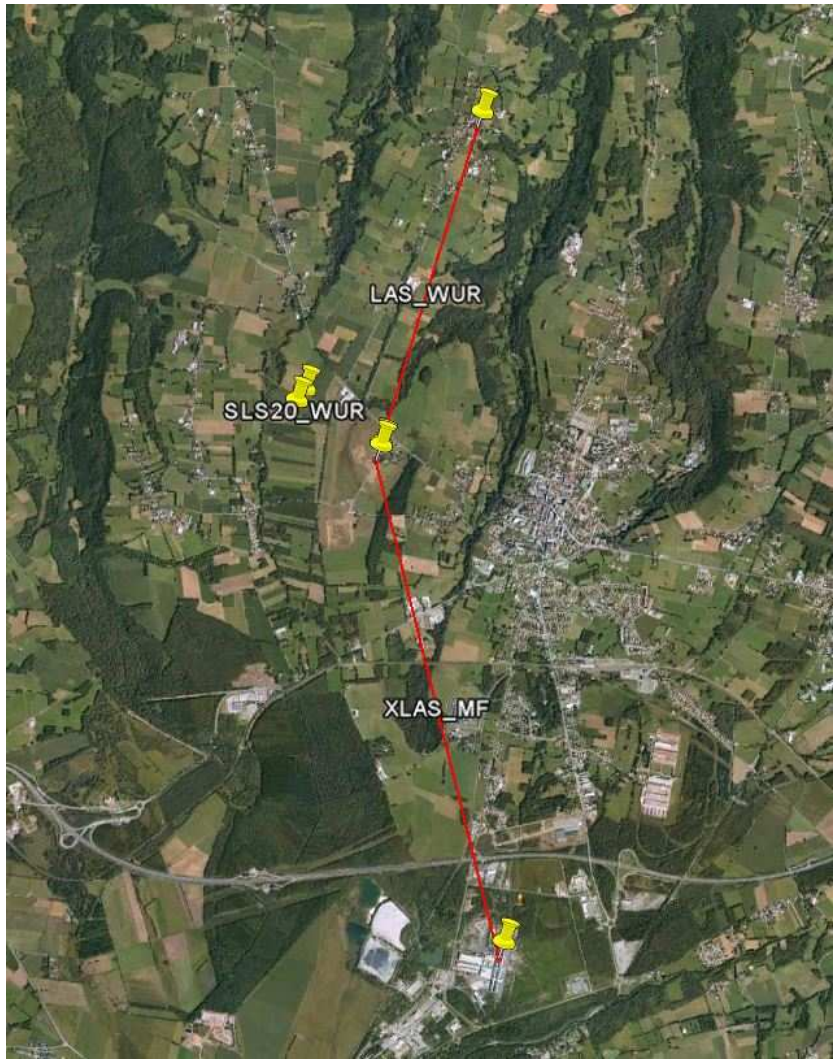
Scintillometry in a nutshell

3 Scintillometers in BLLAST



1. LAS_WUR
2. XLAS_MF
3. SLS20_WUR

3 Scintillometers in BLLAST



1. LAS_WUR
2. XLAS_MF
3. SLS20_WUR

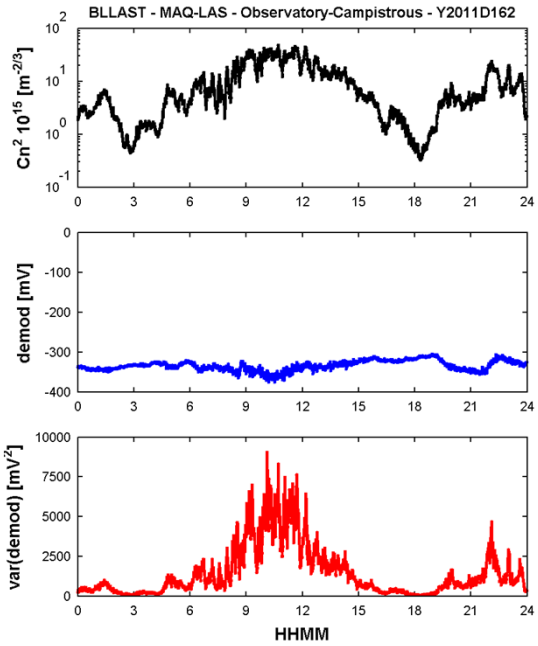
Motivation:
"Characterize the area-averaged surface heat flux over the highly heterogeneous BLLAST domain"

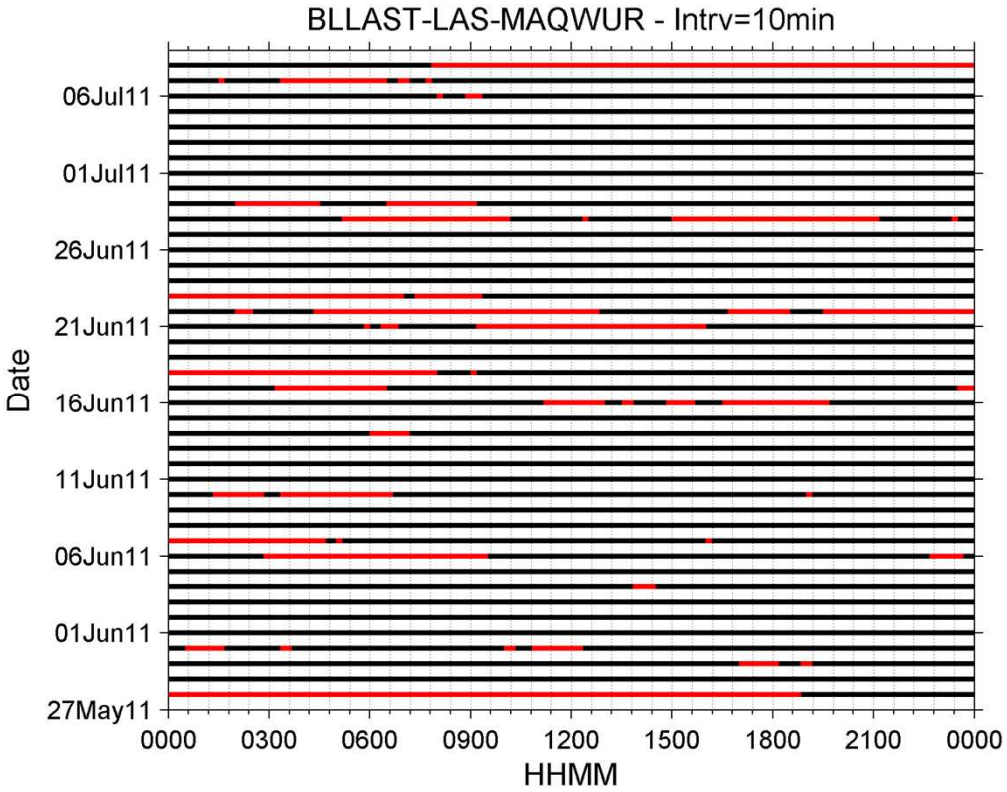
1. LAS_WUR

LAS	
Operated by	WUR-MAQ
Manufacturer	WUR-MAQ
D	0.15m
λ	940nm
Phys Variable	C_n^2
Turbulent Flux	H

Set-up			
	Location	**Z (a.s.l.)**	**L**
Transmitter	CRA	11.4m	2687m
Receiver	Church Campistrous	18.4	

1. LAS_WUR





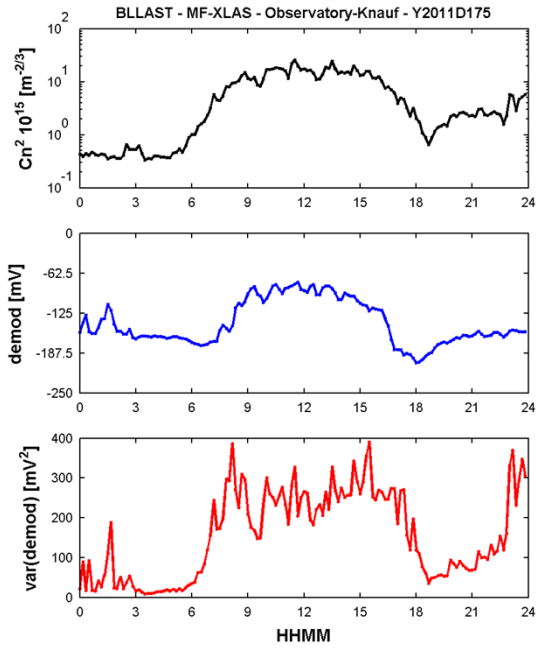
DATA	
Storage Intrv	1, 10, 30 min
Processed	C_n^2
BOC	yes
Format	txt, nc

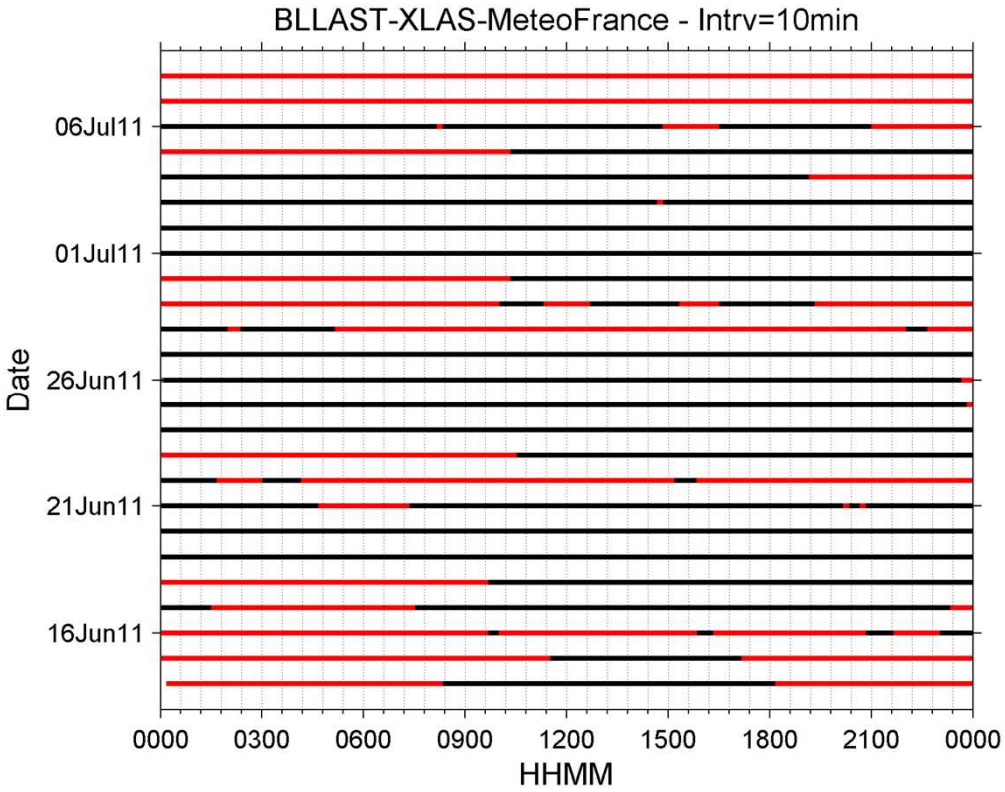
2. XLAS_MF

XLAS	
Operated by	Meteo France
Manufacturer	Kipp&Zn
D	0.30m
λ	880nm
Phys Variable	C_n^2
Turbulent Flux	H

Set-up			
	Location	**Z (a.s.l.)**	**L**
Transmitter	Knauf Factory	65m	3988m
Receiver	CRA	18m	

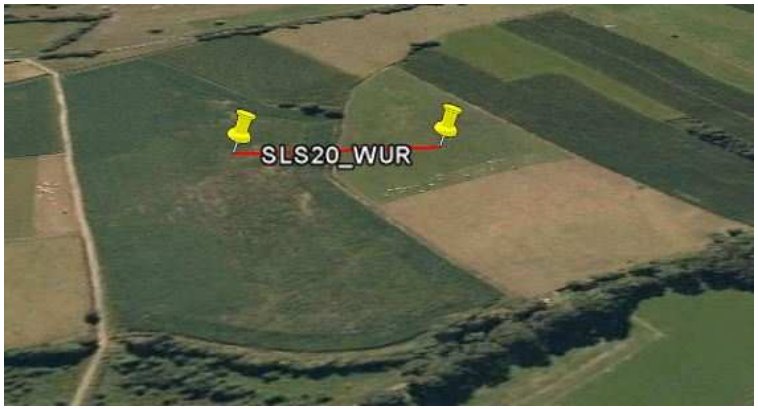
3. XLAS_MF





DATA	
Storage Intrv	1, 10 min
Processed	C_n^2
BOC	yes
Format	txt

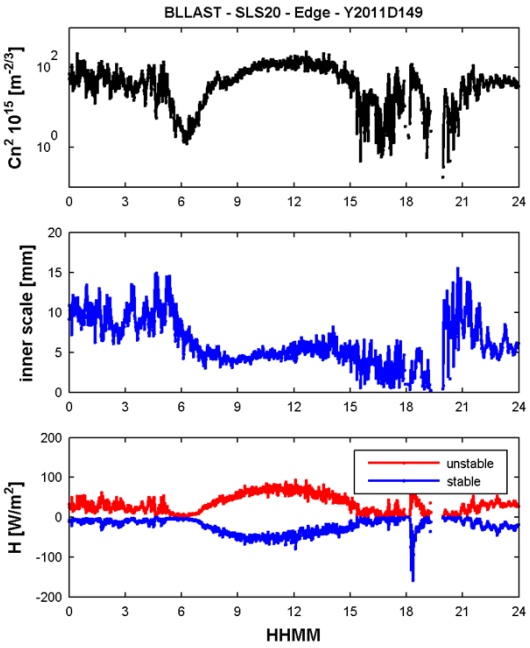
3. SLS20_WUR

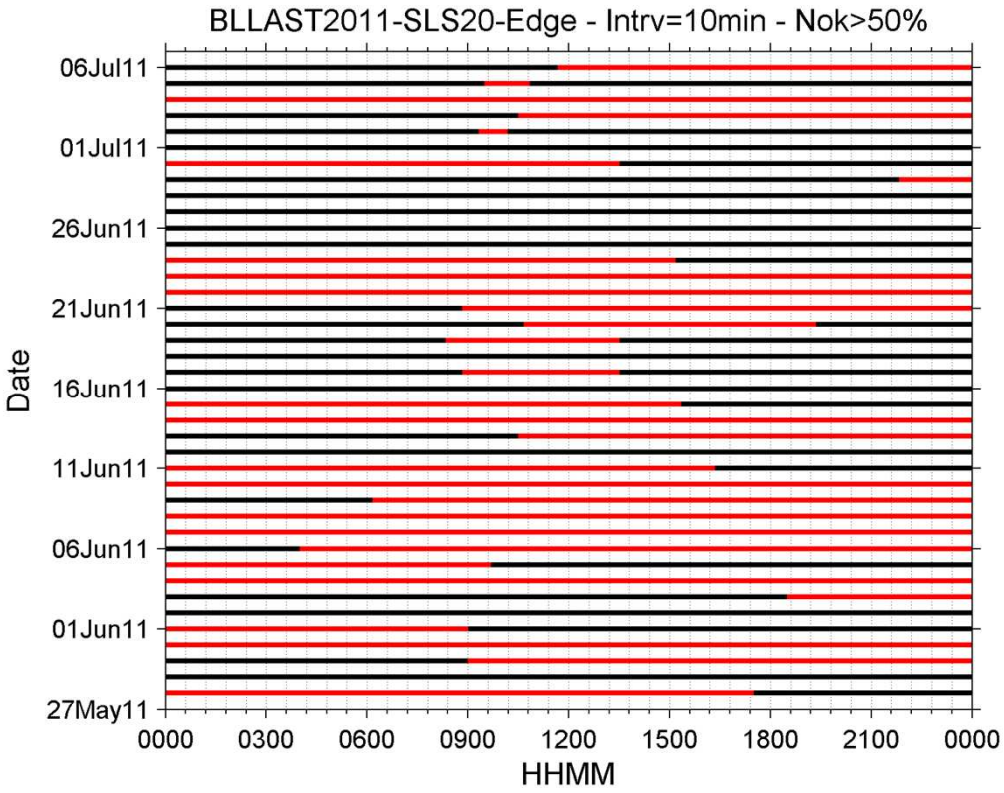


SLS20	
Operated by	WUR-MAQ
Manufacturer	Scintec AG
D	Laser, dual beam
λ	680nm
Phys Variable	C_n^2, l_0
Turbulent Flux	H, u_*

Set-up			
	Location	**Z (a.s.l.)**	**L**
Transmitter	Wheat	2.5m	110m
Receiver	Grass	2.5m	

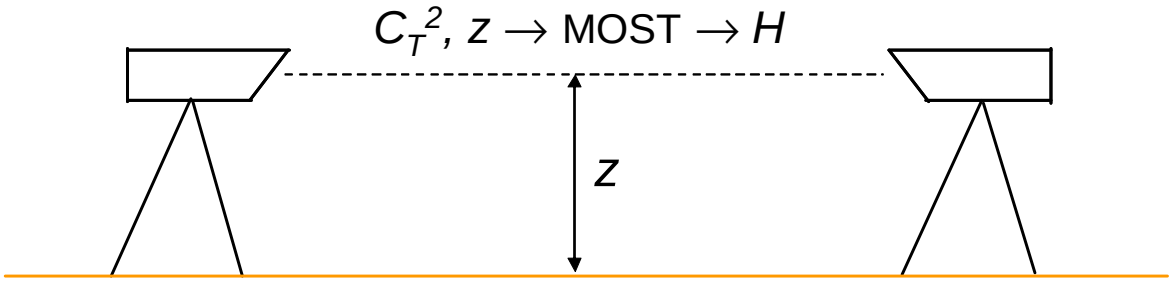
3. SLS20_WUR





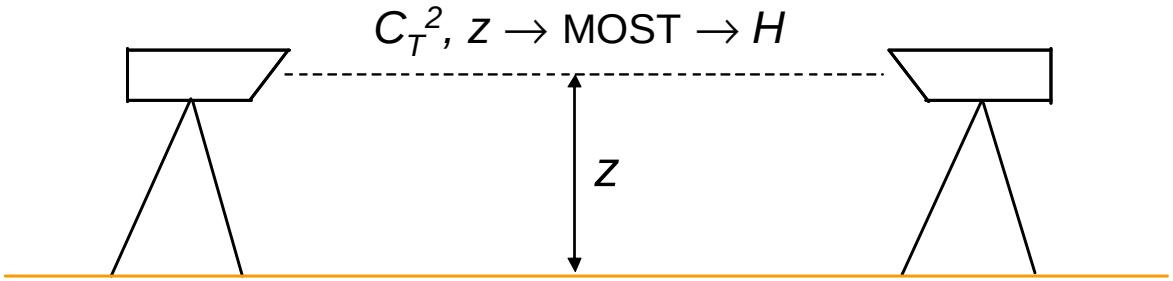
DATA	
Storage Intrv	0.1,1, 10, 30 min
Processed	C_n^2, I_0
BOC	yes
Format	txt, nc

Challange COMPLEX TERRAIN → **Scintillometer Effective Height**



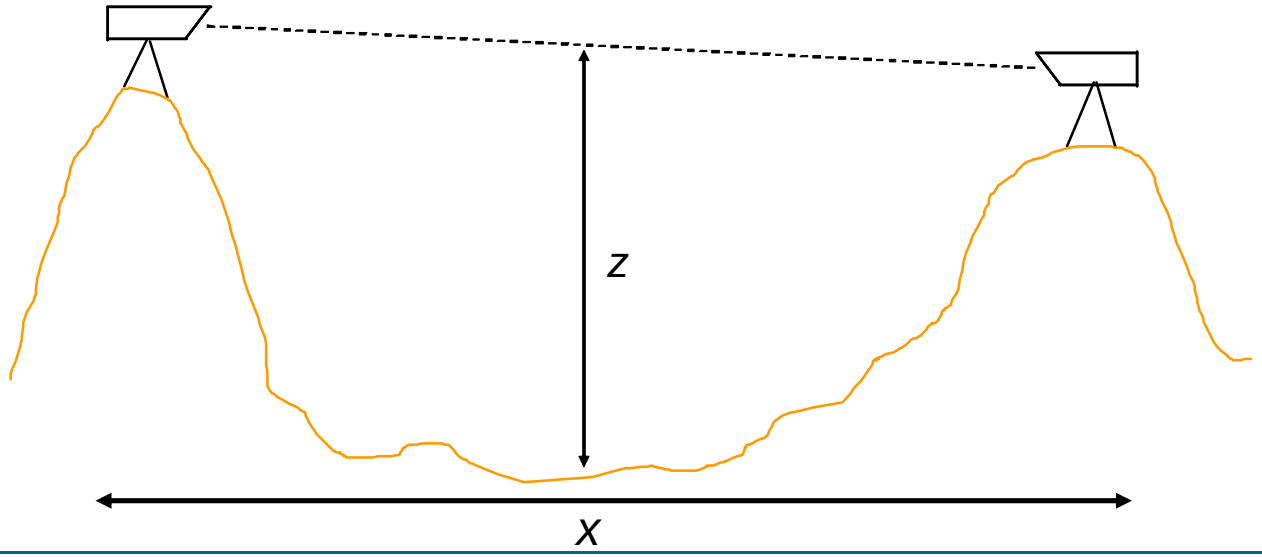
what if …… z is not constant along the path?

Challange COMPLEX TERRAIN → **Scintillometer Effective Height**

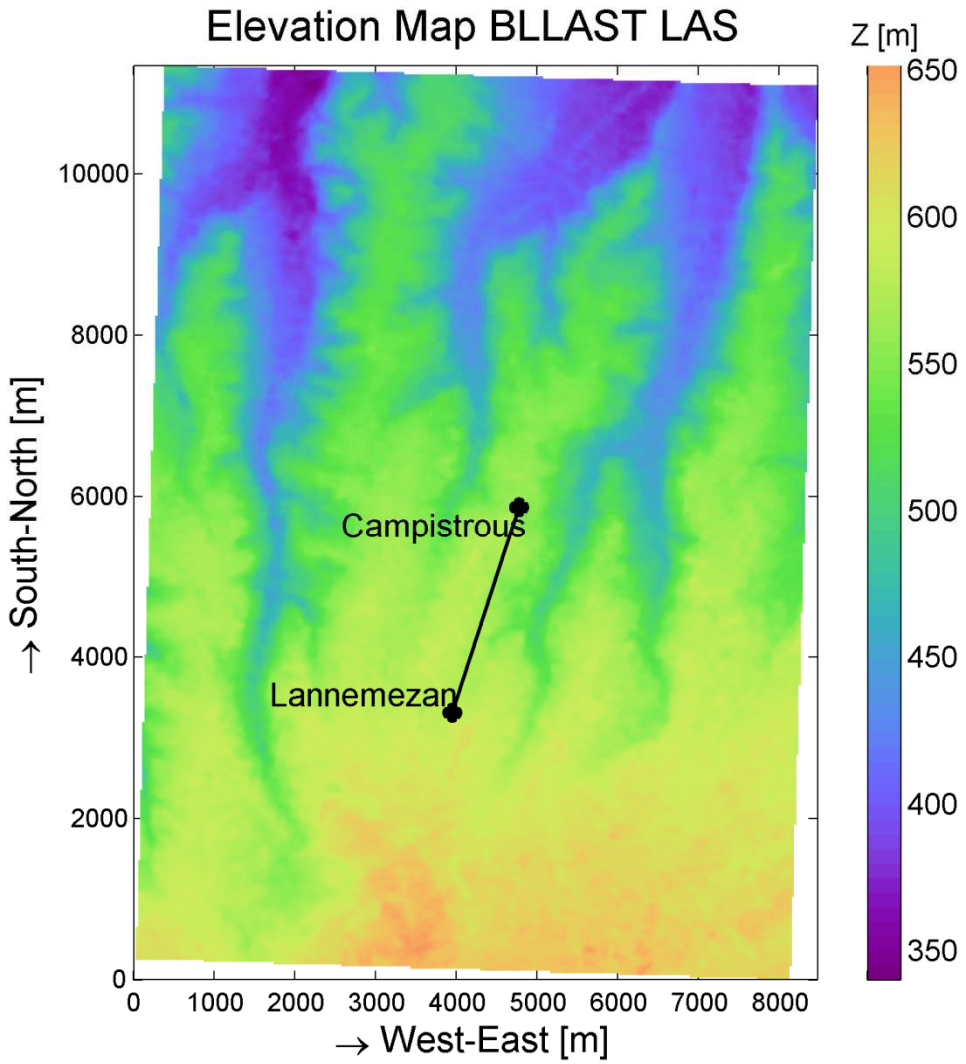


what if …… z is not constant along the path?

Topography/Slant-paths: **Hartogensis et al. (2003) – JHM4**



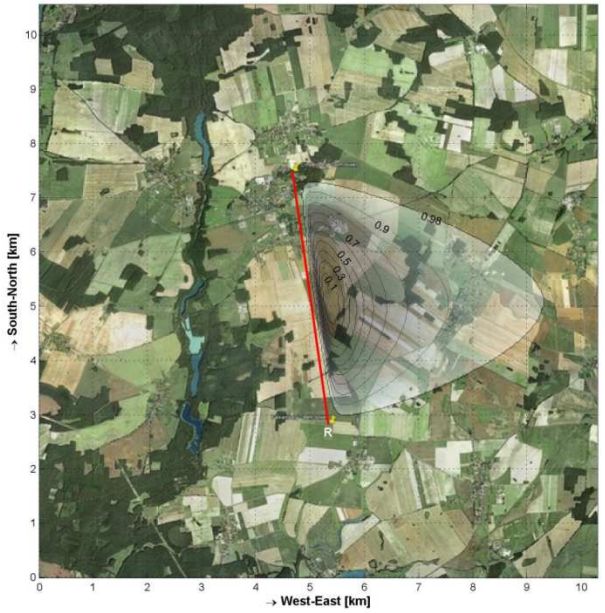
Scintillometer Effective Height – Topography LAS-MAQ footprint



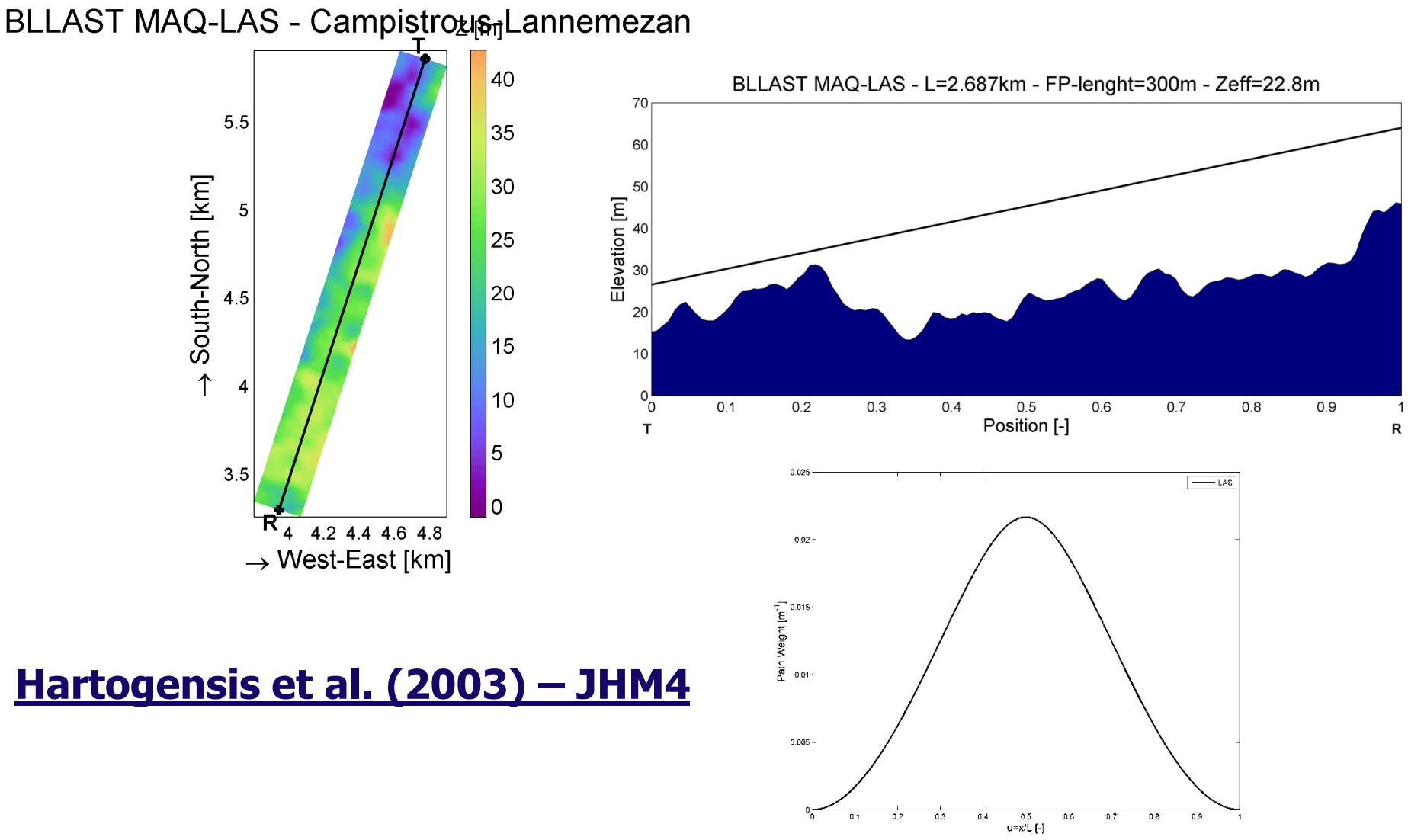
ASTER:

DEM – 25m resolution

Scintillometer footprint

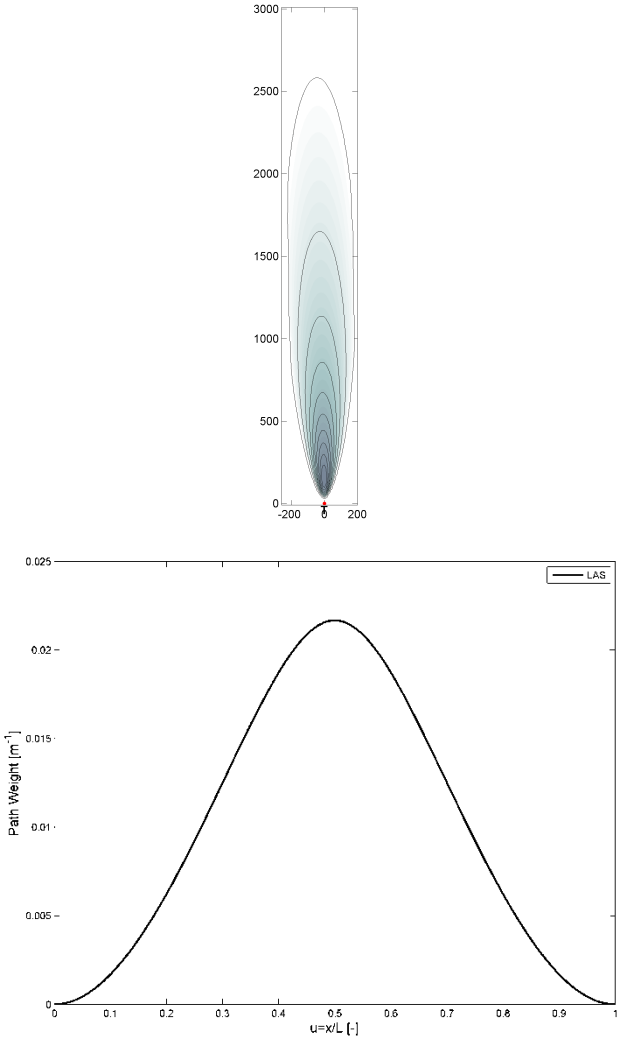


Scintillometer effective height – 1D approach

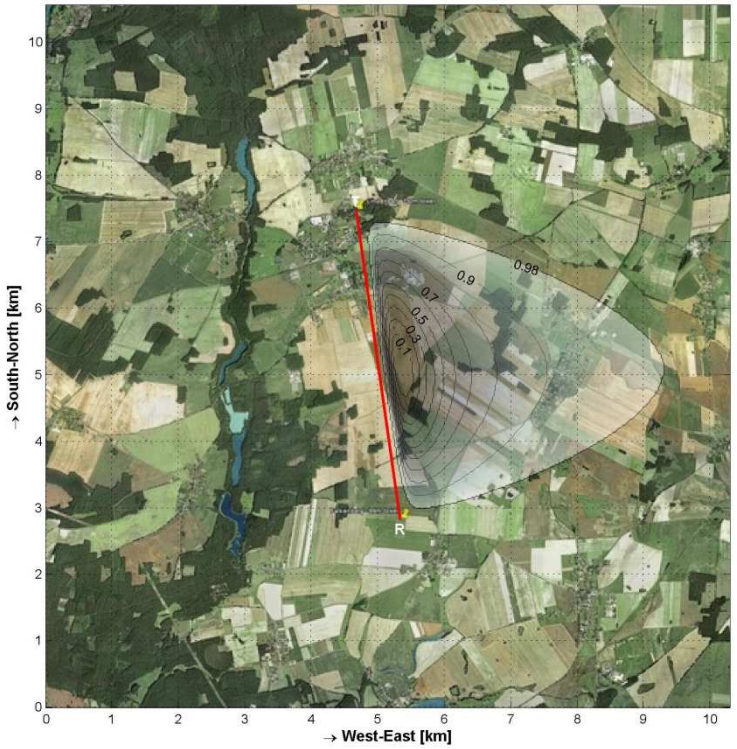


Hartogensis et al. (2003) – JHM4

Scintillometer Effective Height – 2D approach

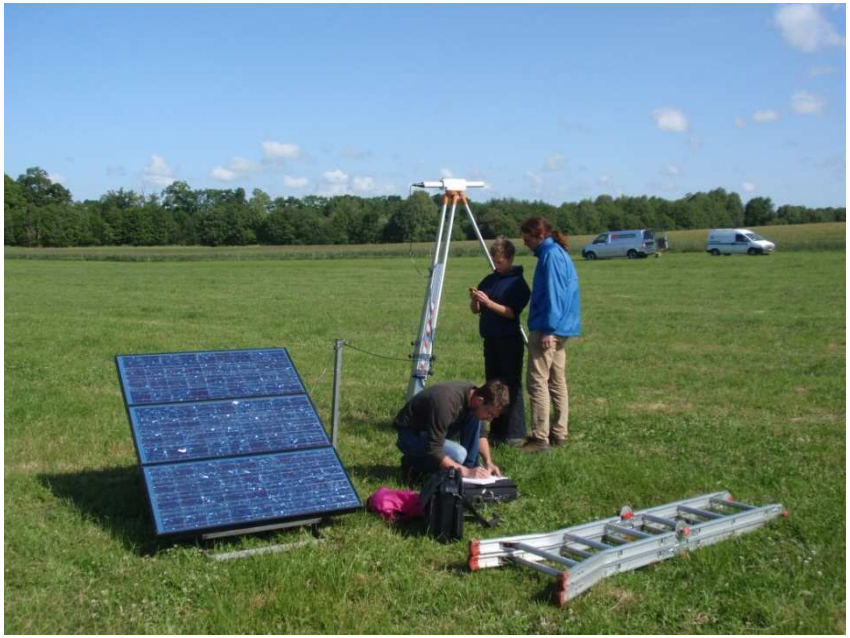


Scintillometer footprint



MSc thesis Olivier de Coster (ongoing)

Thank you



Seems straightforward, but it is quite tricky:

- z_{eff} needed to calculate H and H needed to calculate z_{eff}
- scintillometer footprint not used directly; rather z_{eff} needs to be determined for each along the path with a point footprint and weighed with scintillometer path weighting function.