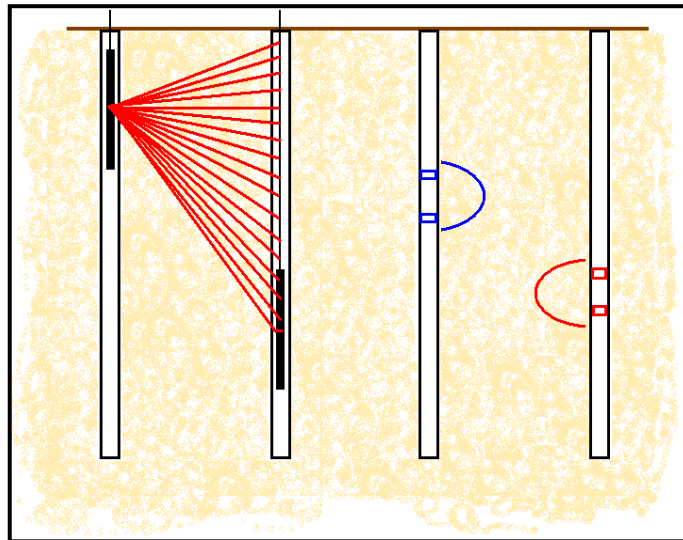


Estimation of recharge using **HYDROGEOPHYSICS**



PhD Eline Haarder

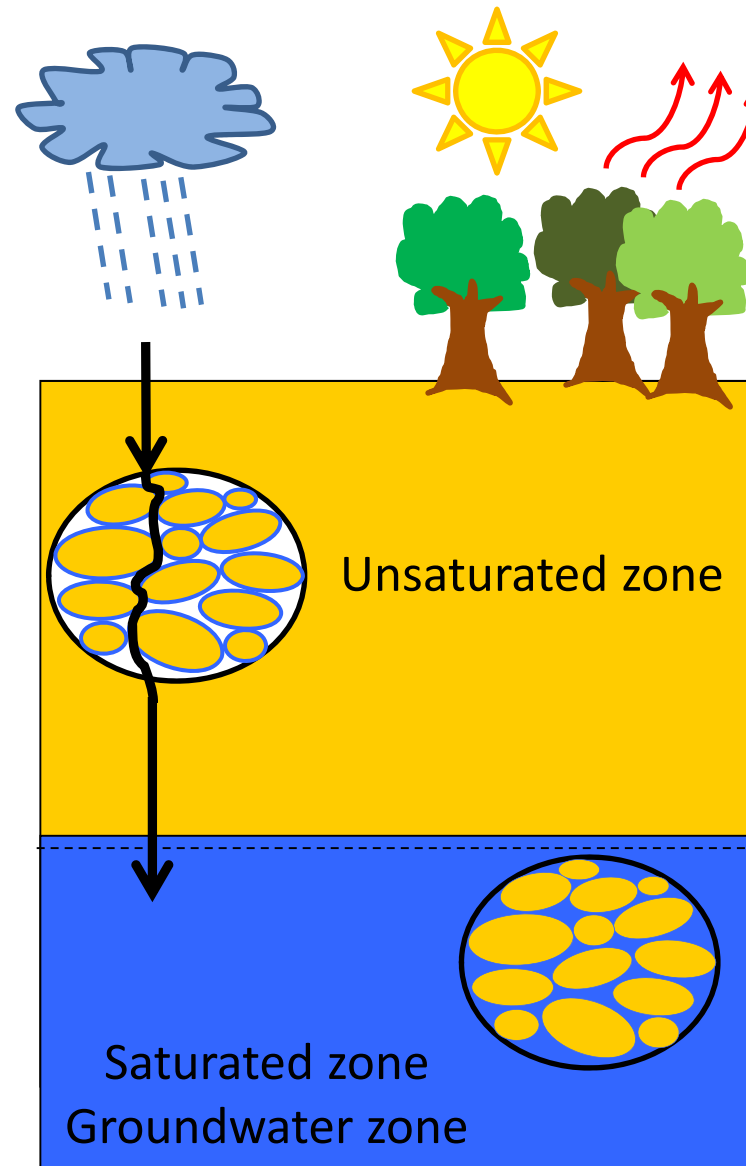
MC Looms, KH Jensen, L Nielsen, A Binley



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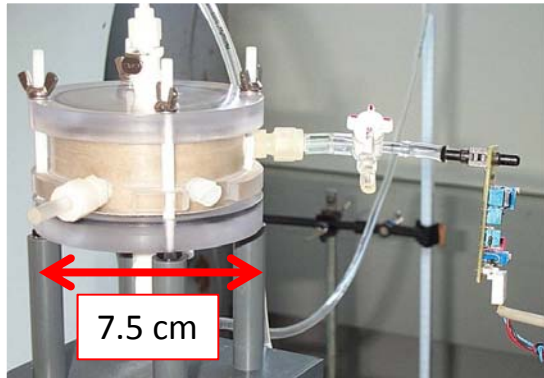


Groundwater recharge



Methodologies

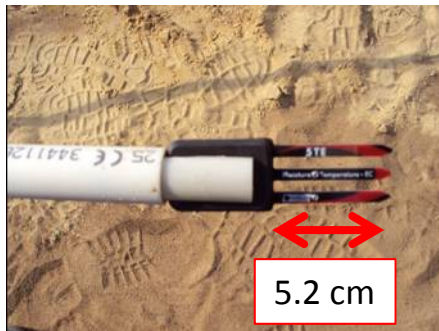
1. Lab investigation of soil samples



3. Mass balance considerations



2. Sensor installation in field



4. Lysimeters



Cross-borehole geophysics

GPR (ground penetrating radar)

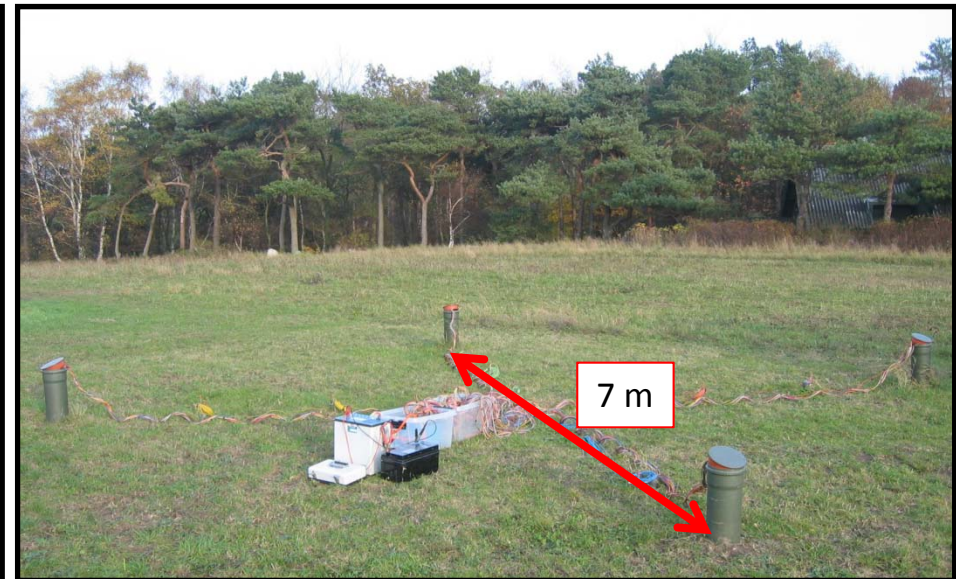


Measure travelttime of EM wave

- EM velocity
- Dielectric permittivity
- Soil moisture

1D profile, 2D image

ERT (electrical resistance tomography)



Measure resistance

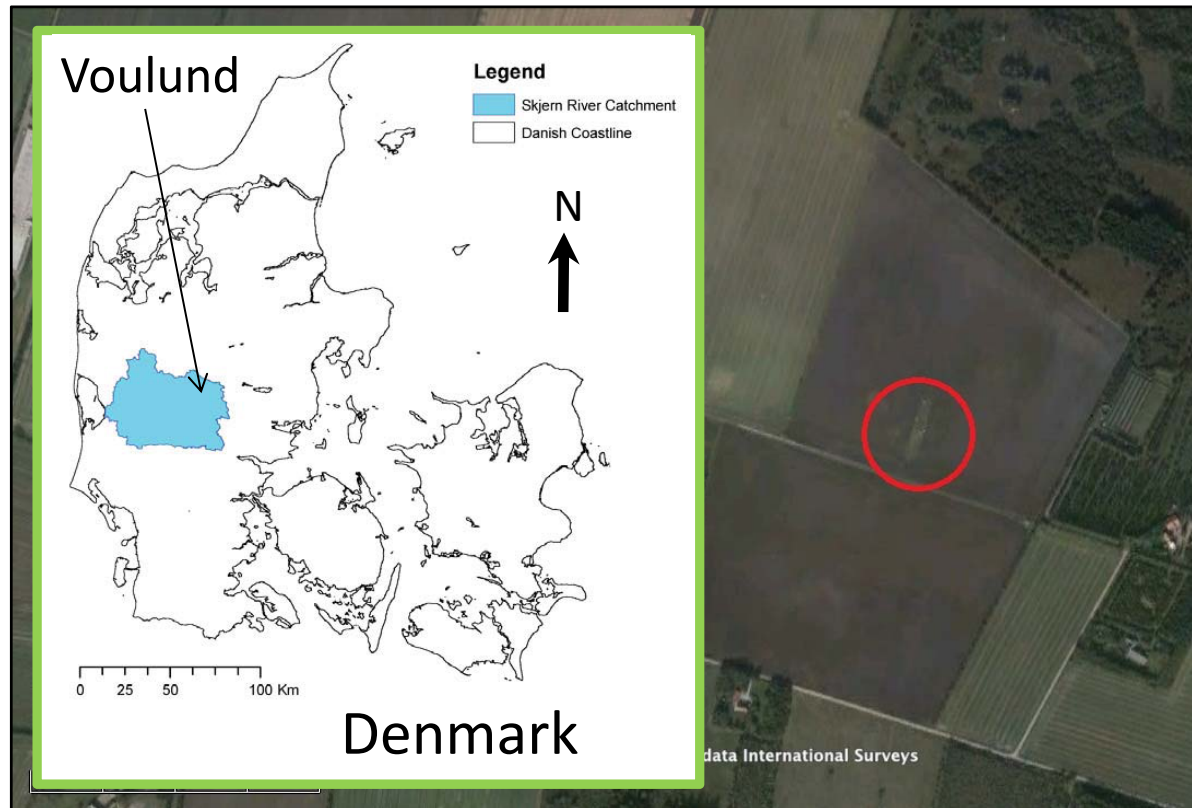
- Invert to resistivity
- Soil moisture & porewater conductivity

3D image, covert to 1D & 2D

HOBE agricultural field site

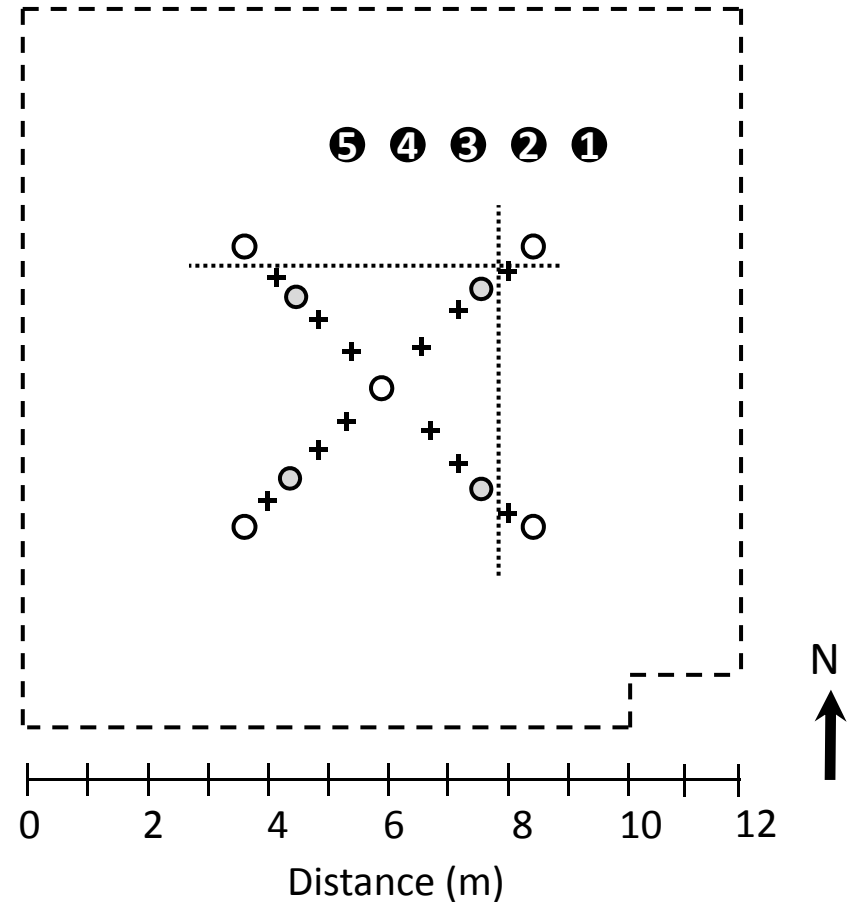
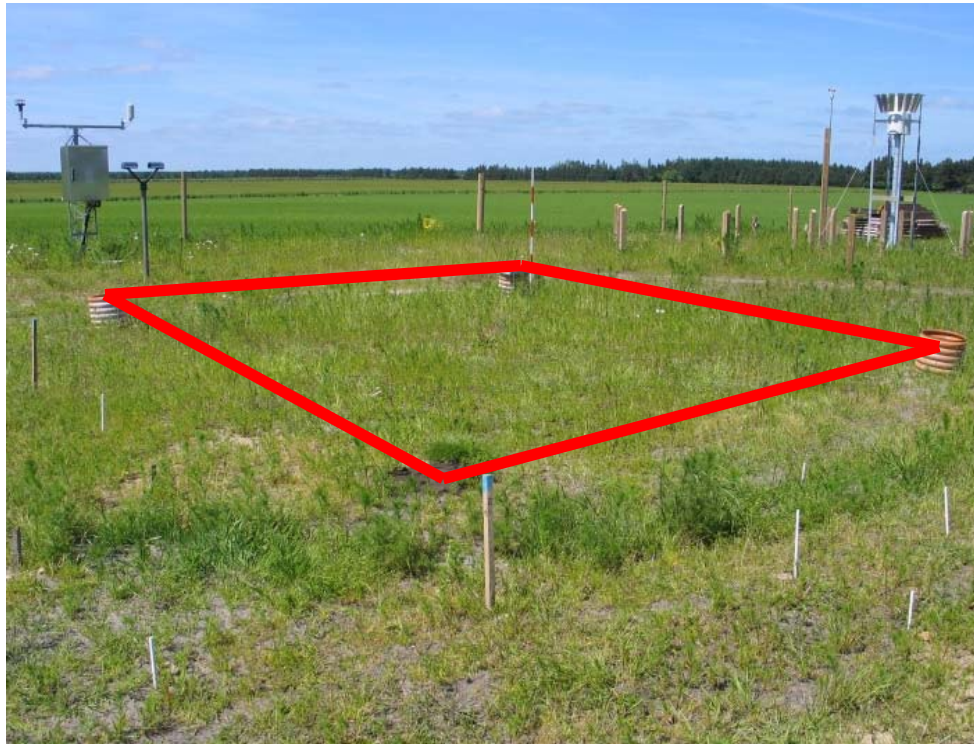


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- Moisture content sensors; 5TE, TDR, cosmic-ray
- Lysimeters
- Rain gauges
- Eddy-flux tower

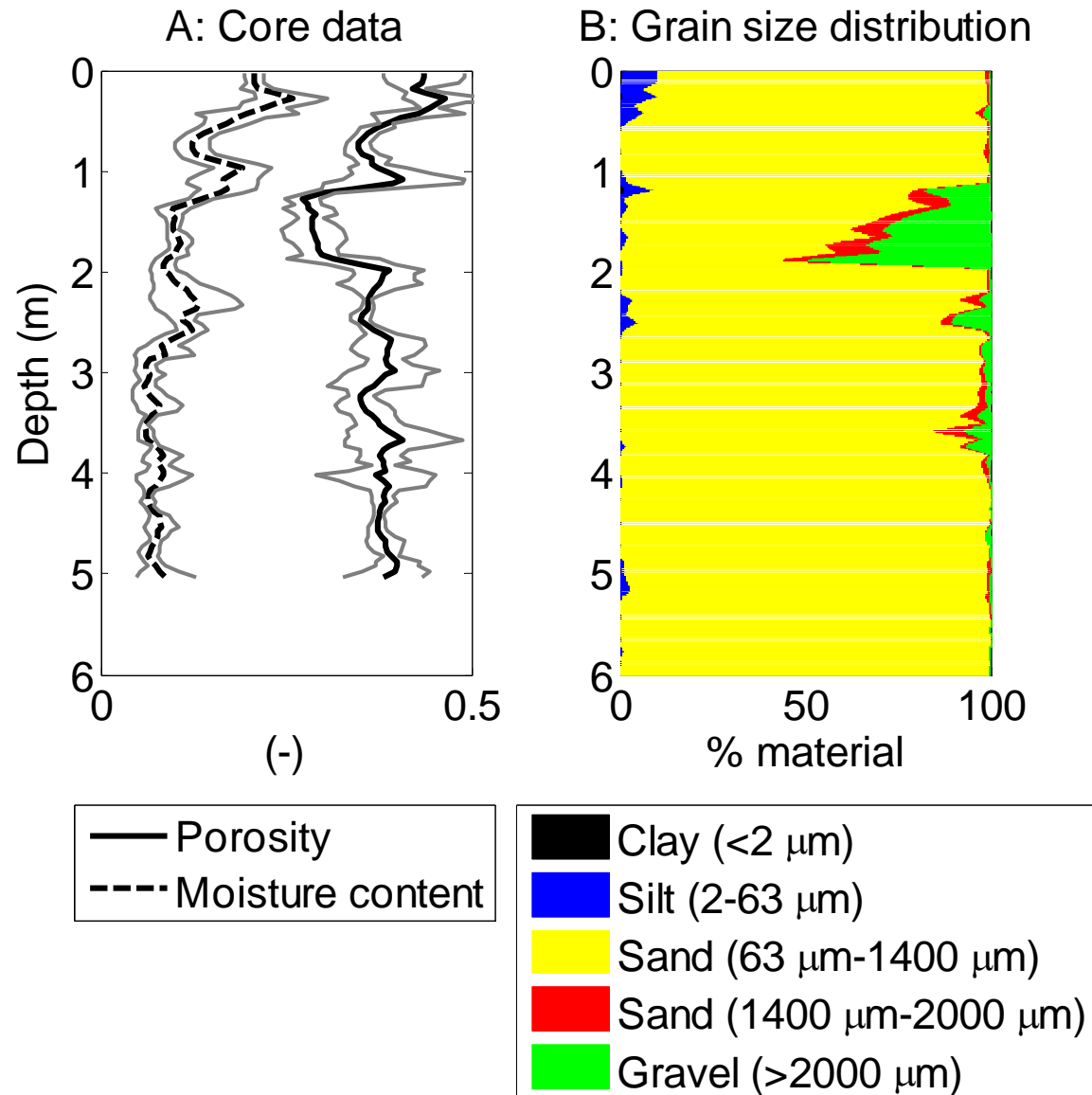
HOBE agricultural field site



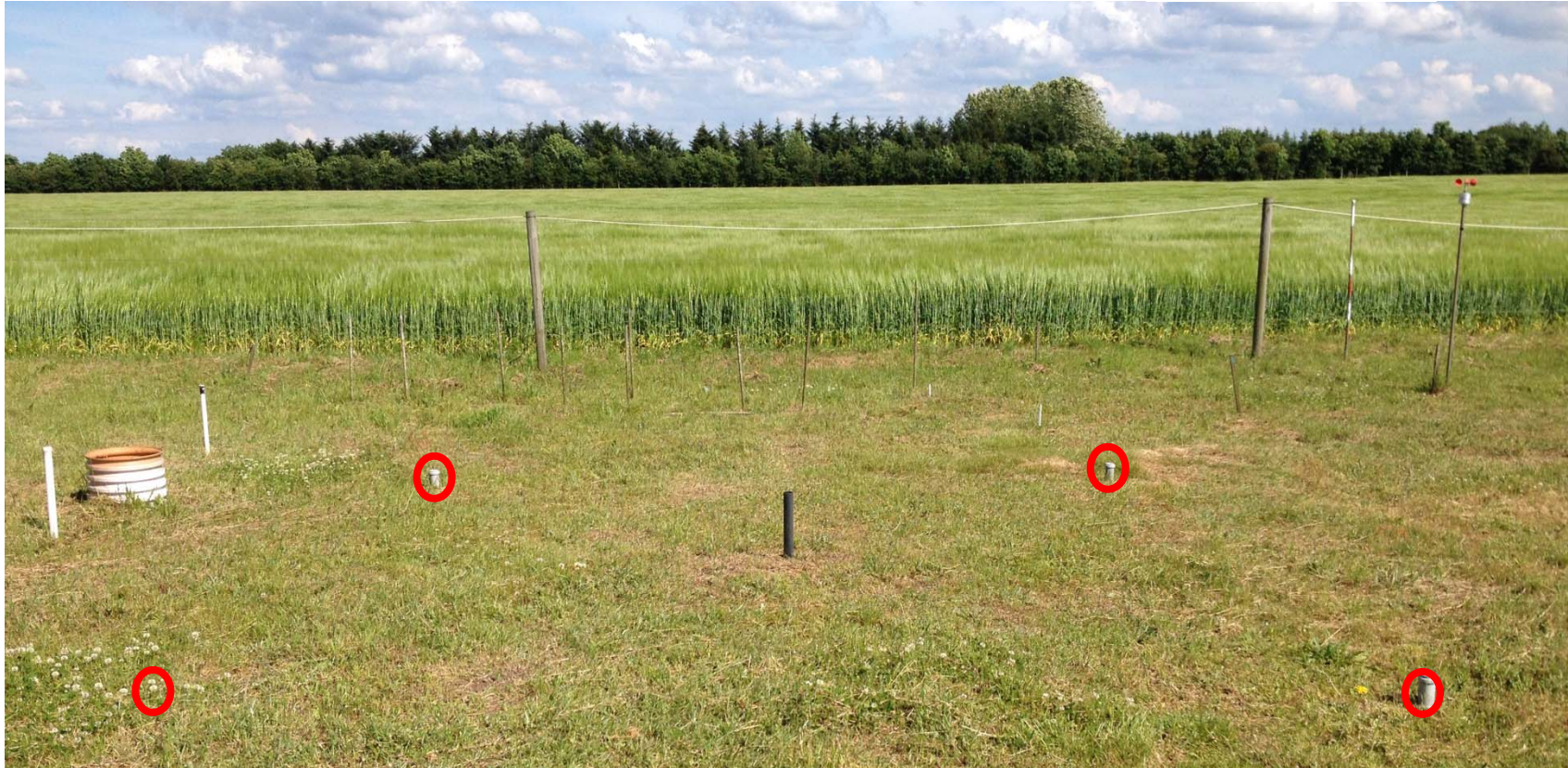
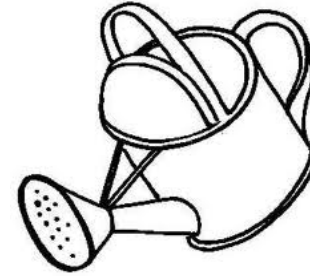
- ERT boreholes
- GPR boreholes
- + Surface electrodes

- ⋯ Tracer application area
- Cores
- ⋯ Profiles

Background data



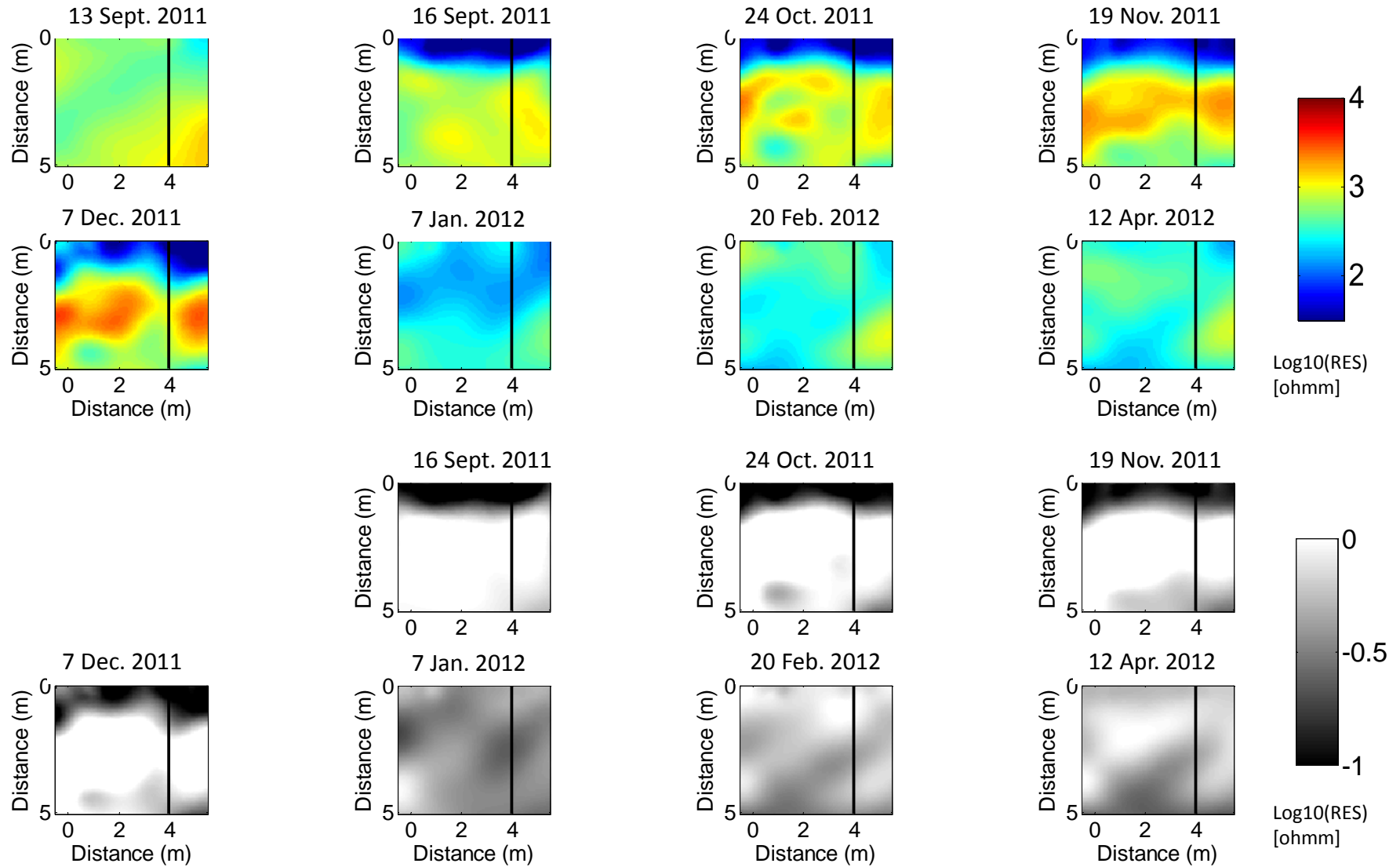
Tracer experiment



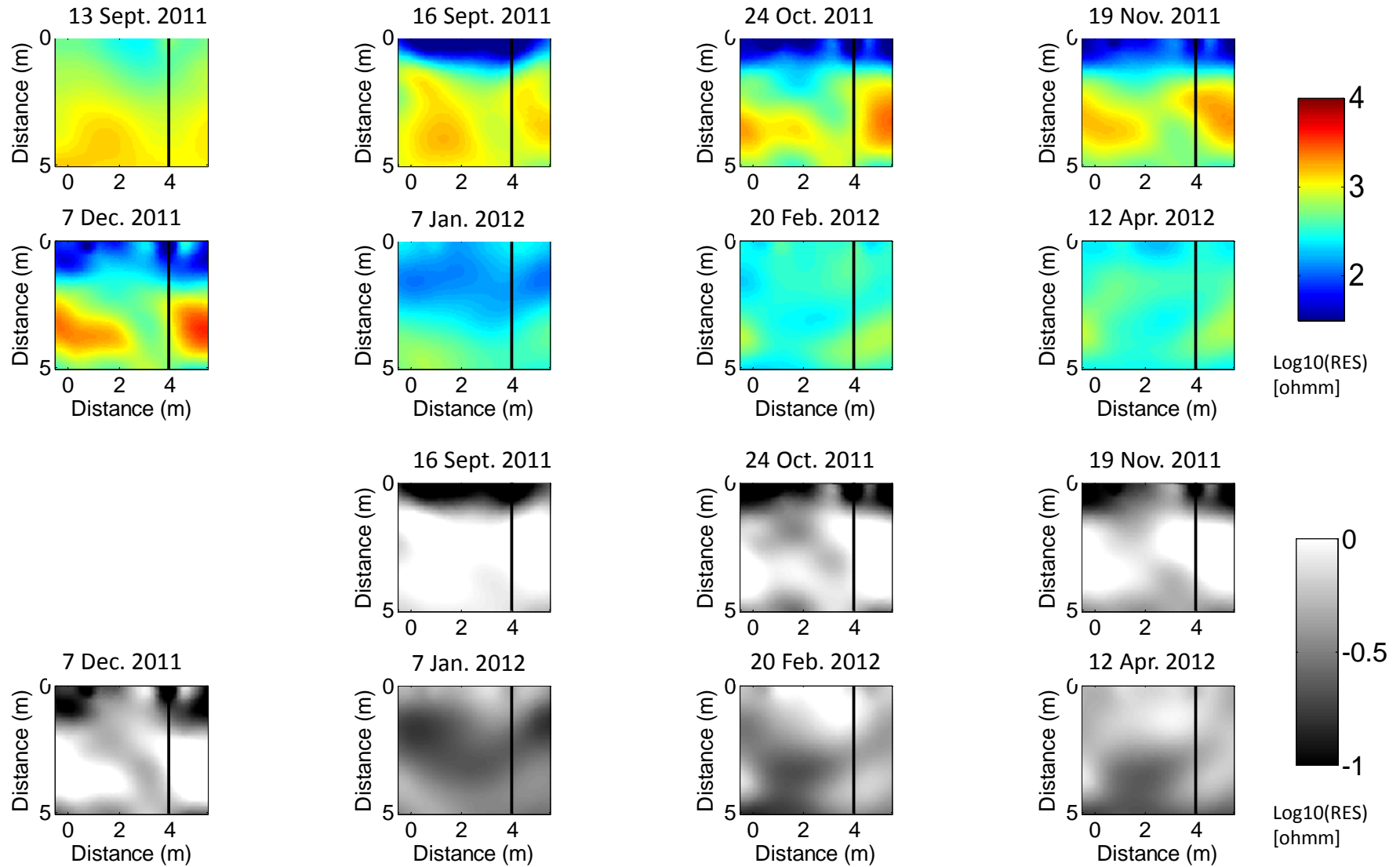
September 14th, 2011:

3.3 mm saline tracer 230 mS/cm over 3 hours

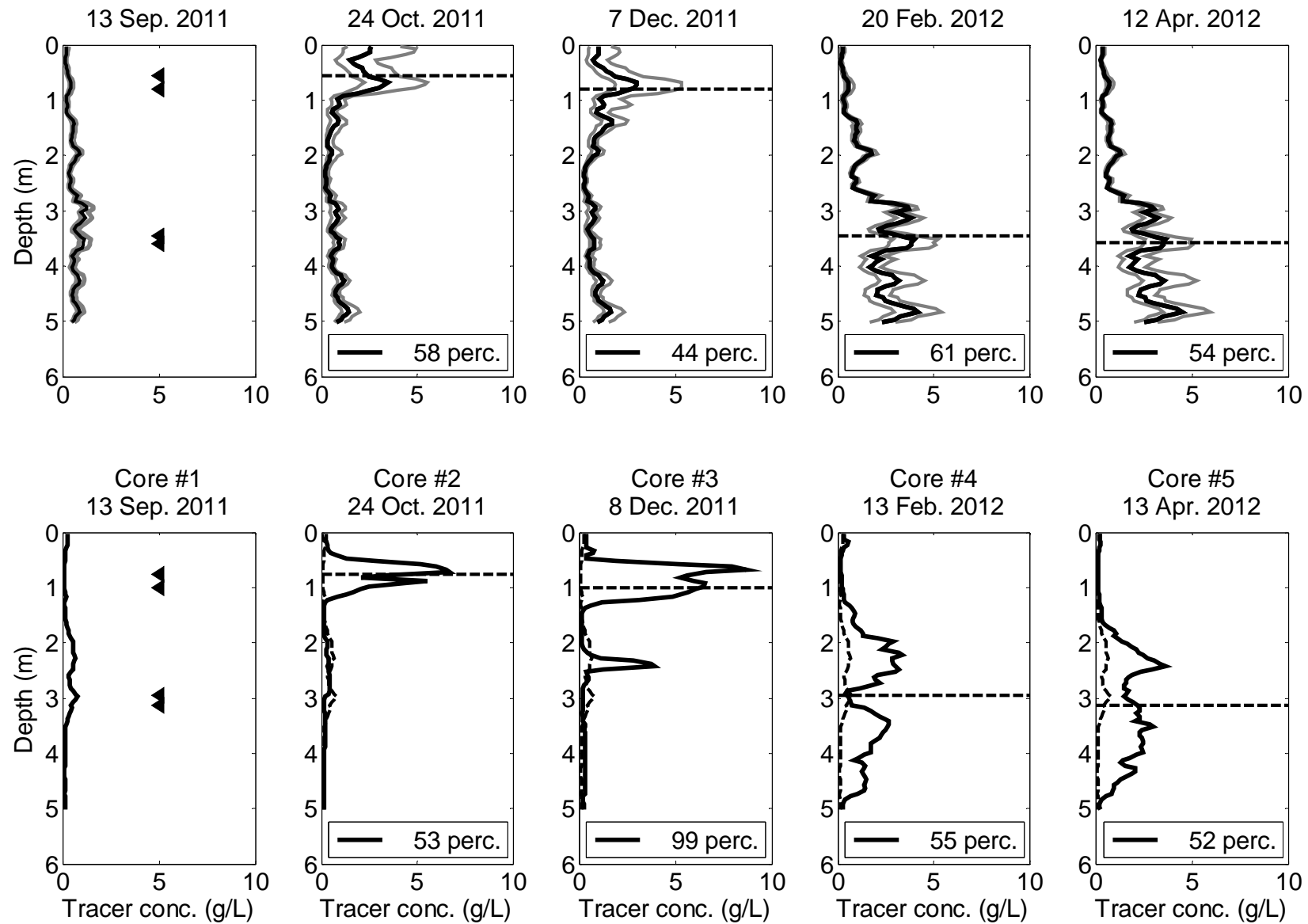
ERT images



ERT images

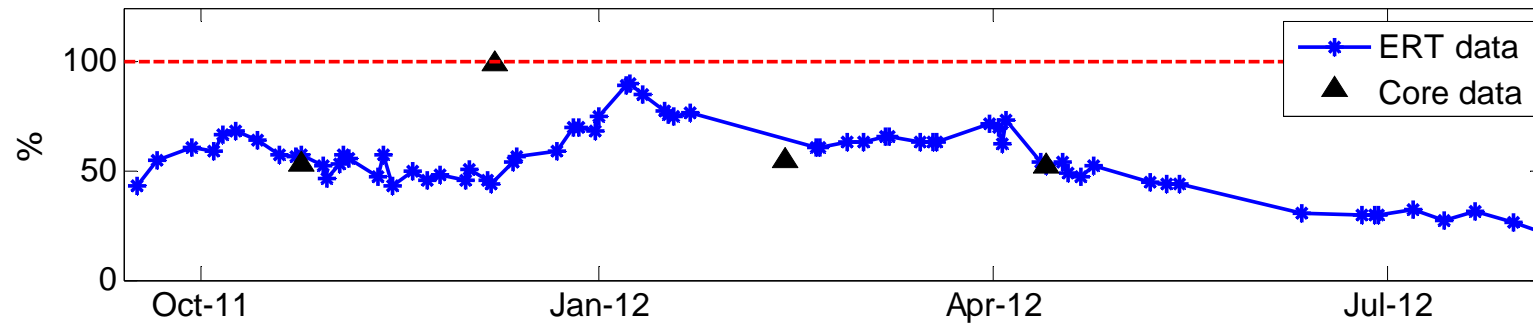


Comparison of ERT data with corings

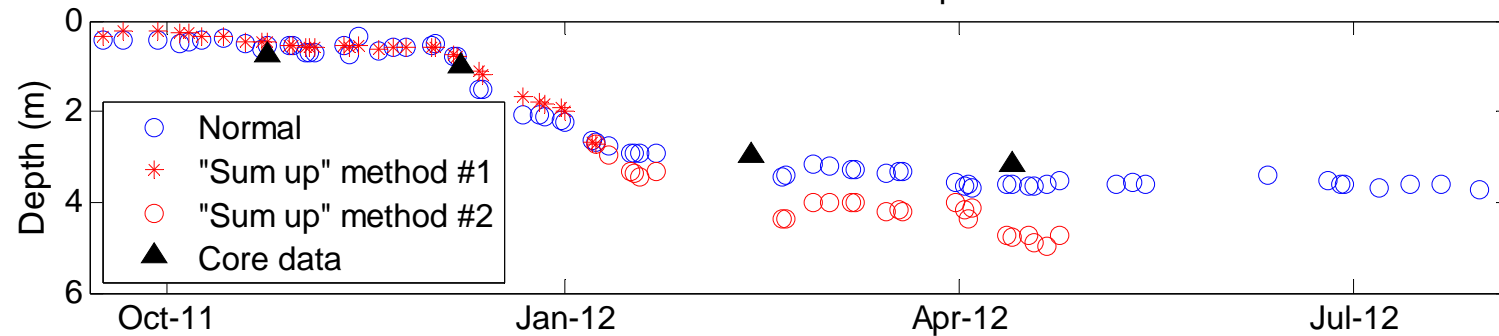


Moment analysis

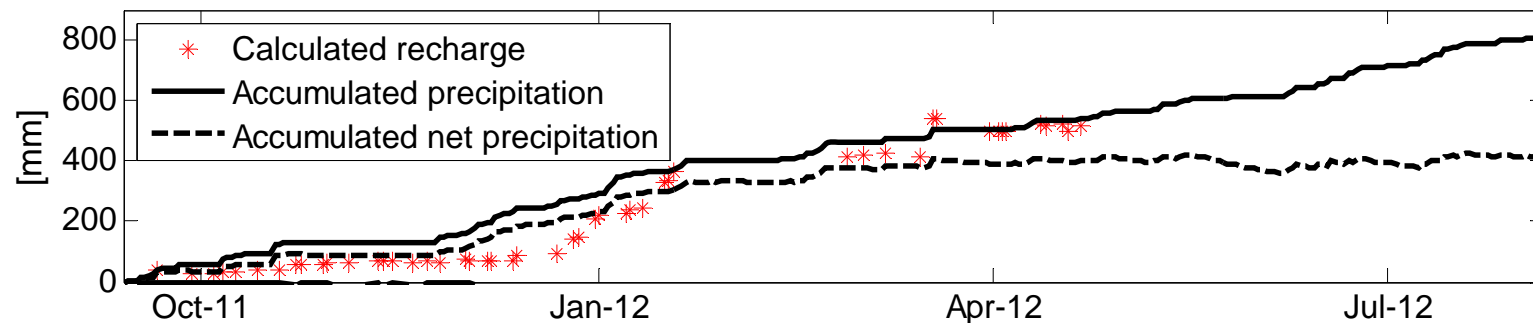
A: Mass recovery



B: Center of mass depth



C. Accumulated precipitation and recharge



THANK YOU 😊

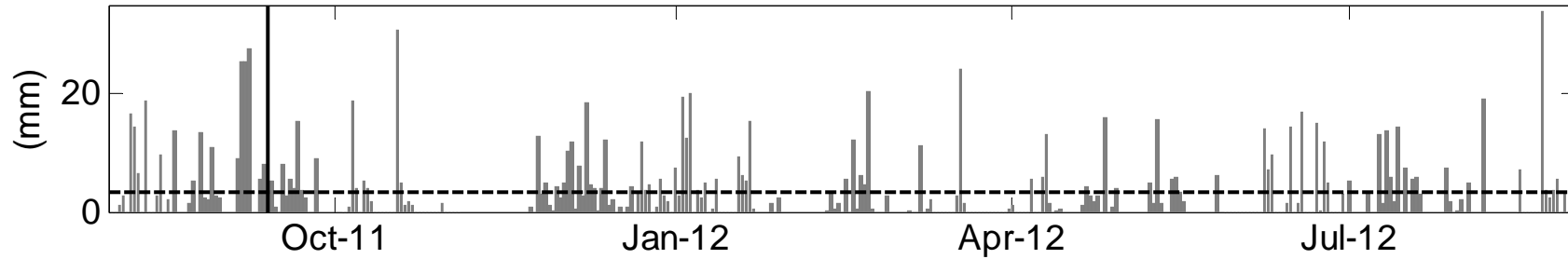
Majken C. Looms
mcl@geo.ku.dk



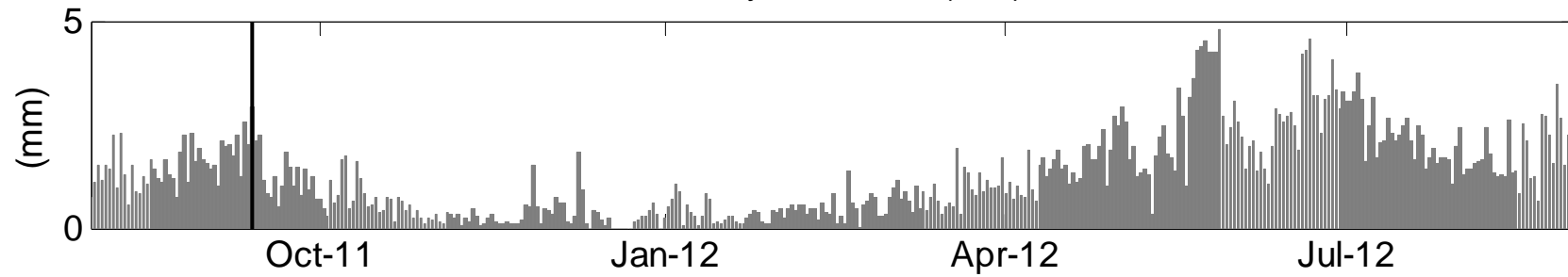
Center for Hydrology
H y d r o l o g i c a l O b s e r v a t o r y



A: Daily precipitation (mm)



B: Daily actual ET (mm)



C: Daily net precipitation (mm)

