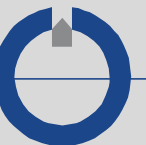


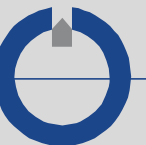
Sammenligning af tTEM med MEP og PACES

Nikolaj Foged
Anders V. Christiansen
HydroGeophysics Group,
Department of Geoscience,
Aarhus University, Denmark

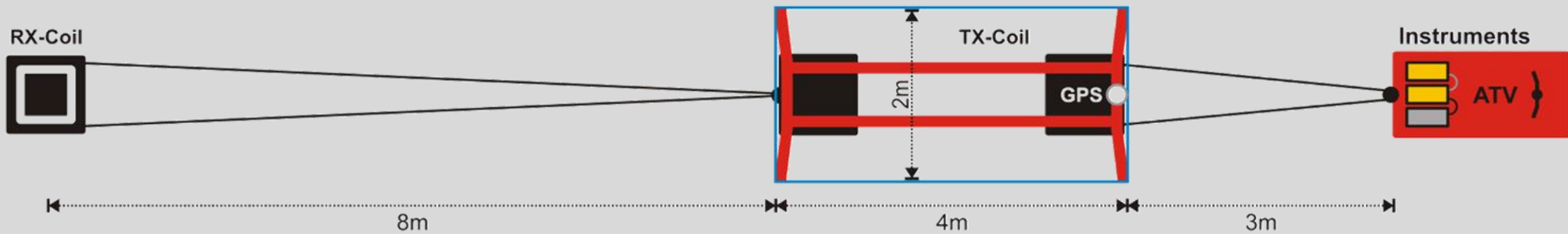


Indhold

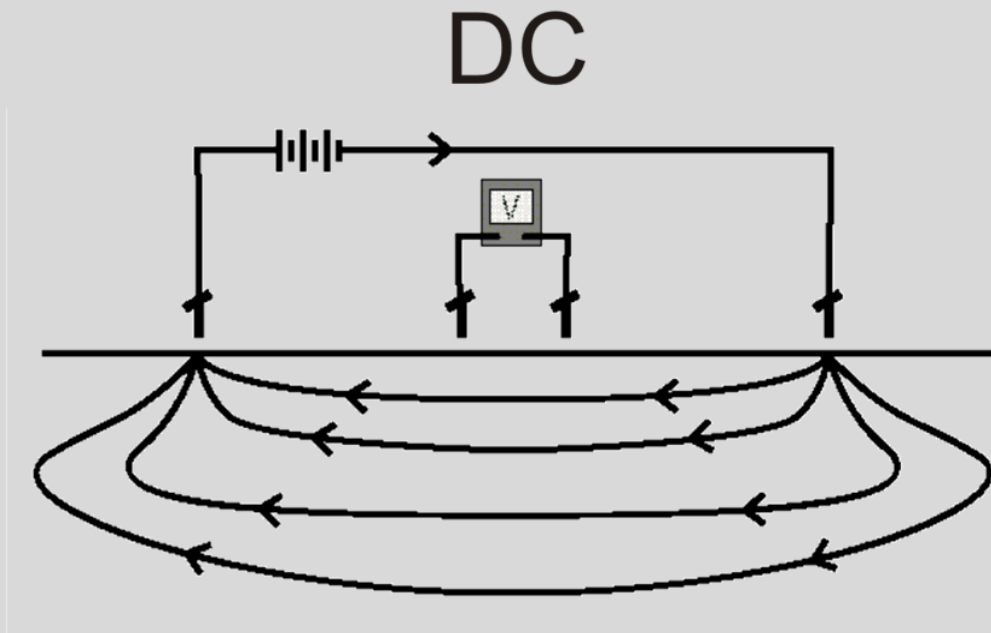
- **Metoder**
- **Bestemmelse af lagdelte modeller**
 - Sammenligning med PACES, MEP
- **Felteksempler**
 - Sammenligning med PACES, MEP
 - Sektioner
 - Middelmodstandskort
 - Lertykkelse



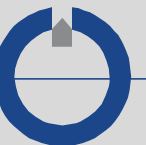
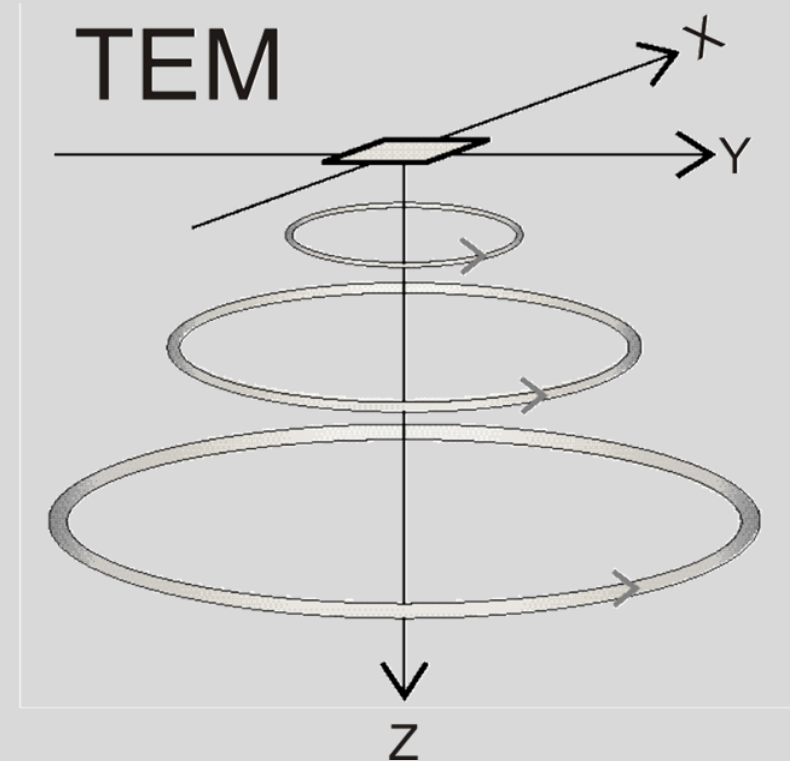
tTEM



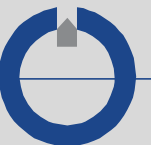
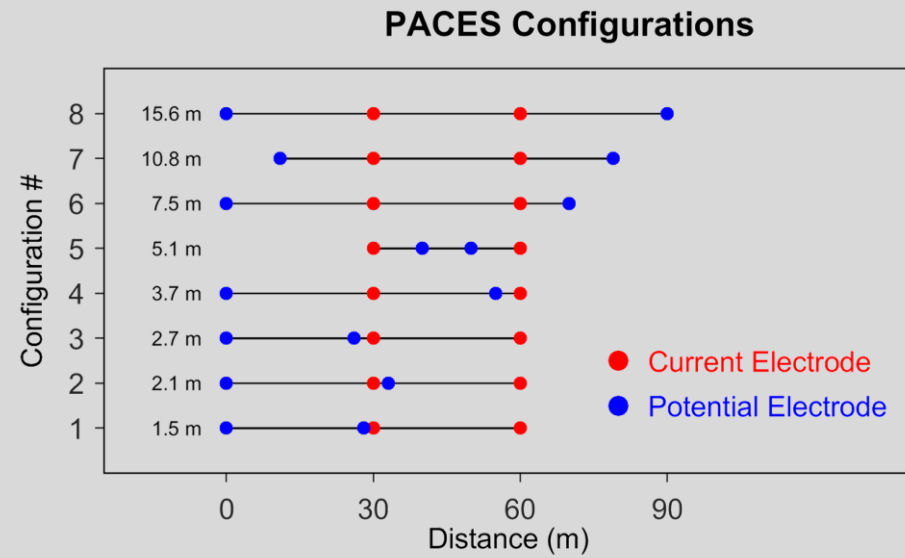
PACES, MEP



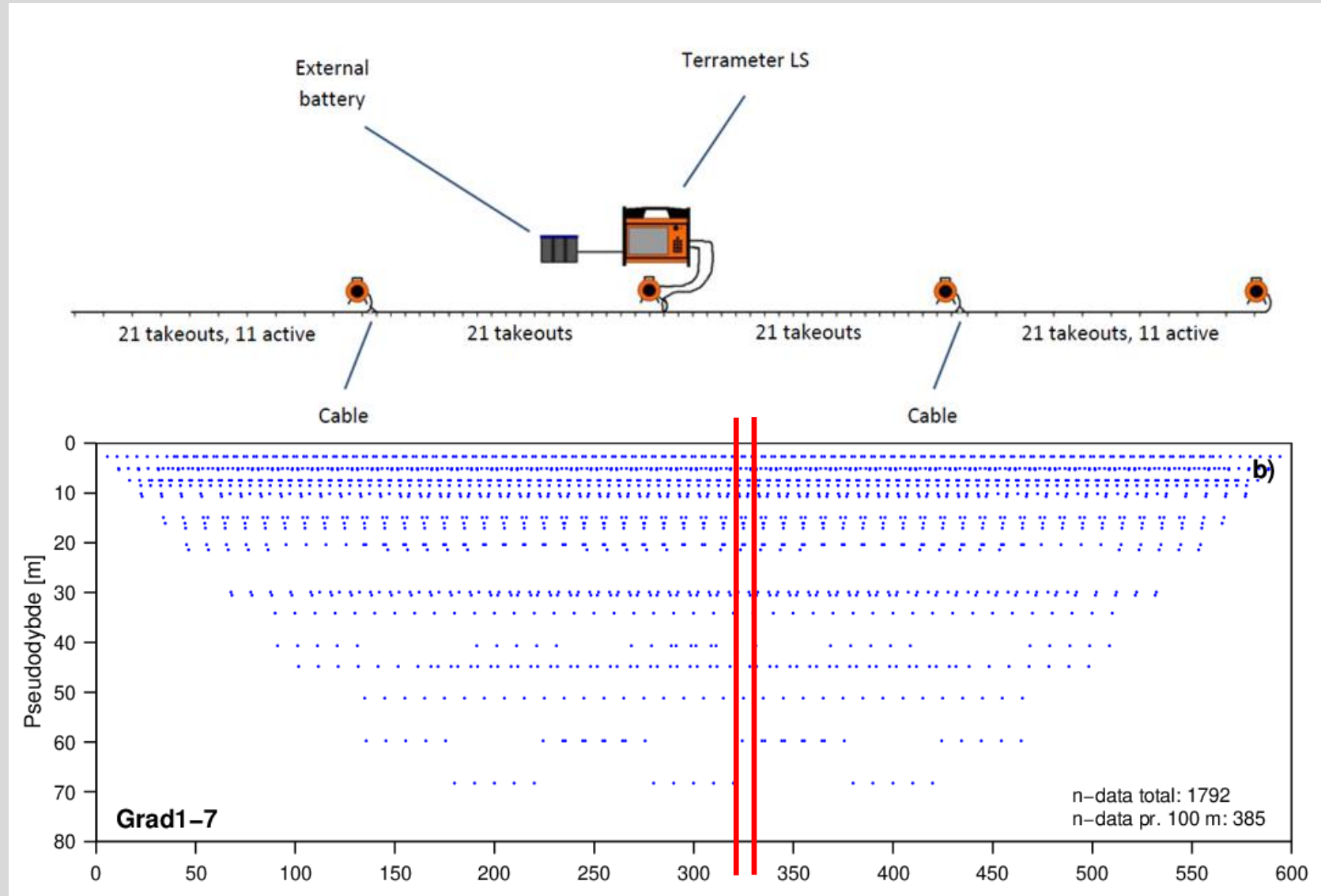
tTEM



PACES

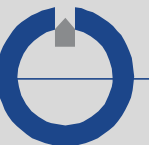


Multi-electrode profiling (MEP, CVES, ERT)



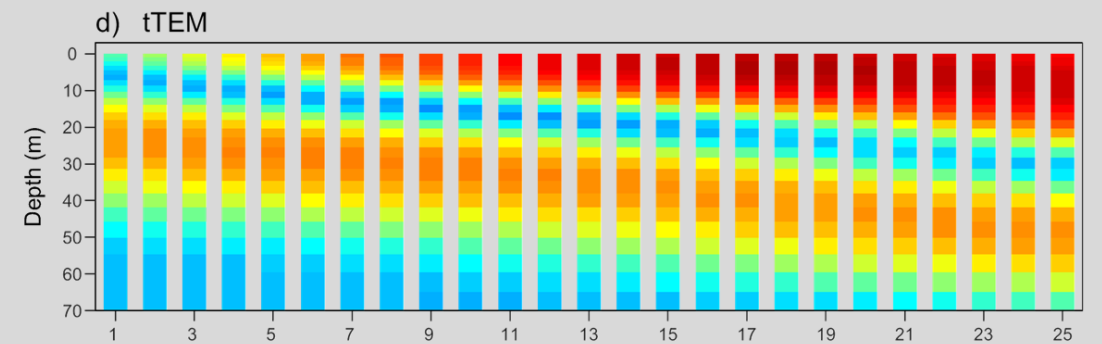
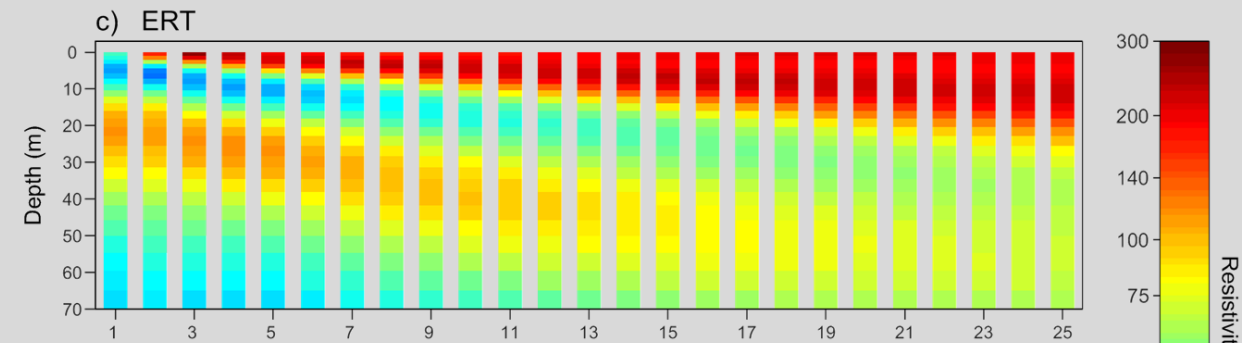
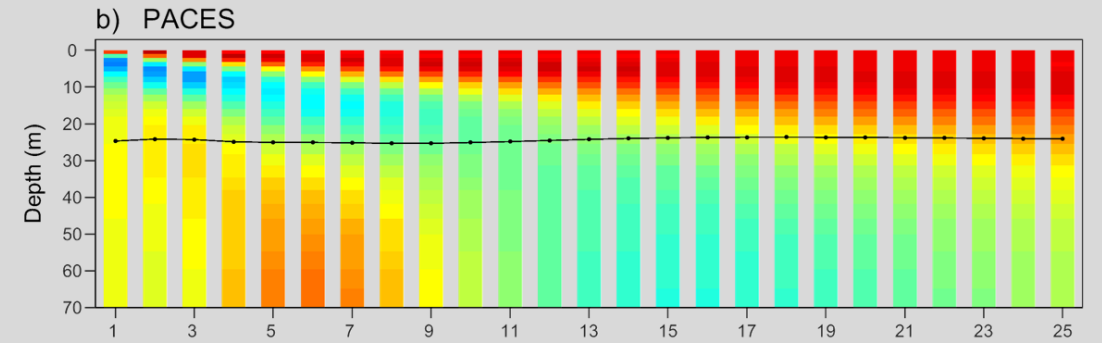
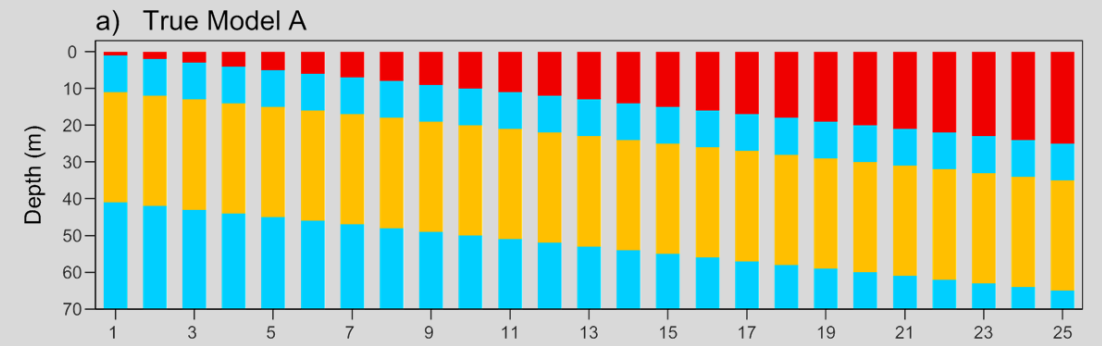
tTEM – PACES - MEP

	tTEM	PACES	MEP
Metode	EM	DC	DC
Kortlægningshastighed	20 km/t, (~150 Ha/dag)	5 km/t	2 km/dag (0.2 km/t)
Linjetæthed	10-30 m	200-300 m	Enkelt linje
Data/modeltæthed	10 m	10 m	5 m
Inversion	1D SCI, smooth/sharp	1D LCI, 3 lag	2D smooth/sharp
Datapunkter per model	~35	8	~35 (per 10m)
DOI	60-90 m	~25m	~90 m

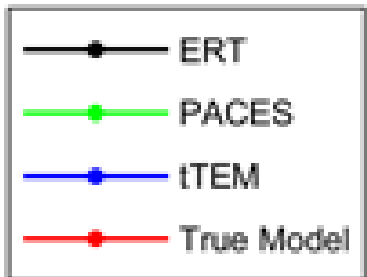
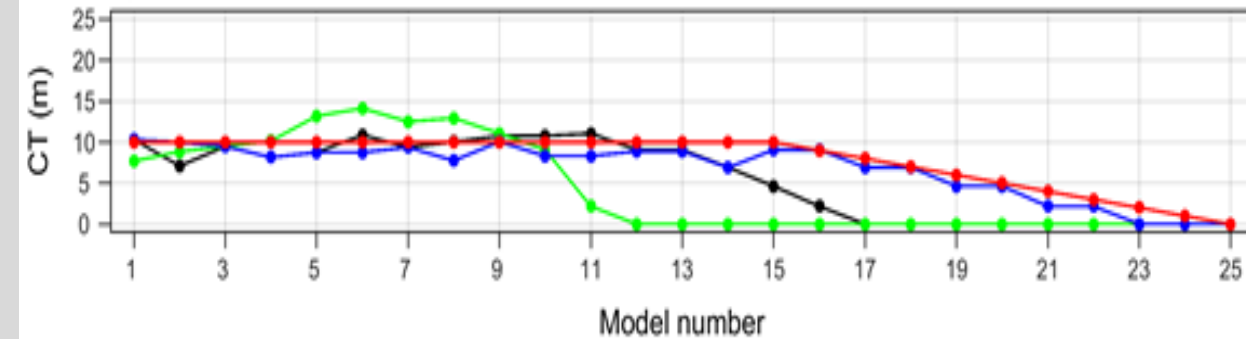


Syntetiske modeller

70 m

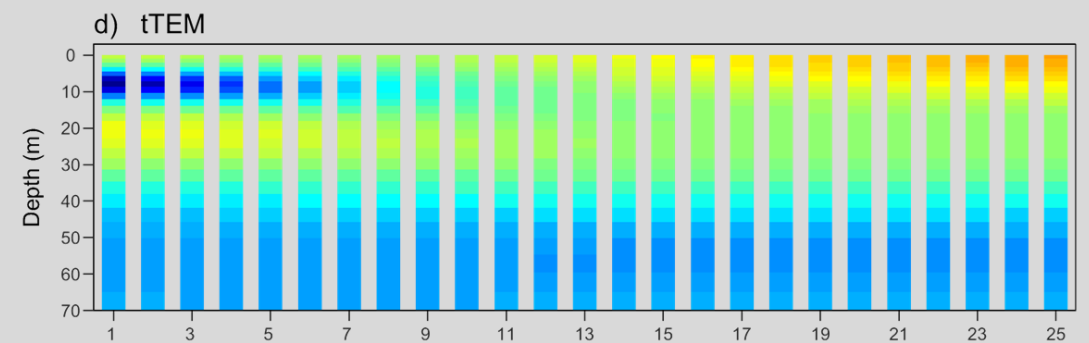
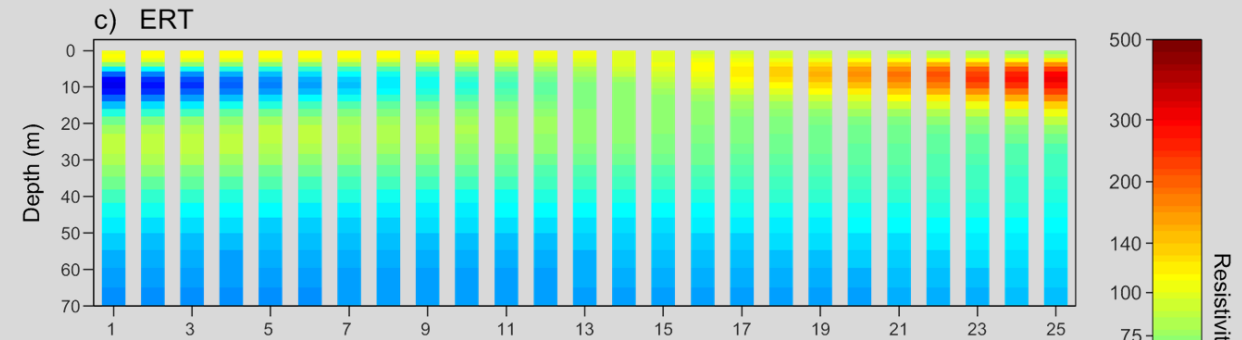
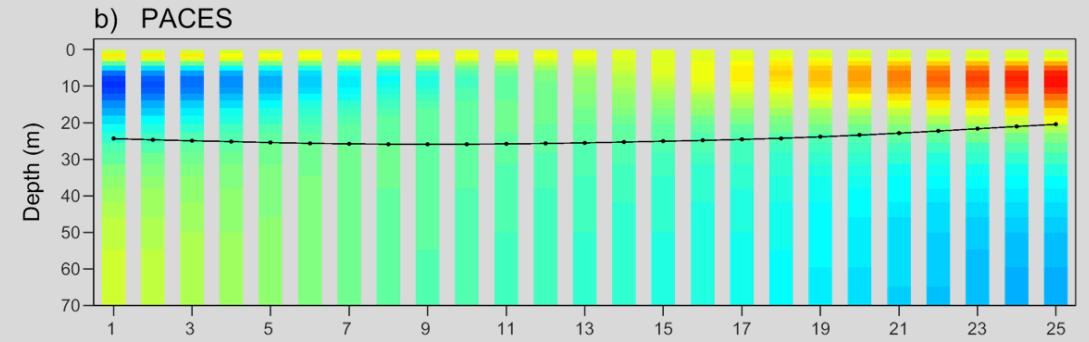
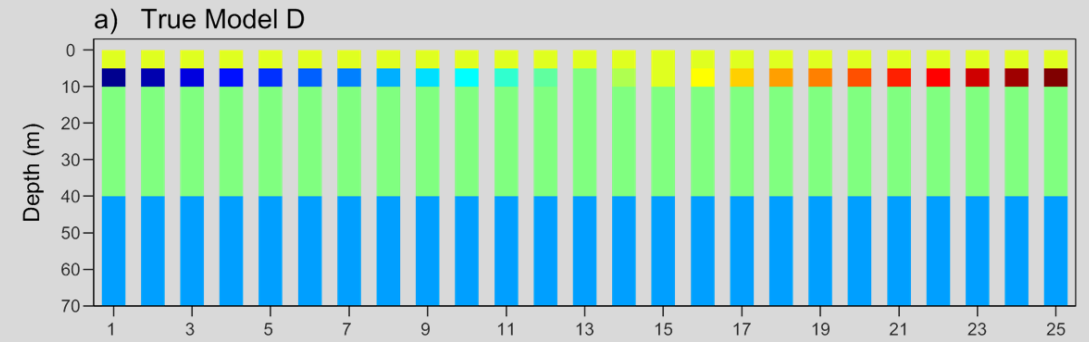


e) Clay Thickness 0-25 m

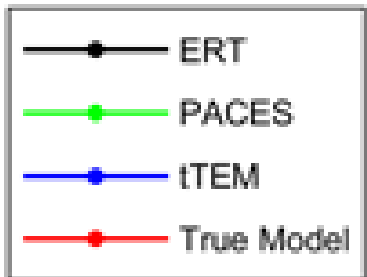
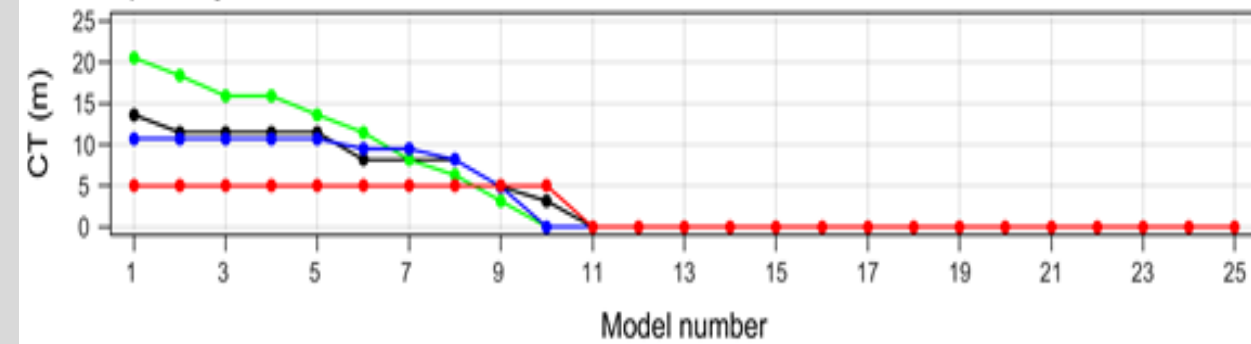


Syntetiske modeller

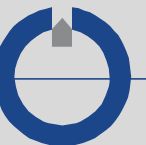
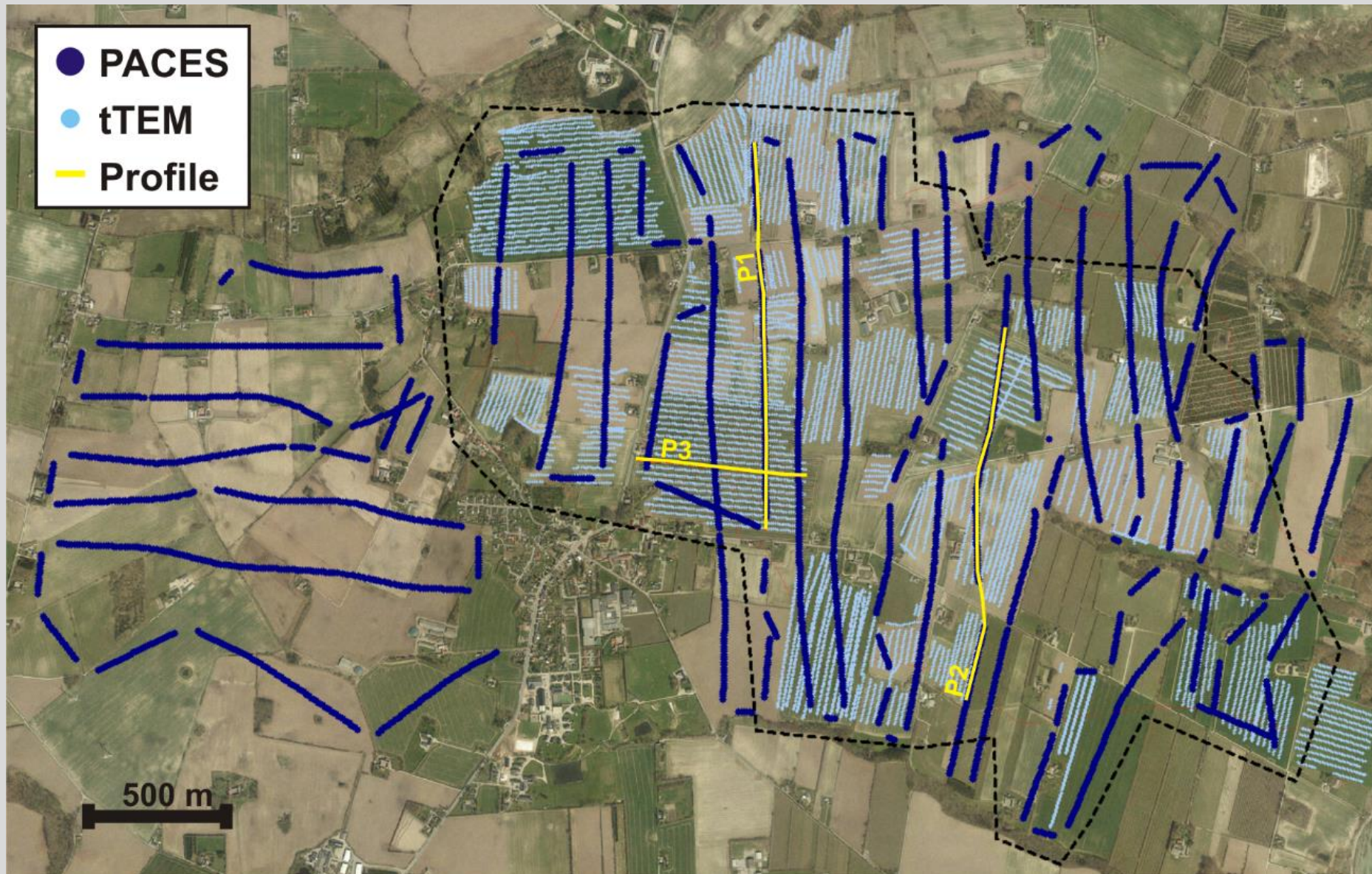
70 m



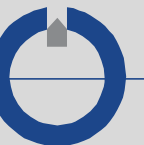
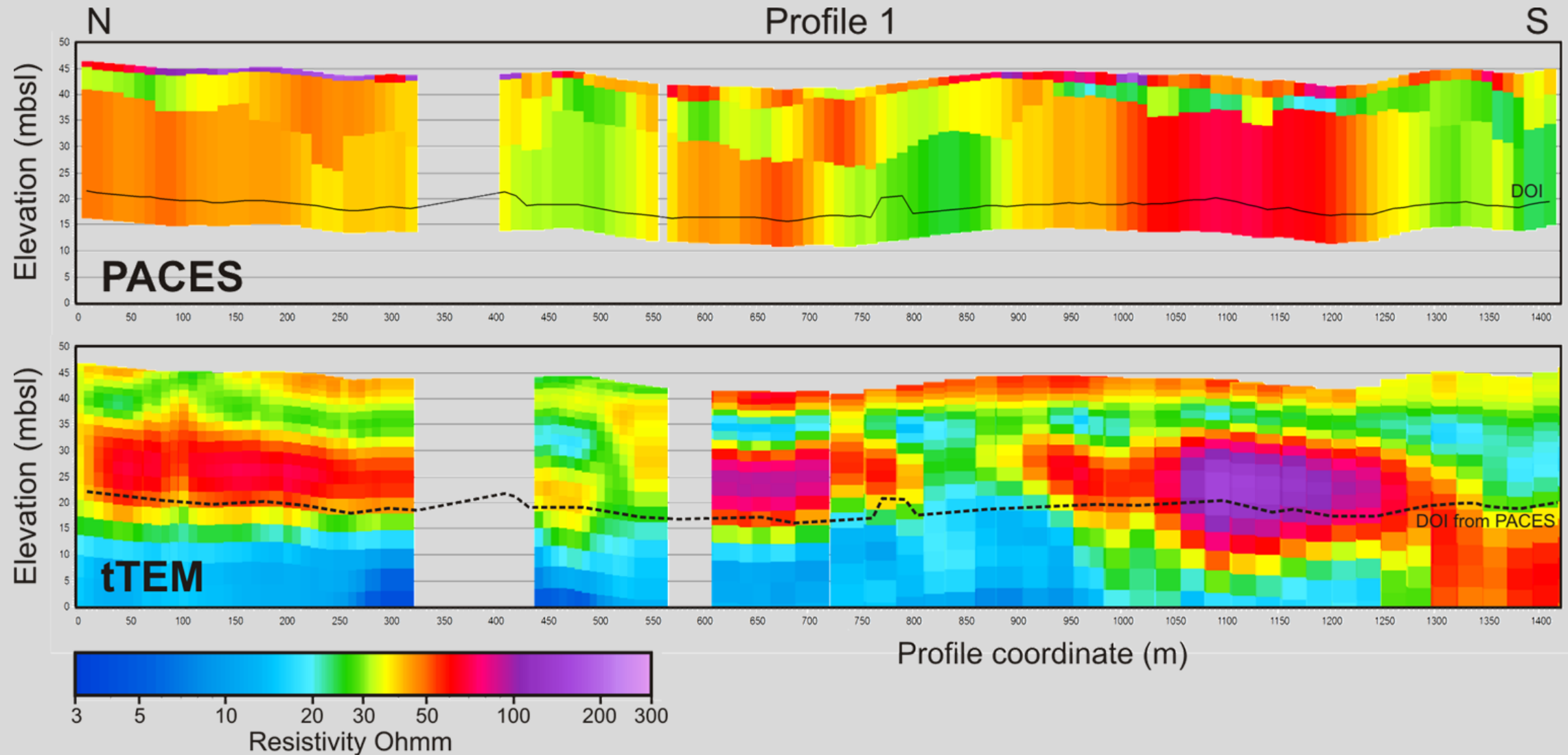
e) Clay Thickness 0-25 m



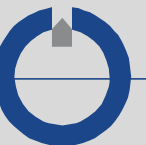
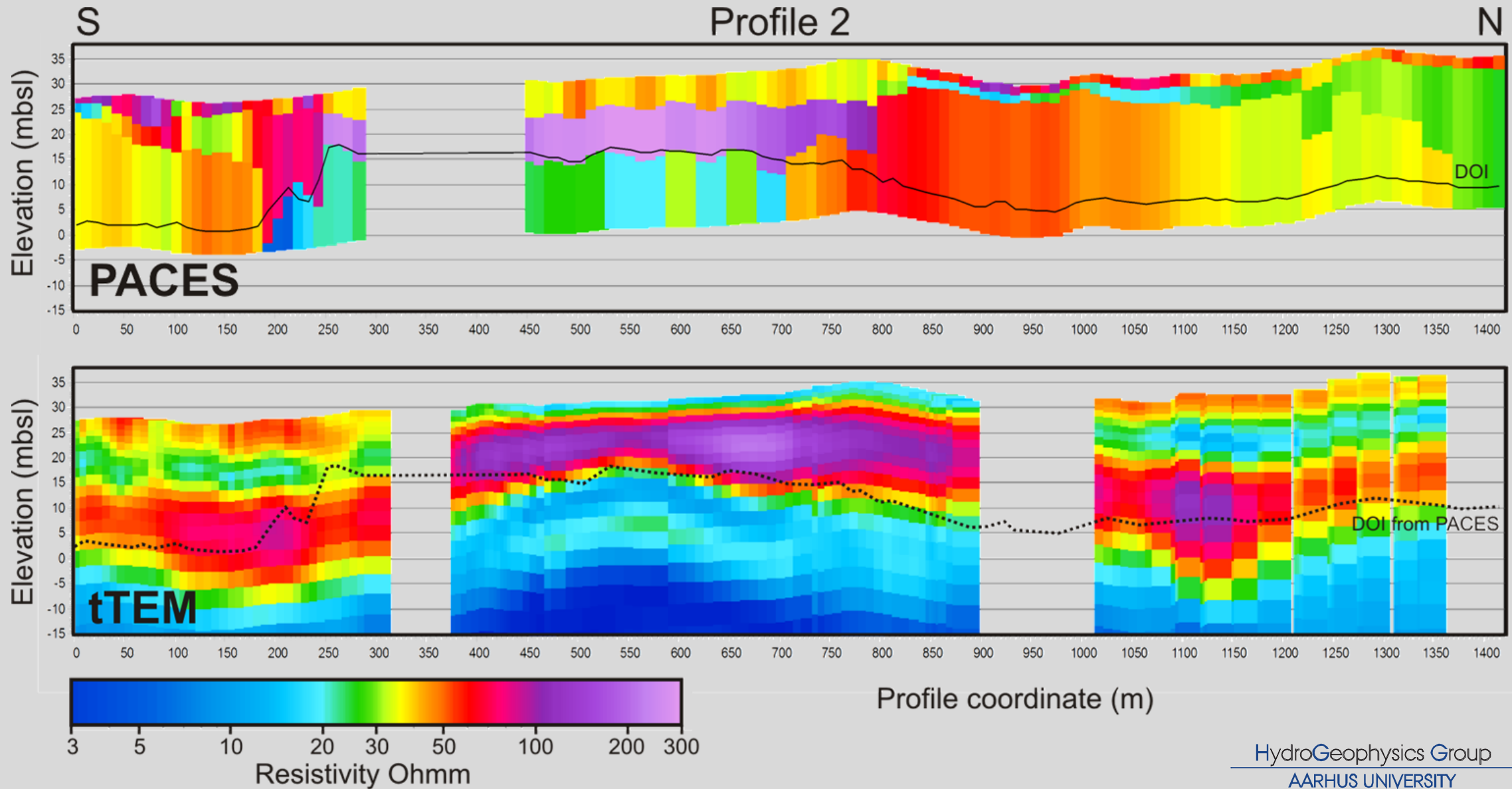
tTEM - PACES, Oure



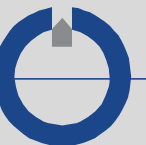
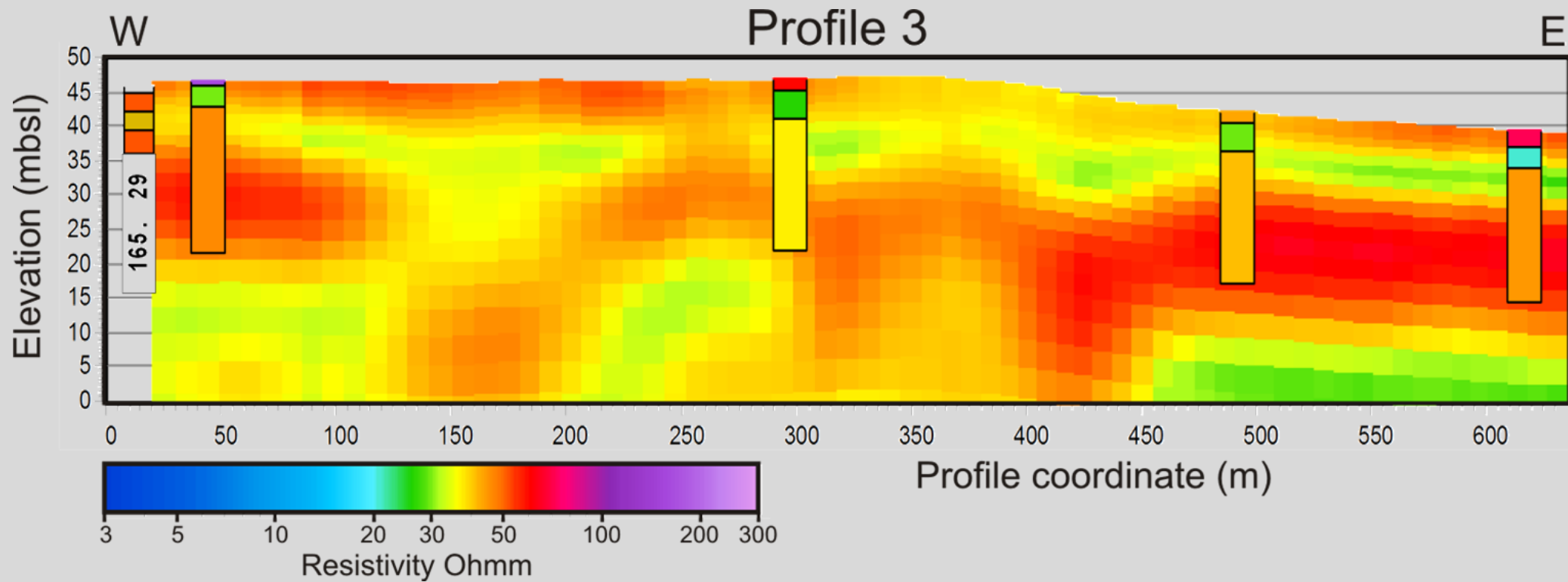
tTEM - PACES, Oure



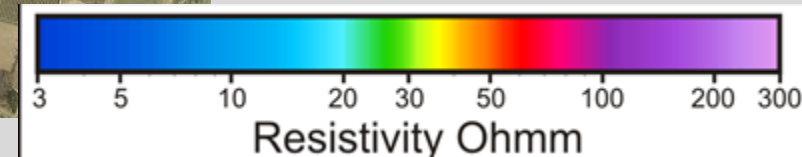
tTEM - PACES, Oure



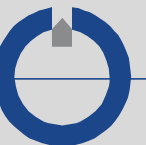
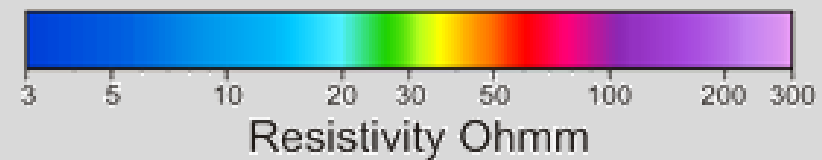
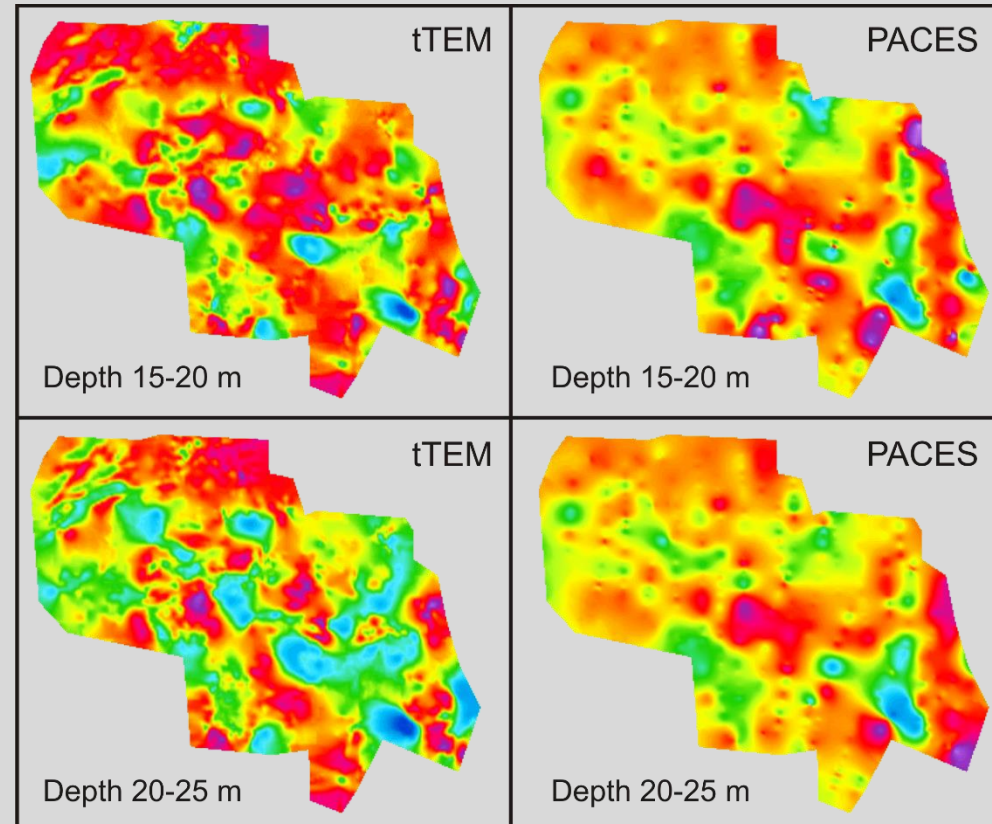
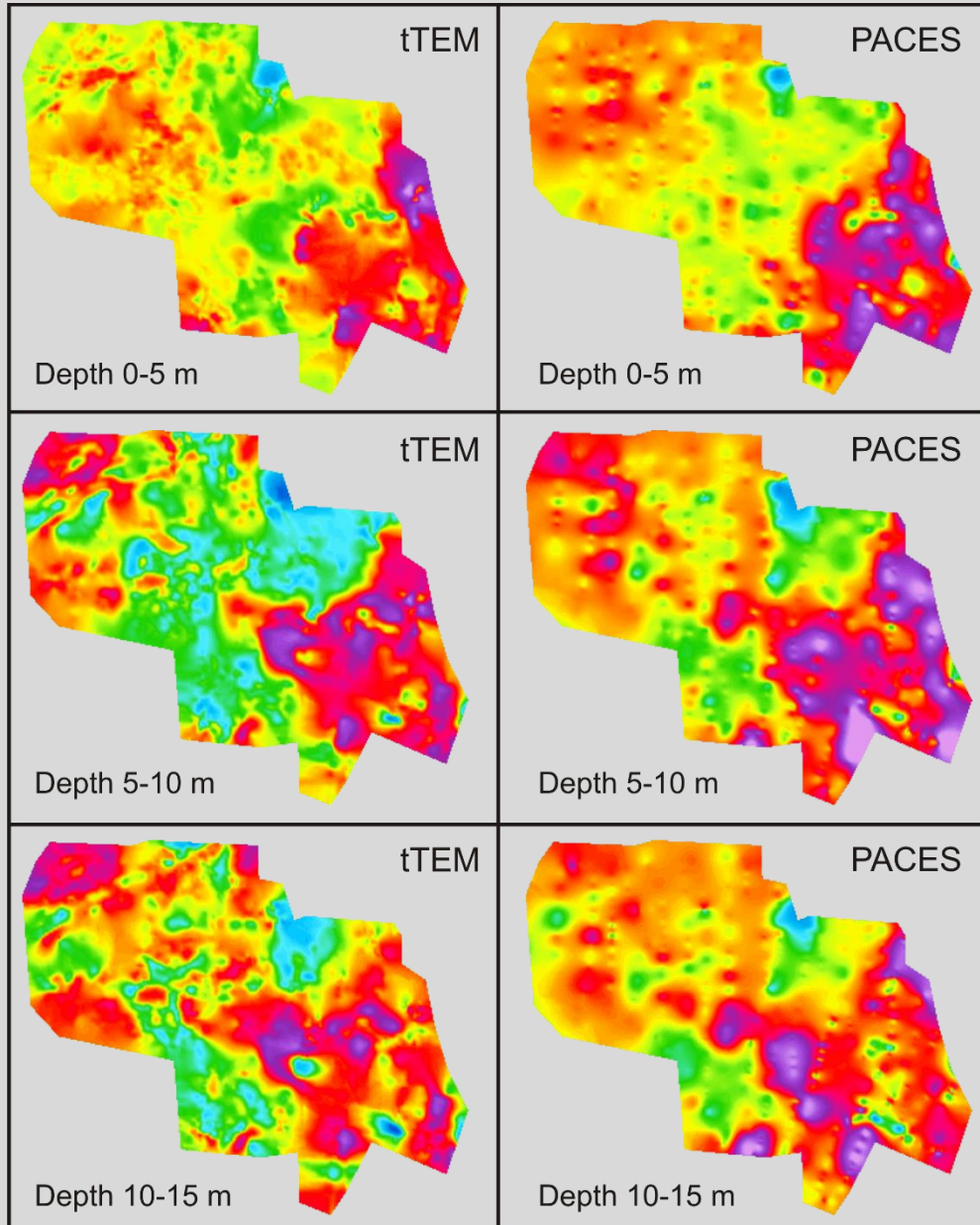
tTEM - PACES, Oure



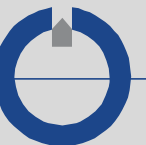
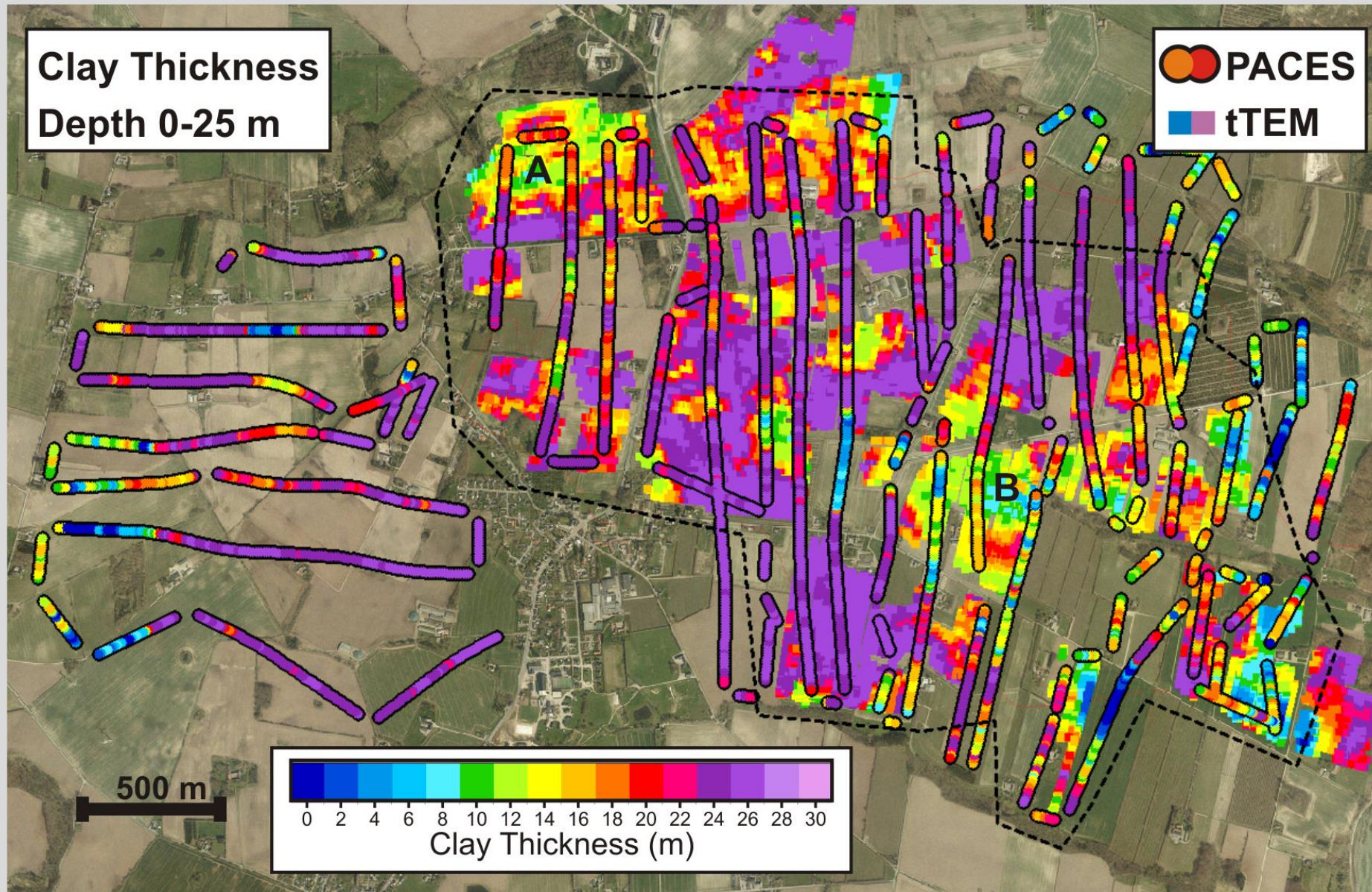
tTEM - PACES, Oure, middelmodstand 5-10 m



tTEM - PACES, Middelmøstandskort

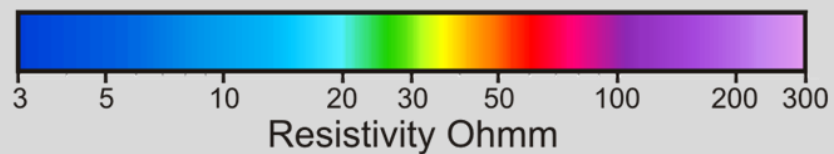
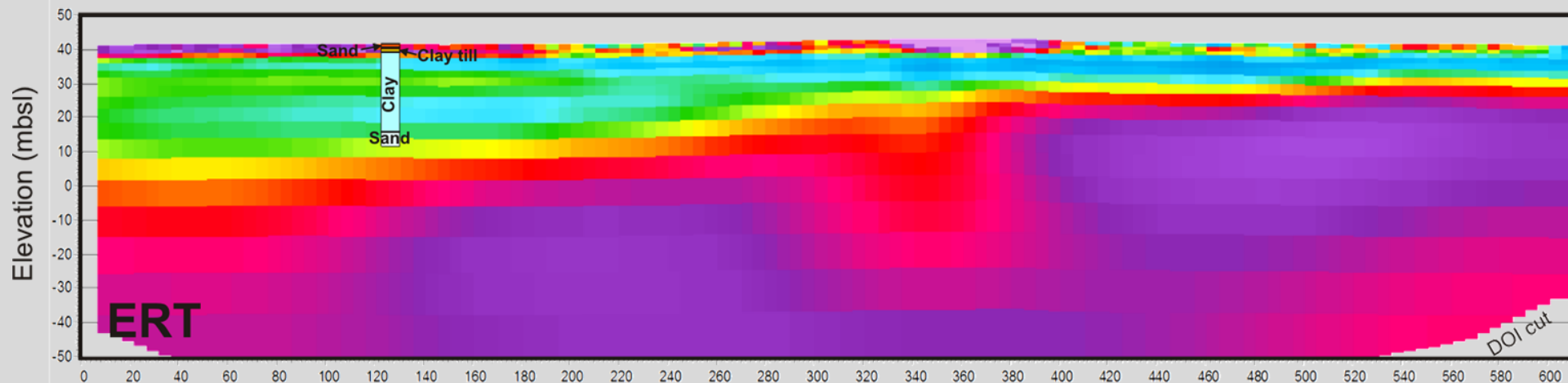
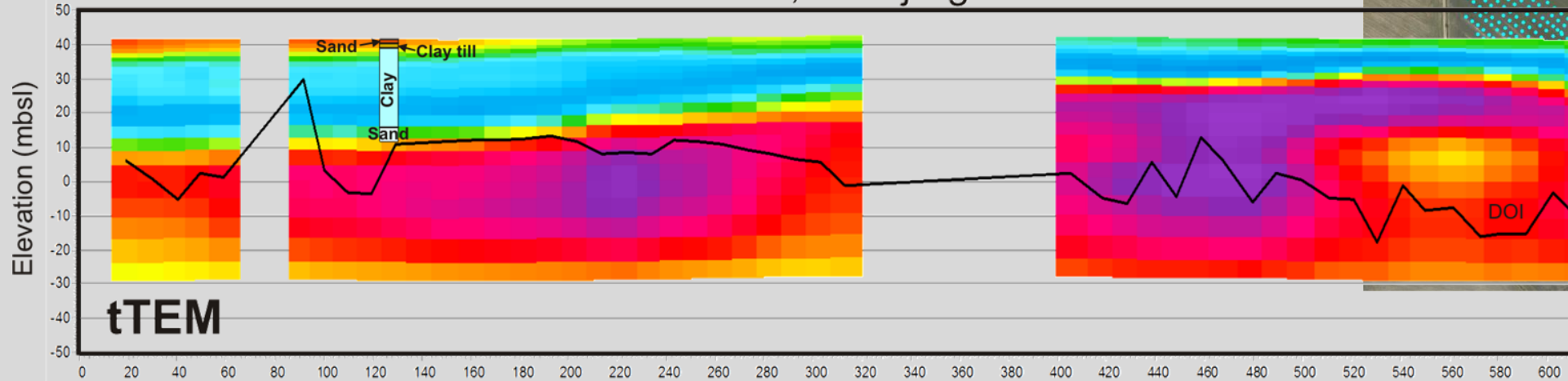


tTEM-PACES, Lertykkelseskort



tTEM - MEP, Vildbjerg

NE Profile 1, Vildbjerg



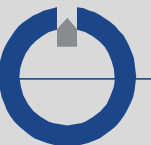
Vildbjerg

SW

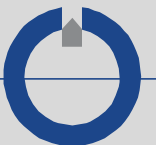
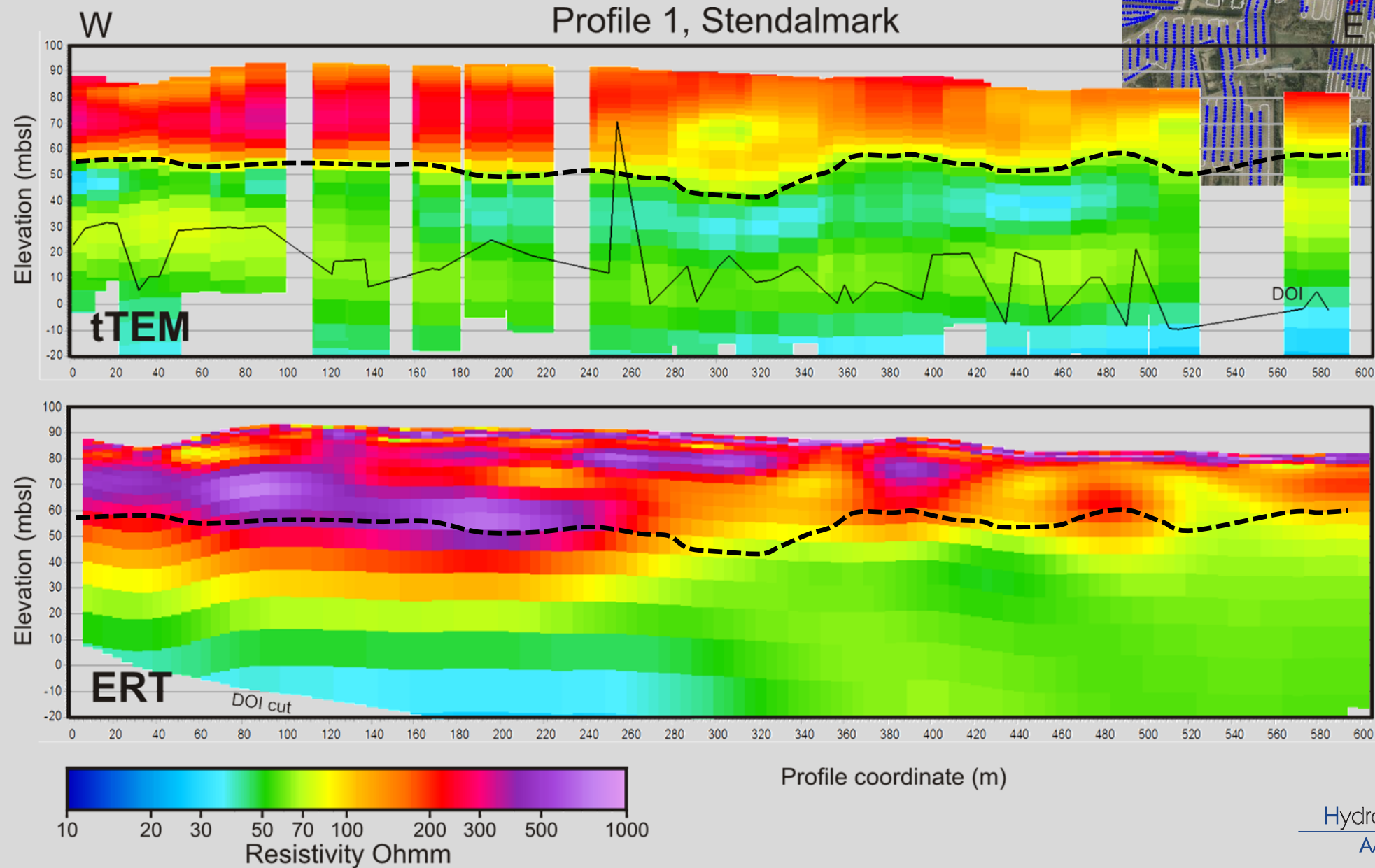
- tTEM models
- ERT profile
- Boreholes

Profile 1

Profile 2



tTEM - MEP



Konklusion

tTEM:

- er god til at bestemme konduktive lag og konduktive lagsekvenser
- er mindre god i bestemmelse af lagsekvenser med udelukkende resistive lag
- kan bestemme en resistivt toplag når tykkelser er $>\sim 3\text{-}4\text{m}$
- kan bestemme en konduktivt toplag når tykkelser er $>\sim 2\text{m}$

tTEM ifht. PACES og MEP:

- har lidt dårligere opløsning i de øverste 10-15 m specielt i bestemmelse af resistive struture
- bedre bestemmelse af konduktive lag og lertykkelser
- er PACES overlegen mht. den laterale opløsning
- DOI
 - 3-4 gange dybere end PACES
 - sammenlignelig med MEP med nyets instrument generation
- **Effektive data indsamling**

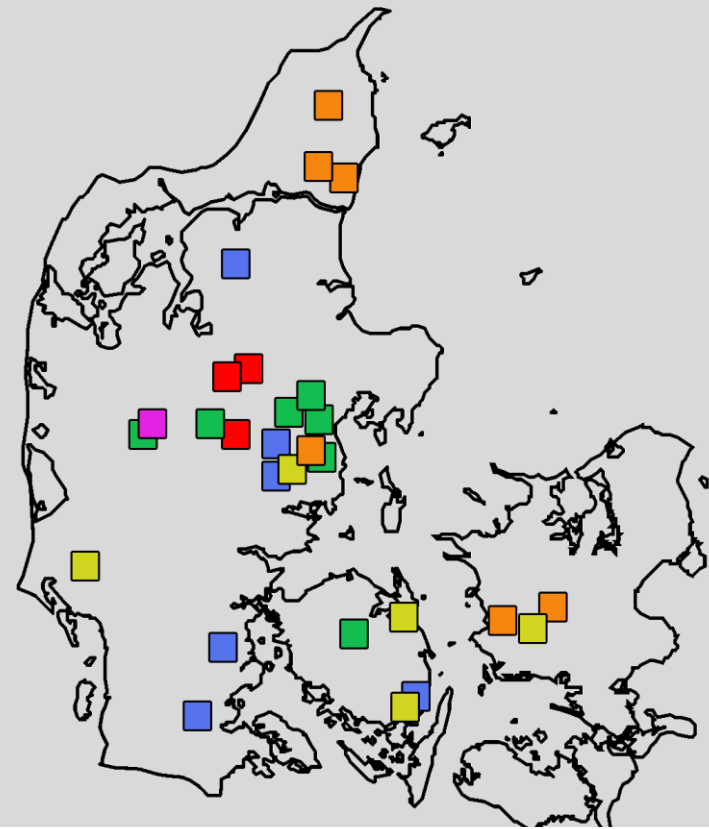
tTEM litteratur

- **GFS rapporter:**

- The tTEM system, System validation and comparison with PACES and ERT
- Status for tTEM-kortlægninger, April 2019

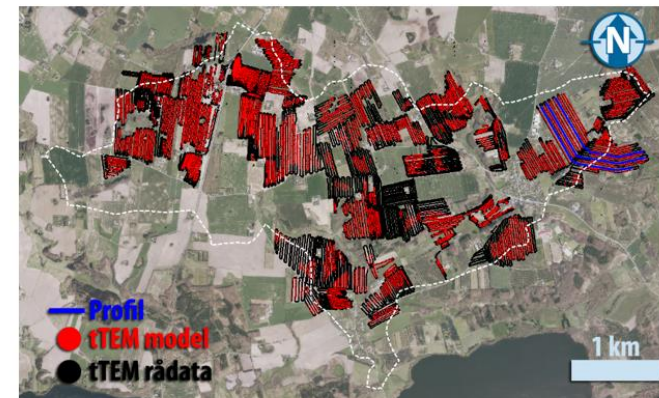
- **Artikler**

- tTEM - A towed transient electromagnetic system for detailed 3D imaging of the top 70 m of the subsurface, 2018, *GEOPHYSICS*
- Case studies of high resolution 3D subsurface mapping using towed transient electromagnetic system tTEM



3. Field scale nitrate retention mapping

Innovation Fund Denmark project, [rOPEN](#)



AREA	JAVNGYDE
GEOLOGY	Smeltevandssand og ler fra Mådeformationen
SIZE/TIME	1001 ha/11 days
LINE-KM	400,4
LINE-DISTANCE	10-25 m

Purpose:
Geological mapping at field scale for developing automated N-retention maps in ID15 catchments

