KNOWLEDGE CENTRE FOR AGRICULTURE

GEUS

Mapping nitrate reduction from field to streams

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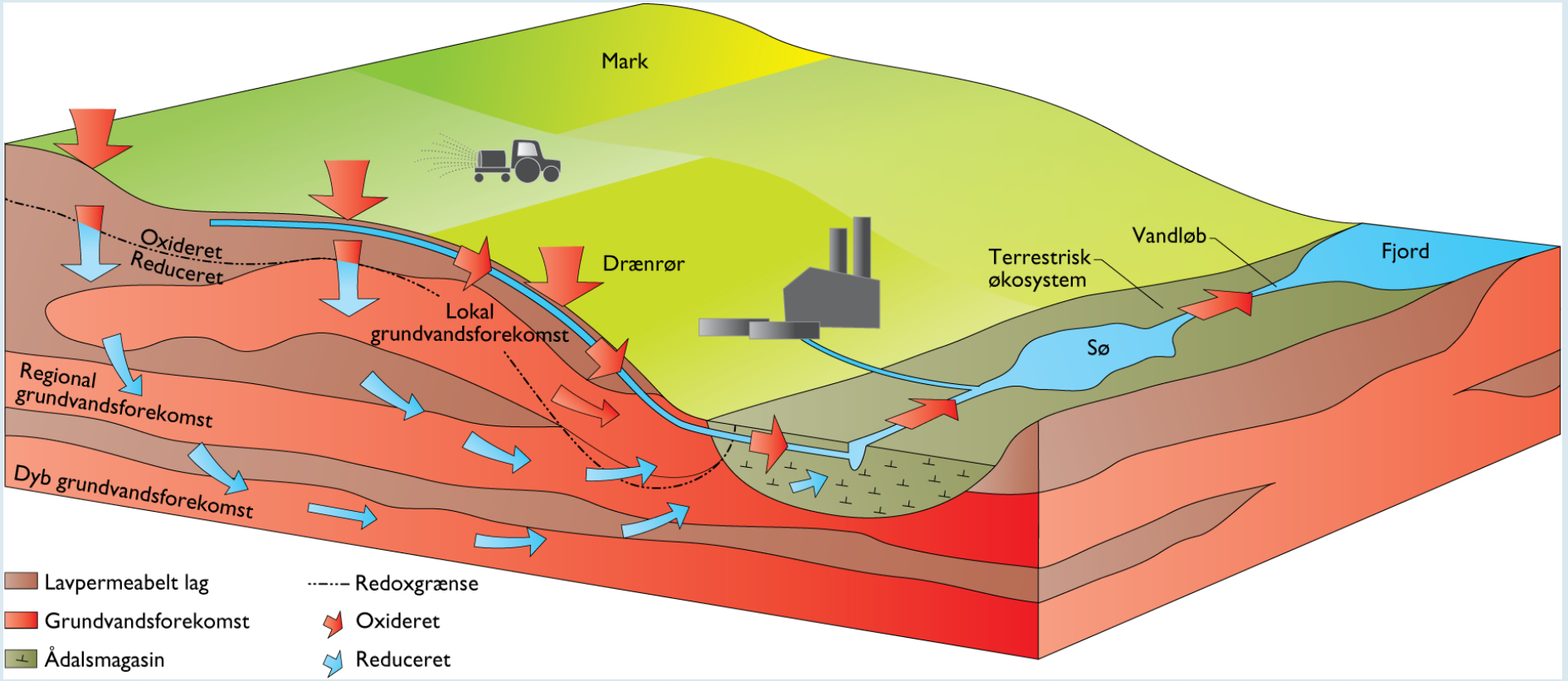
NiCA Et strategisk forskningsprojekt

NITRATREDUKTION I GEOLOGISK HETEROGENE OPLANDE

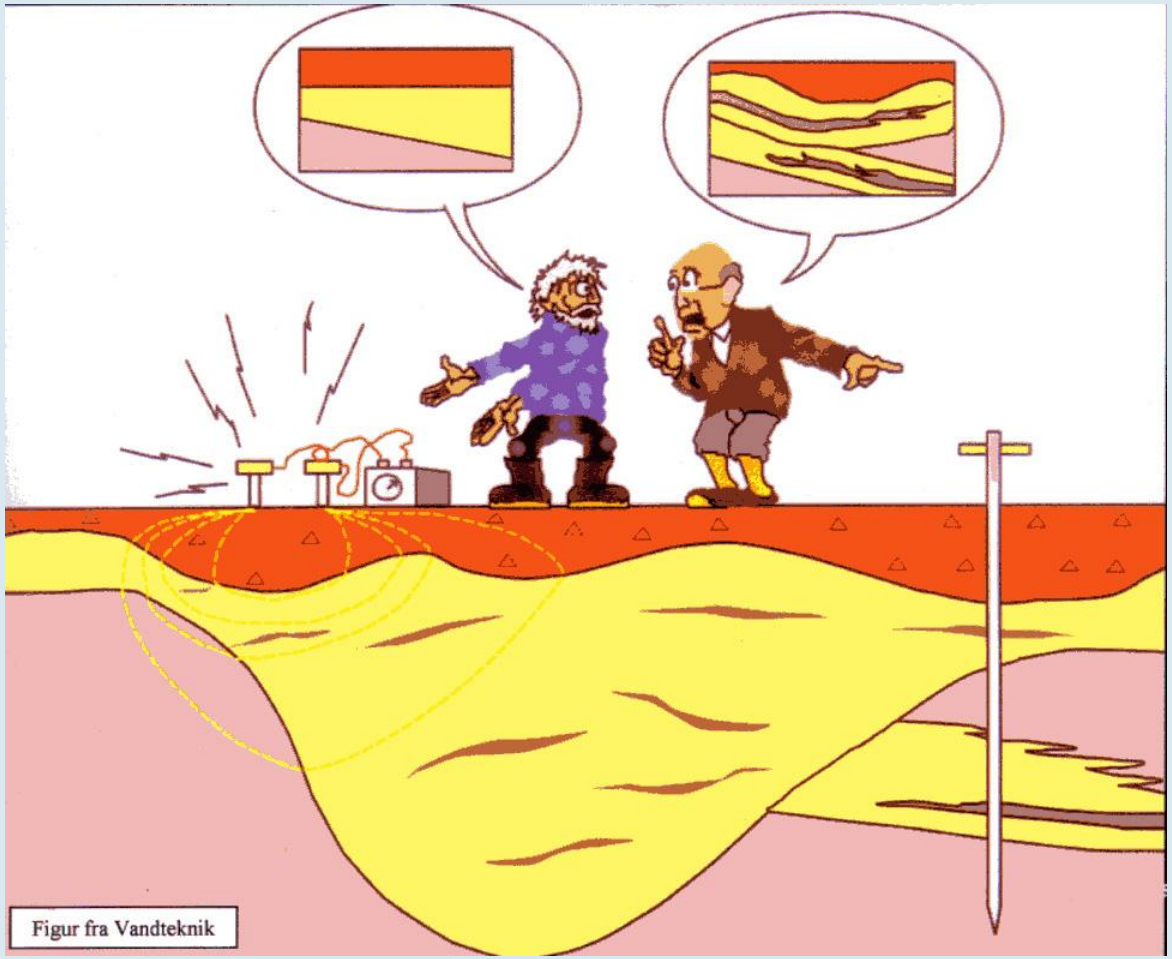
Nitrate transport

- can we predict where nitratereduction will happen?

App. 2/3 of the leached nitrate from fields will be removed before coast waters. Most part in ground water.

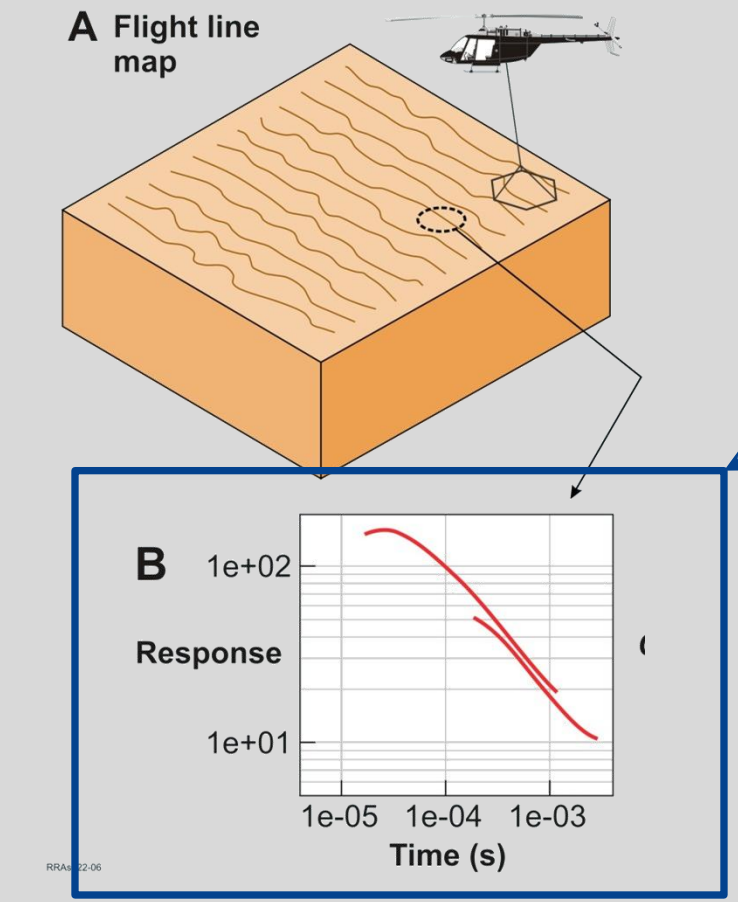


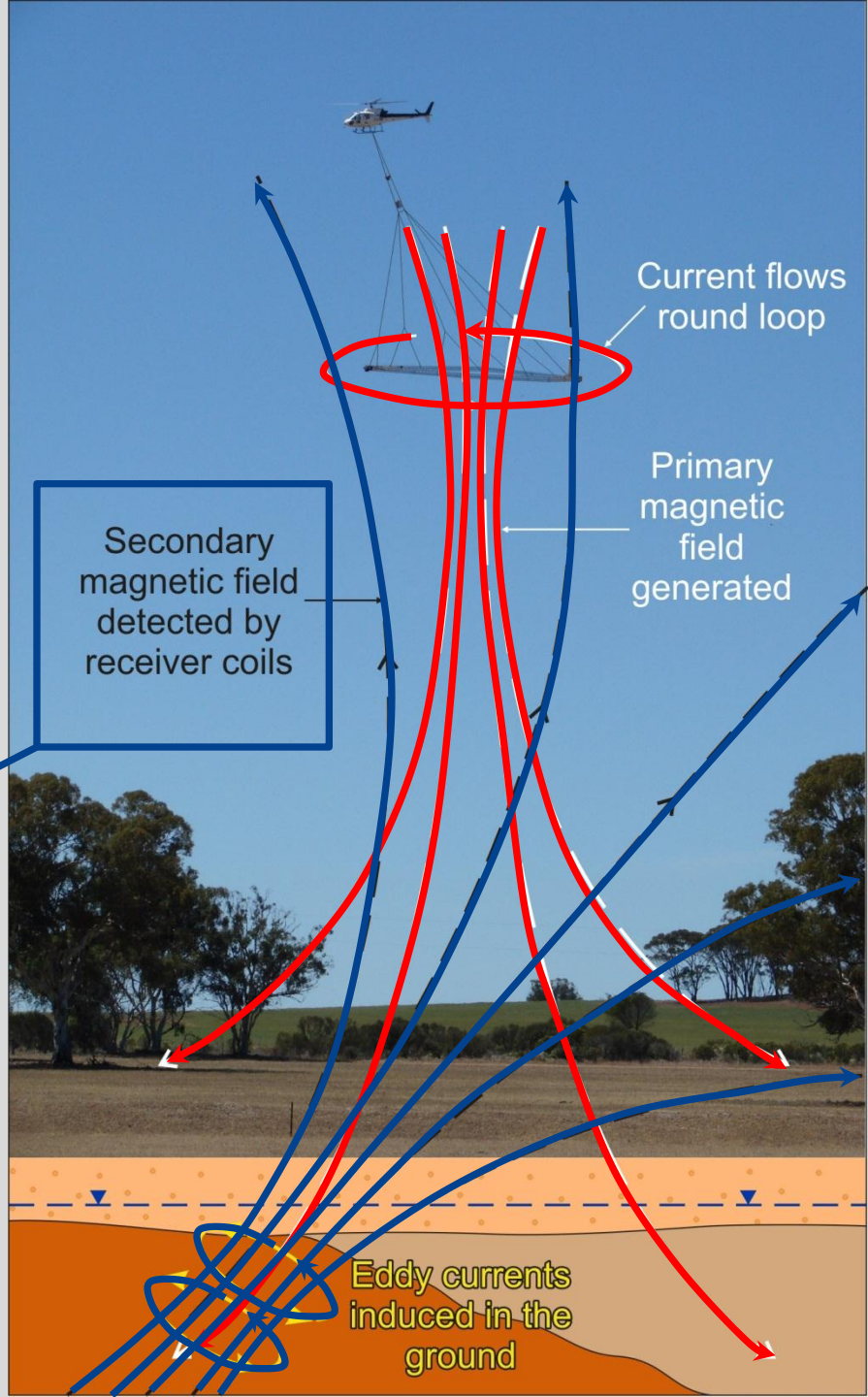
Geological uncertainty is a major barrier?



The geology is often very heterogenic

SkyTEM data collection





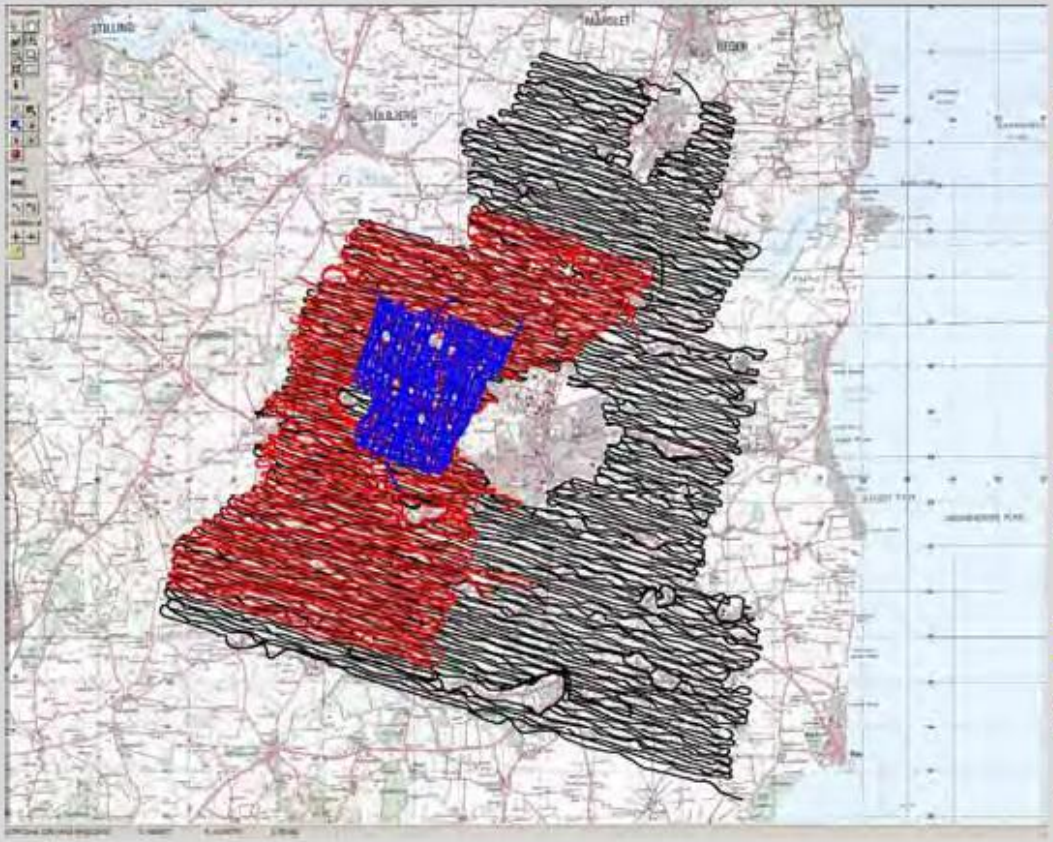
“Mini”SkyTEM – a new development

SkyTEM (used for deaper groundwater mapping

MiniSkyTEM (developed in NICA)

- Higher solution
  - Verticalt: down to 1-2 m
  - Horisontal: down to 20-50 m

NiCA project – Norsminde area



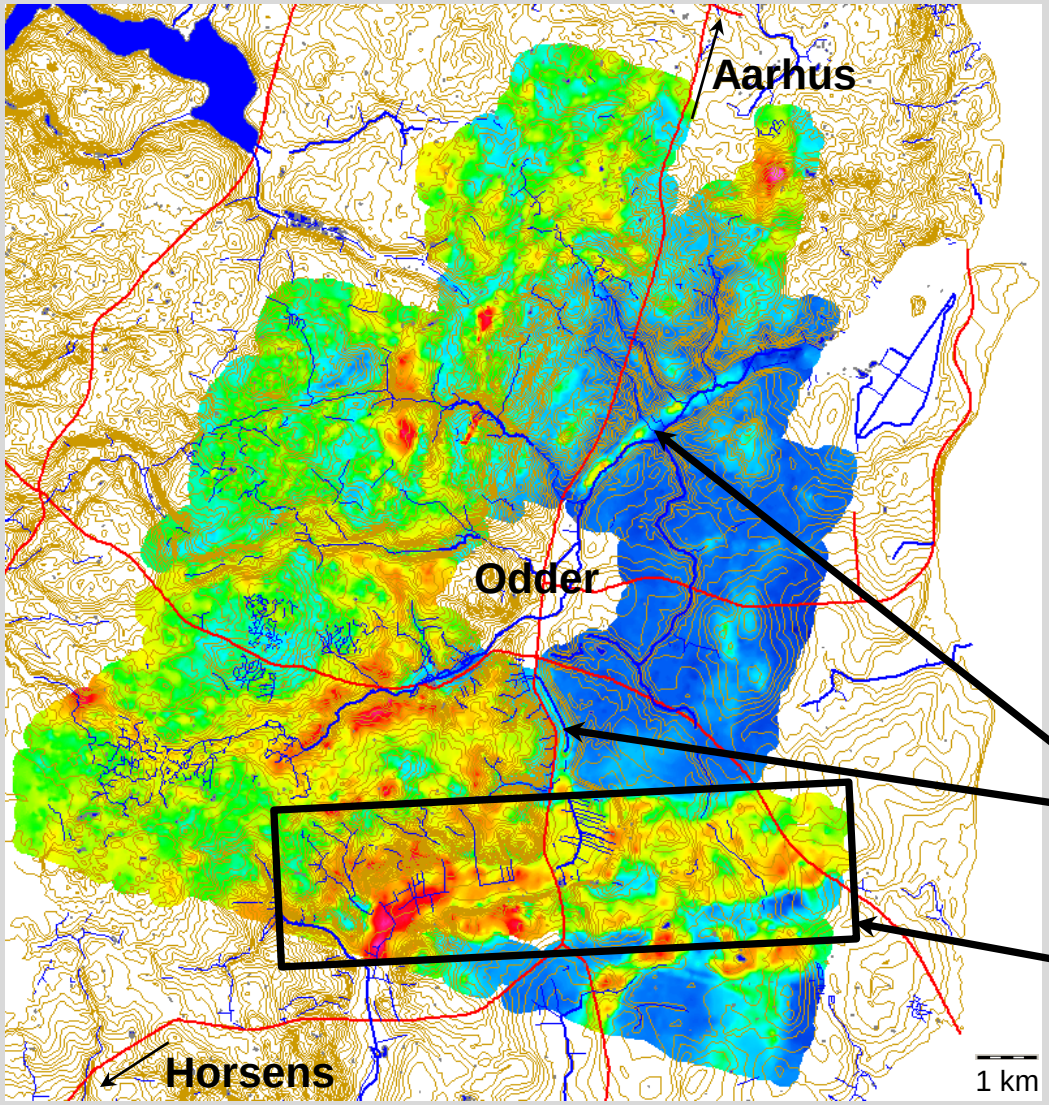
Black: Phase 1
100 m line spacing
13h26m
1203 km

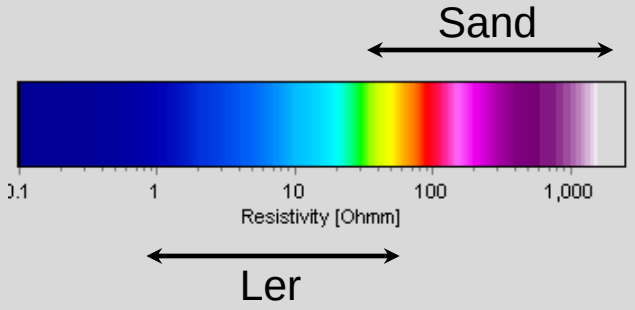
Red: Norsminde Phase 2 - inlines
100 m line spacing
5h06m
465 km

In blue: Norsminde Phase 2 - tie lines
50 m spacing
1h59m
178 km

…1846 km in 1 week
(Aarhus->Barcelona)

Mean resistivity map: 15-20 m depth

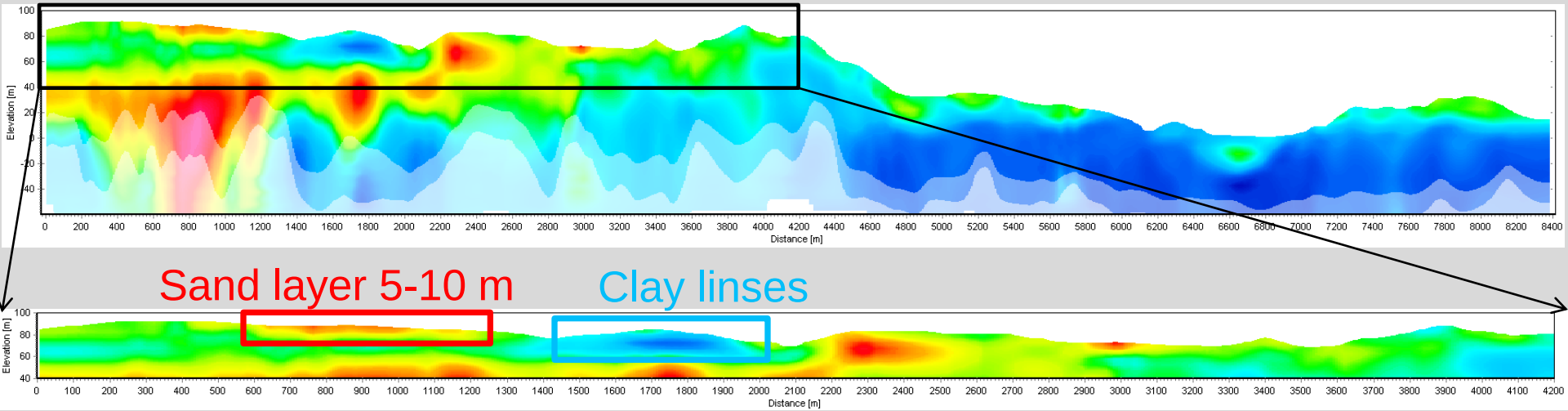




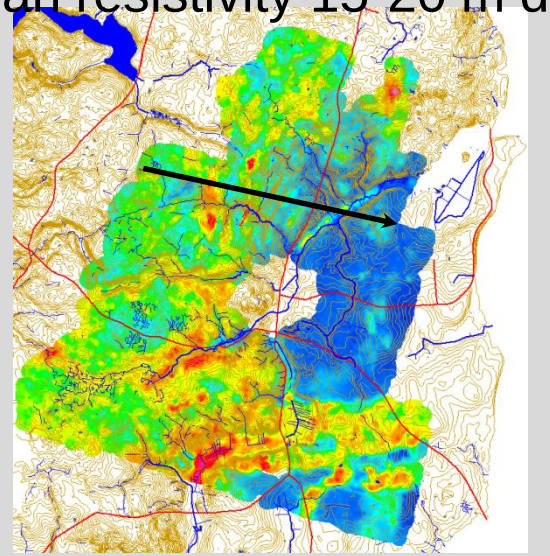
Paleo channels with more sandy sediments

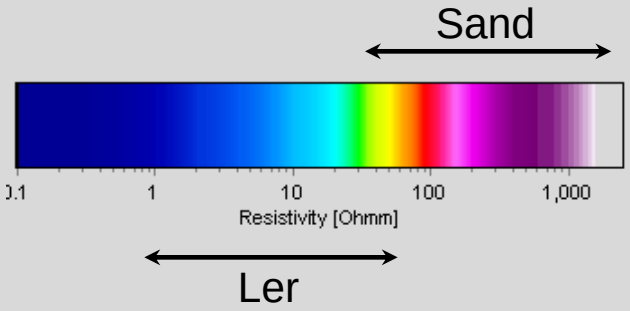
Buried glacial valley filled with sandy sediments

Profil west-east



Mean resistivity 15-20 m depth



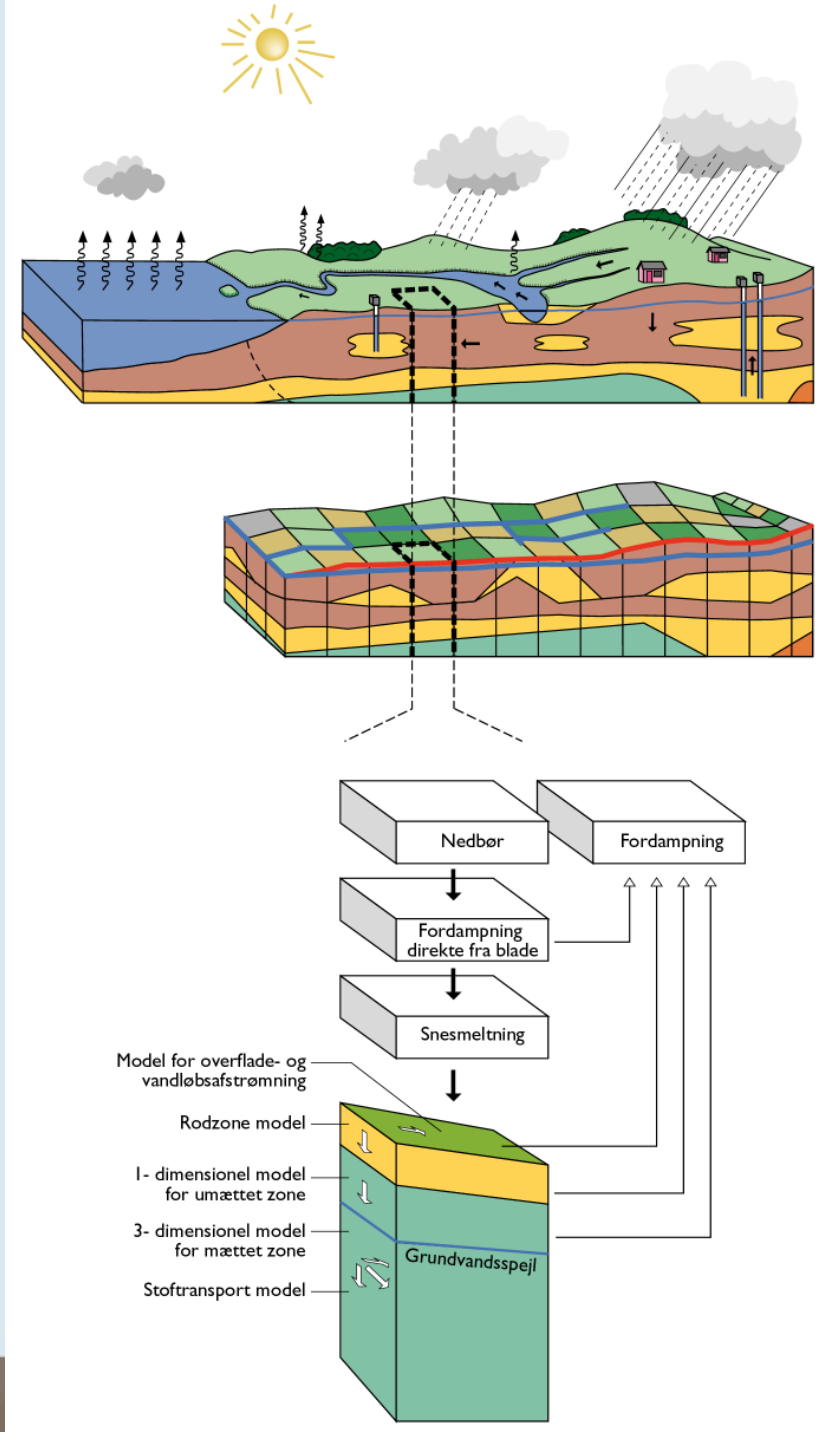


HydroGeophysics Group
AARHUS UNIVERSITY

Modeling nitrate transport

- Geological model –
  right understanding of the layers

- Hydro dynamic model –
  predicting water flow



Economic costs?

- Collecting data
- Processing data
- Boreholes and more for validation
- Geology interpretation
- Hydrologic model
- Uncertainty analysis

➔ 500 – 1500 kr./ha (65- 200 euro/ha)

Perspectives

- On a small scale be able to predict:
  - ➔ robust areas
  - ➔ areas more sensitive for farming
- We will evaluate economic efficiency
  - General regulation
  - Centrally controlled differential regulation
  - Local managed differentiated regulation
- ➔ new management system?

NICA – partners and finansing

- De Nationale Geologiske Undersøgelser for Danmark og Grønland (GEUS)
- Institut for Geografi og Geologi, Københavns Universitet
- Geologisk Institut, Aarhus Universitet
- Aarhus Geophysics Aps
- Videncentret for Landbrug
- Fødevareøkonomisk Institut, Københavns Universitet
- Laval University, Quebec, Canada
- Alectia A/S
- Aarhus Kommune
- Odder Kommune
- SkyTEM
- DHI

- **14,5 mill dk kr from**
- **The Danish Council for Strategic Research**
- **2010 - 2013**

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