



3D modeller generert fra geofysiske-, lidar- og fotogrammetri målinger: Hva de betyr og hvordan vi bruker de

Andi A Pfaffhuber, avdeling Geokartlegging, NGI

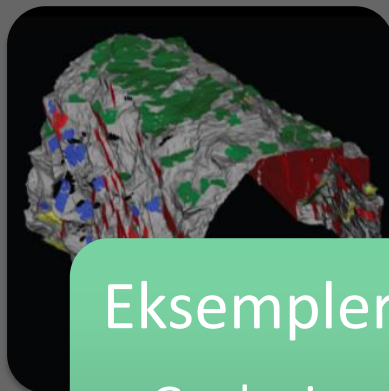
Digitalisering i tunnelbransjen
Tekna kursdagene 9.-10. januar 2018

Innhold



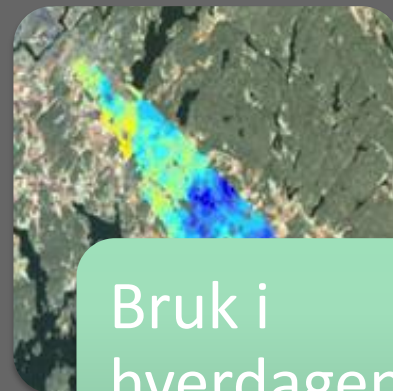
Metoder

- AEM
- Lidar
- Drone



Eksempler

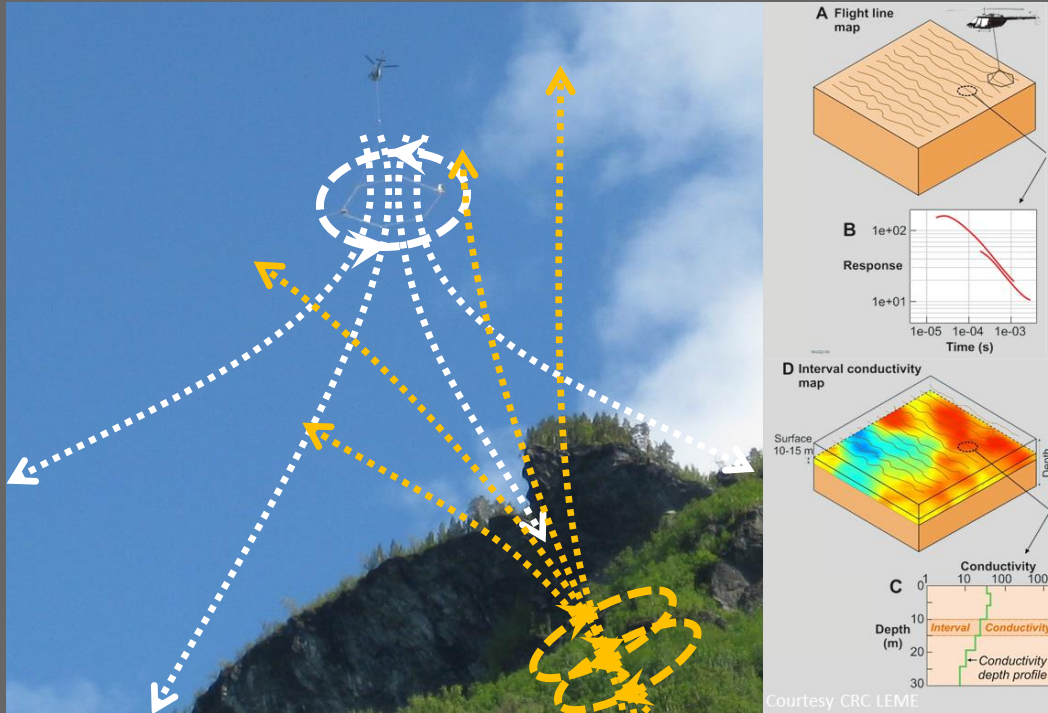
- Geologi
- Sikring
- Sprekker



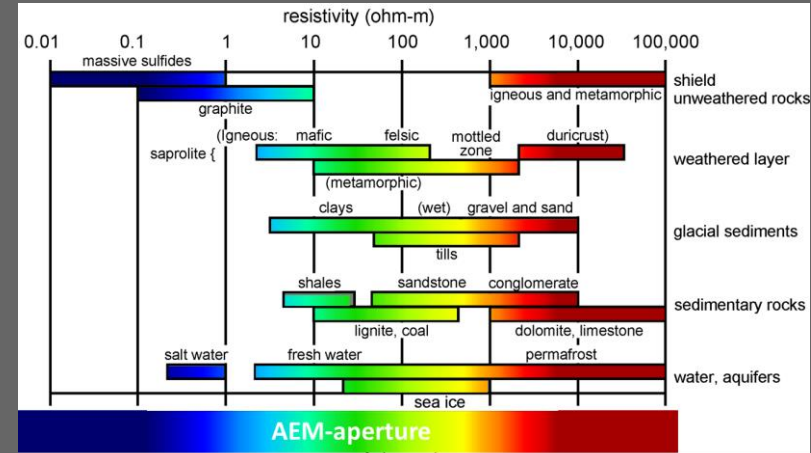
Bruk i hverdagen

- Formater
- Programmer

Airborne Geoskanning



Resistivitet beskriver geologien



Lidar og fotogrammetri

- 3D modeller fra m³ til km³ med mm til cm nøyaktighet

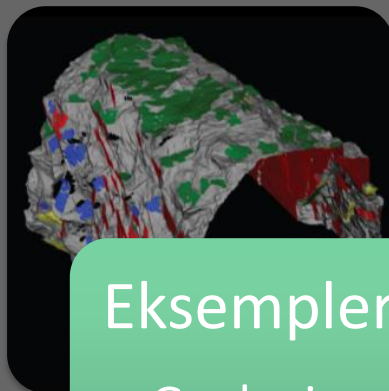


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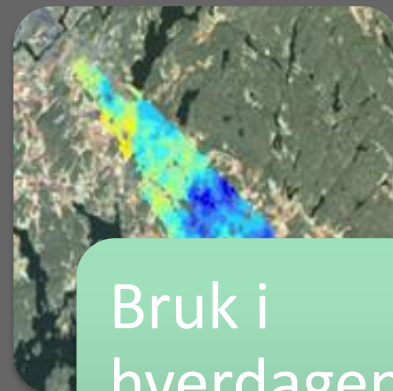
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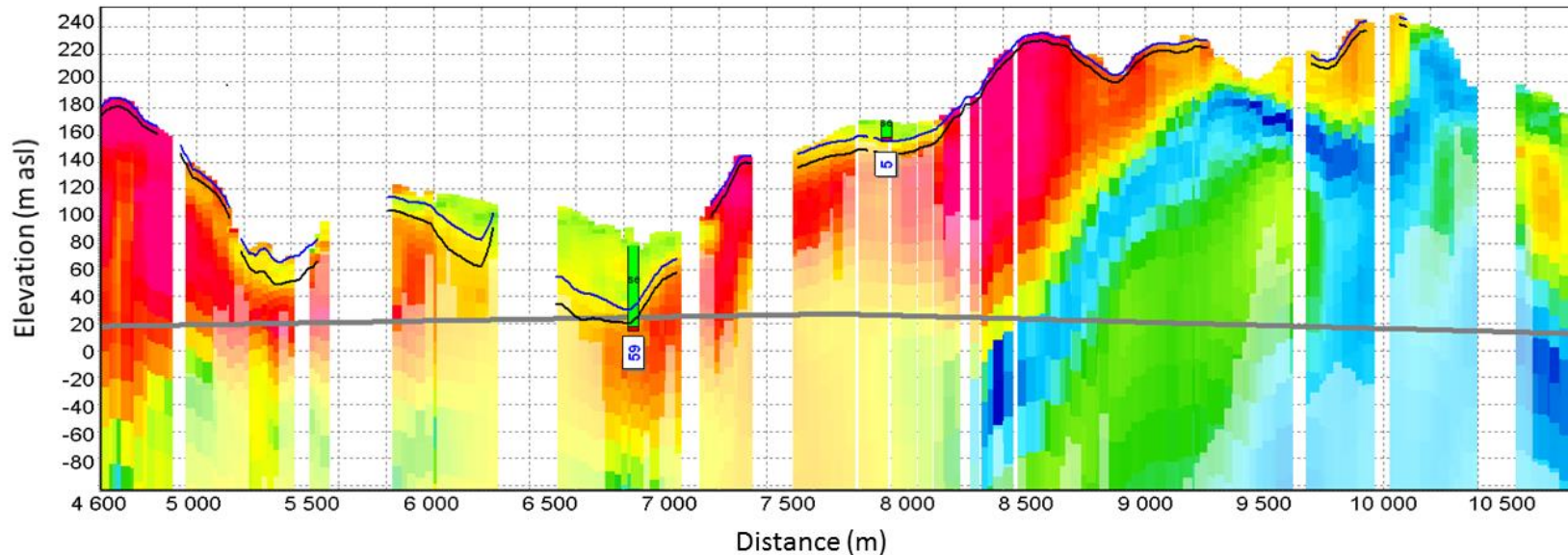
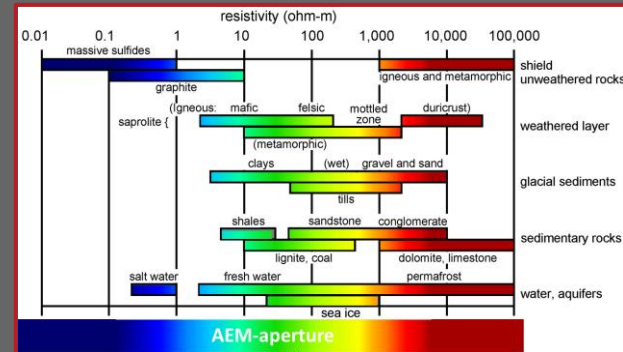
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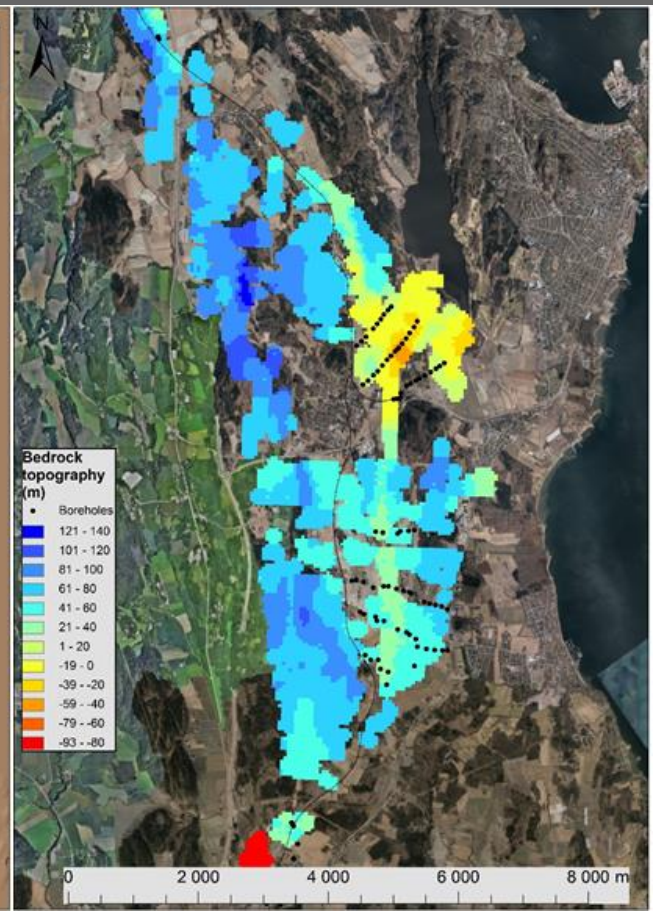
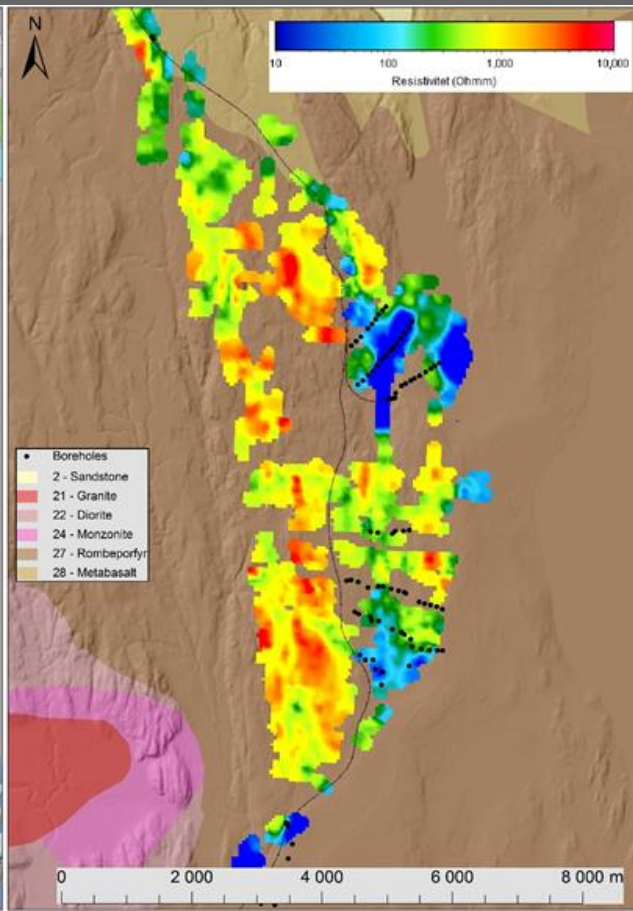
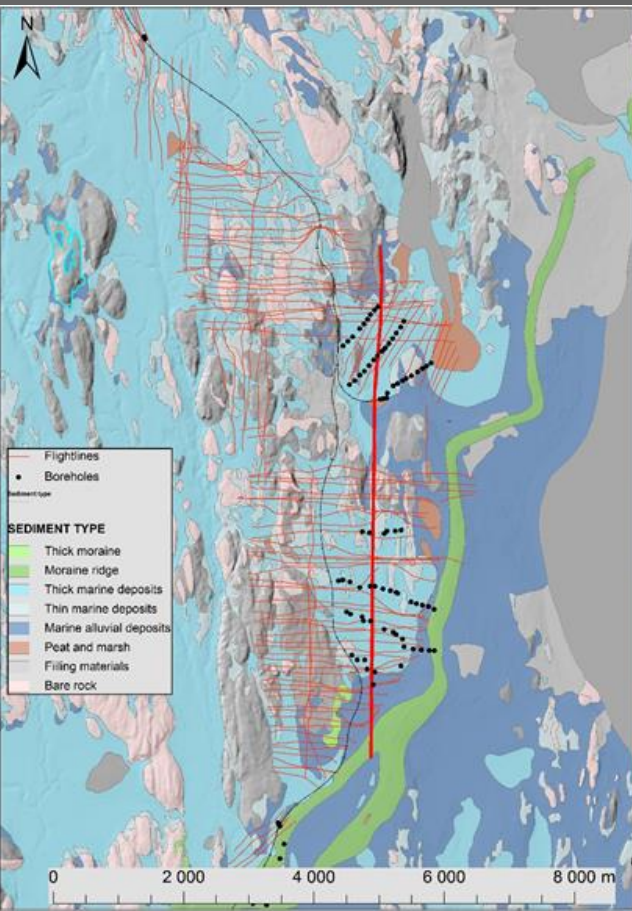
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Bergkote og bergkvalitet i stor skala

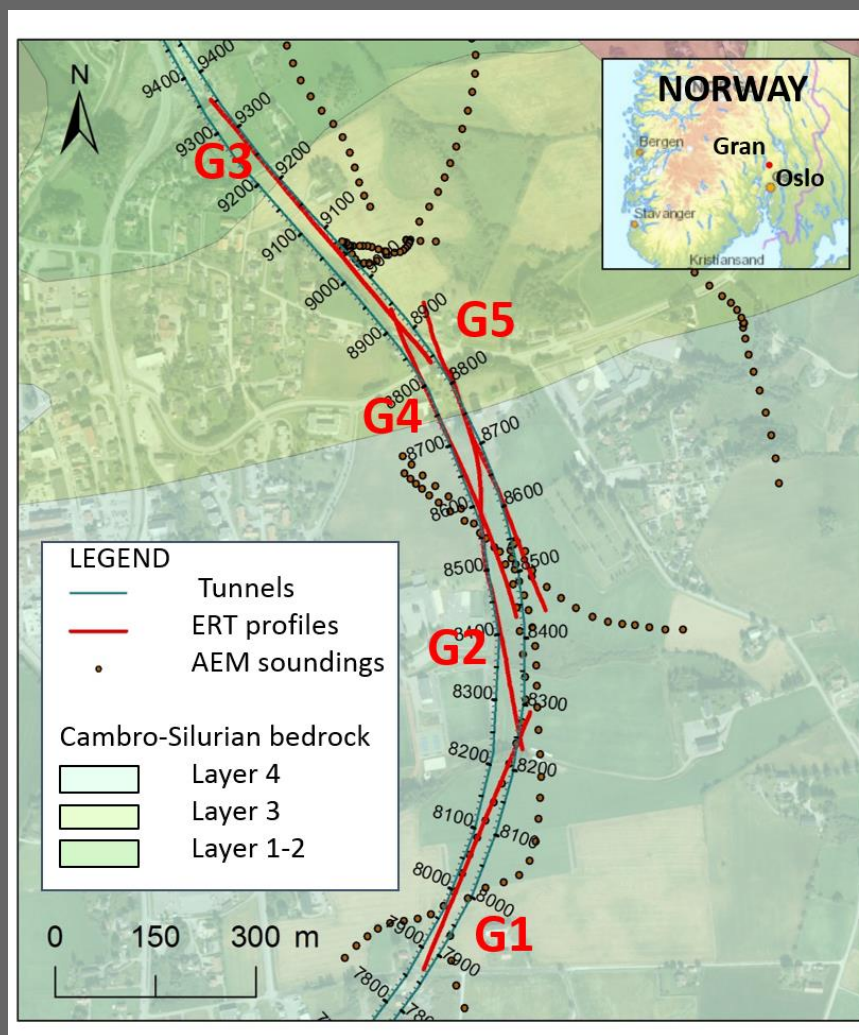


15 km² i Vestfold

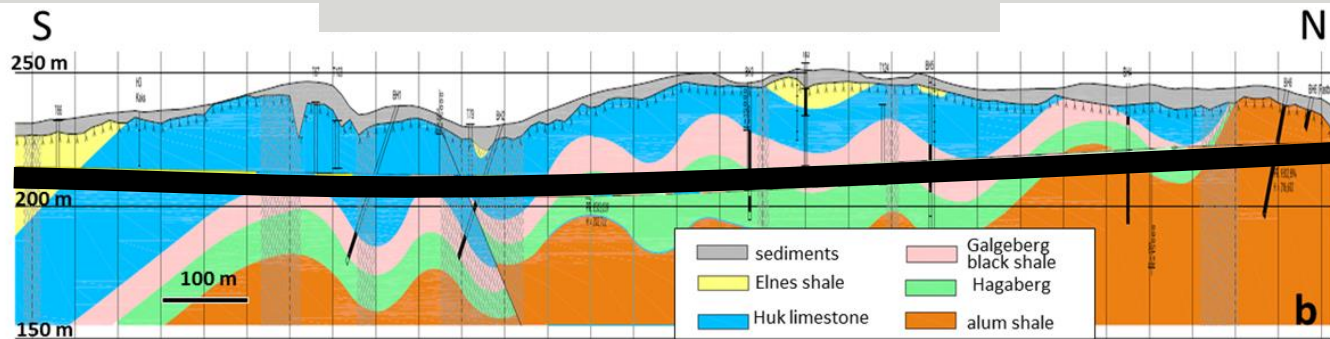
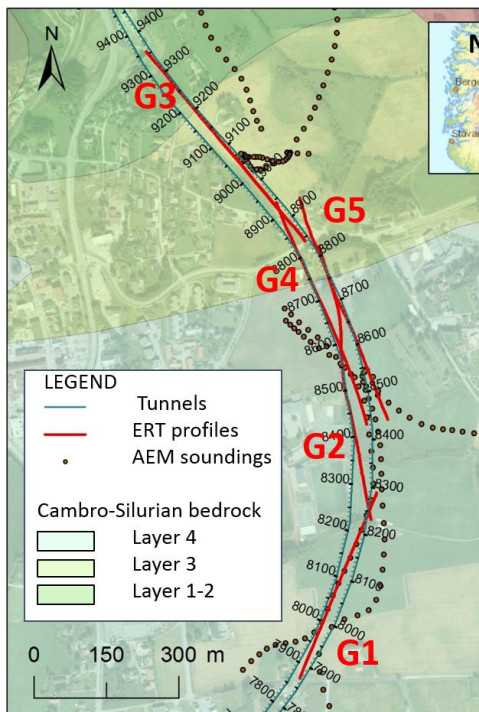


En tunnel i forskjellige skalaer

- Hovedmål:
 - Å finne syredannende leirskifer

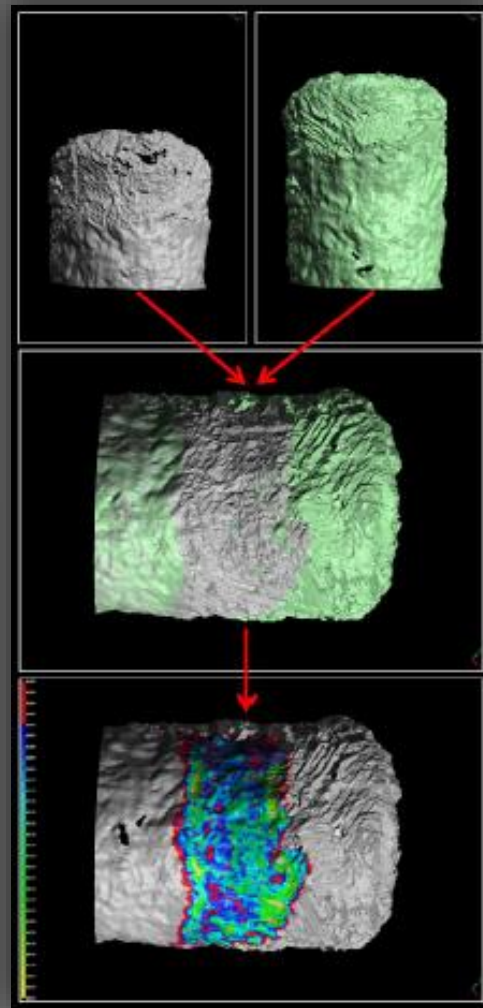
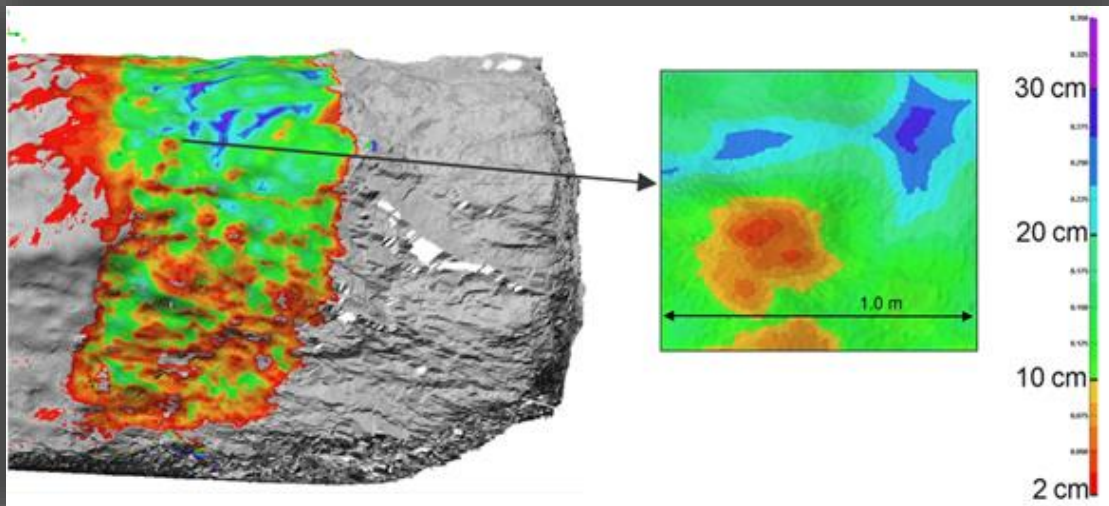


Hva er virkeligheten ?



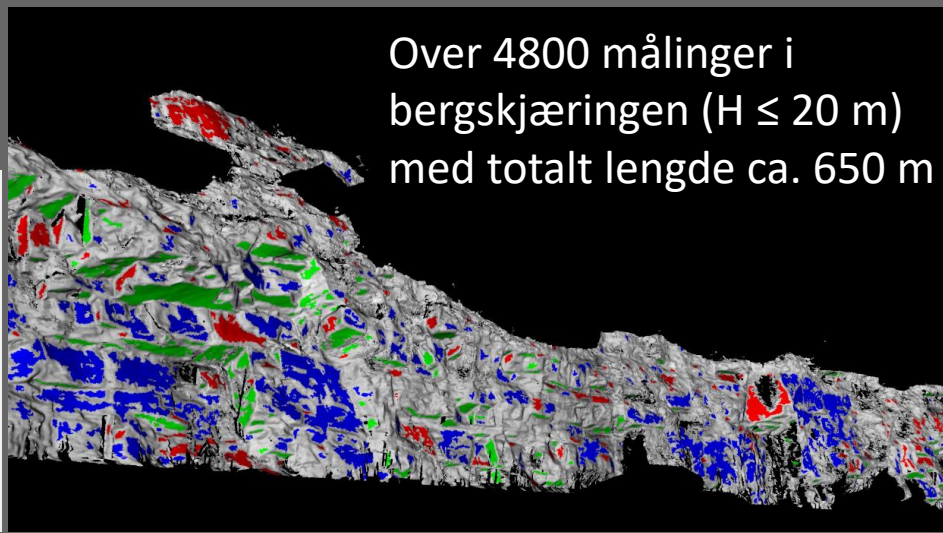
Sprøytebetongtykkelse i 3D

- Høy oppløsning med 3D skanning
- Eksempel fra 2009: >50% utenfor spec:
 - 31% > 9 cm & 22% < 5 cm
- Stor verdi for on-site KS

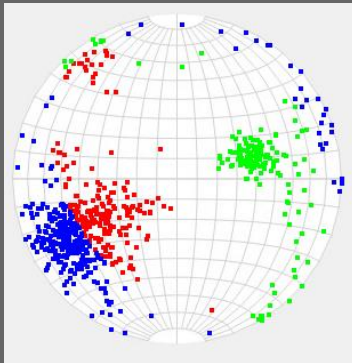


Sprekkemønstre fra kamera / drone

- Dokumentasjon av bergmasse: strøk/fall-målinger
- Mer nøyaktig og signifikant enn manuelt
- Anvendes i tunneler, veiskjæringer og bergskråninger



Over 4800 målinger i
bergskjæringen ($H \leq 20$ m)
med totalt lengde ca. 650 m

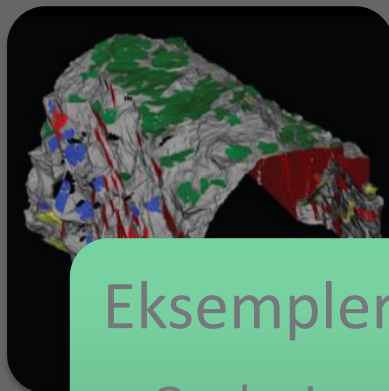


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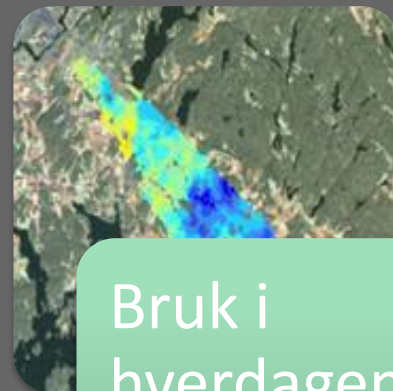
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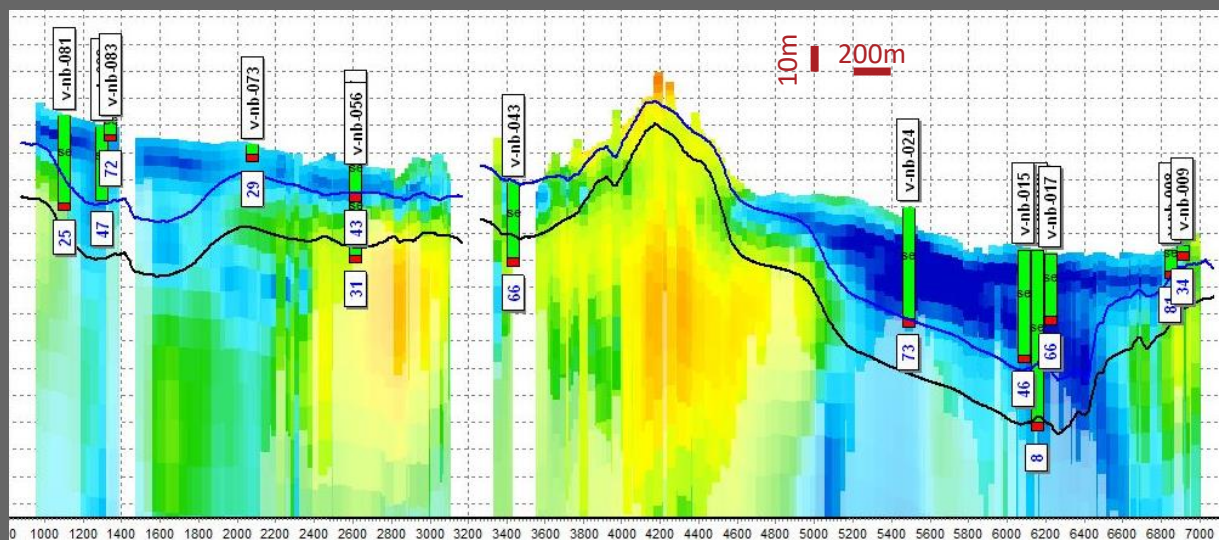
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Hvordan jobber jeg med dette?



- Komplekse 3D data må forenkles
 - men verdien må ikke tapes
- CAD vs .kof vs .las vs .xlsx
- Smaken er som baken når det kommer til programvarer
 - nesten alt kan «oversettes» mellom programvare



#onsafeground

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