

# Hydrotermisk aktivitet og metalliske mineralavsetninger i Norskehavet

Rolf B. Pedersen

Senter for Dyphavsforskning

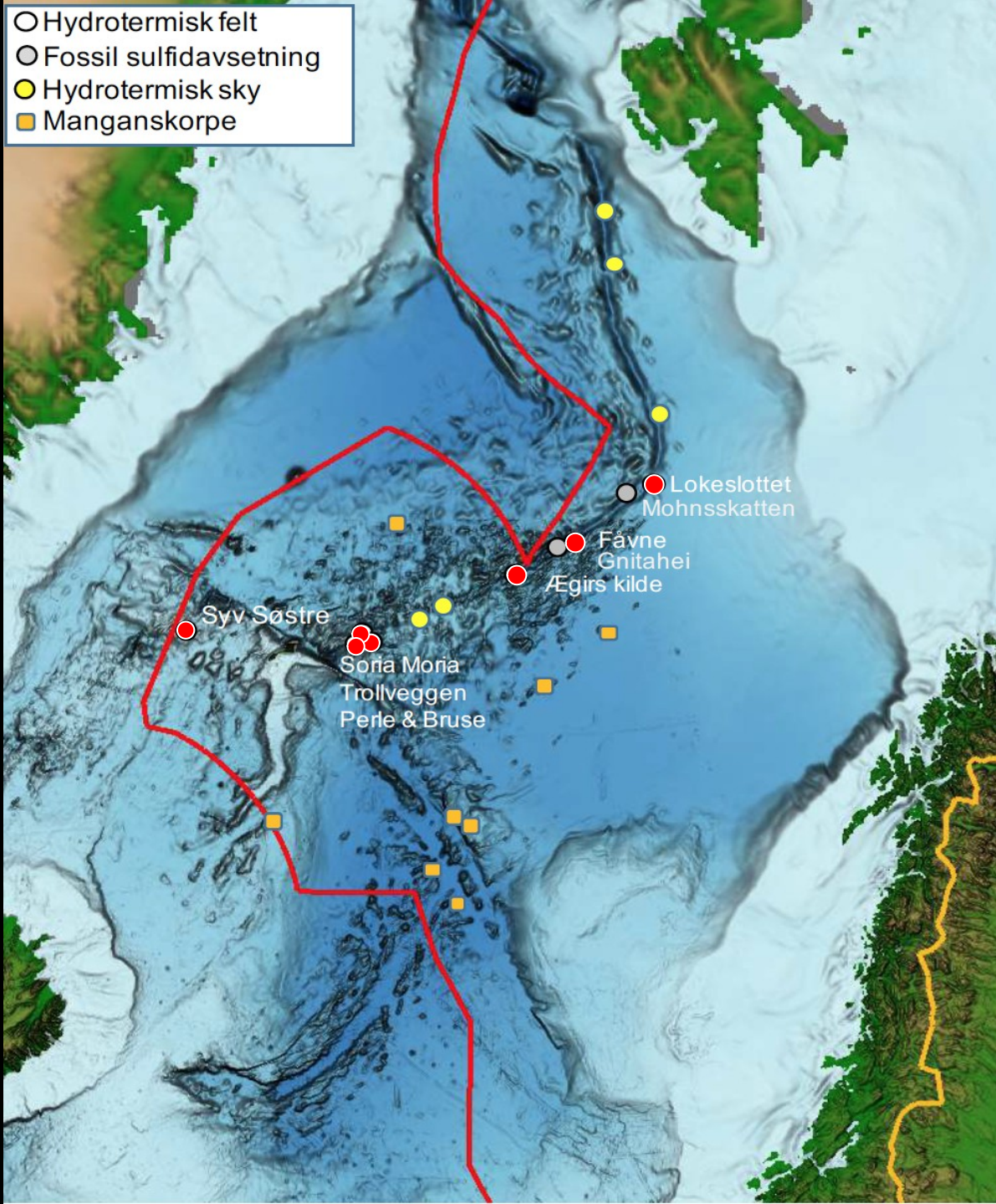
Institutt for geovitenskap, Universitetet i Bergen



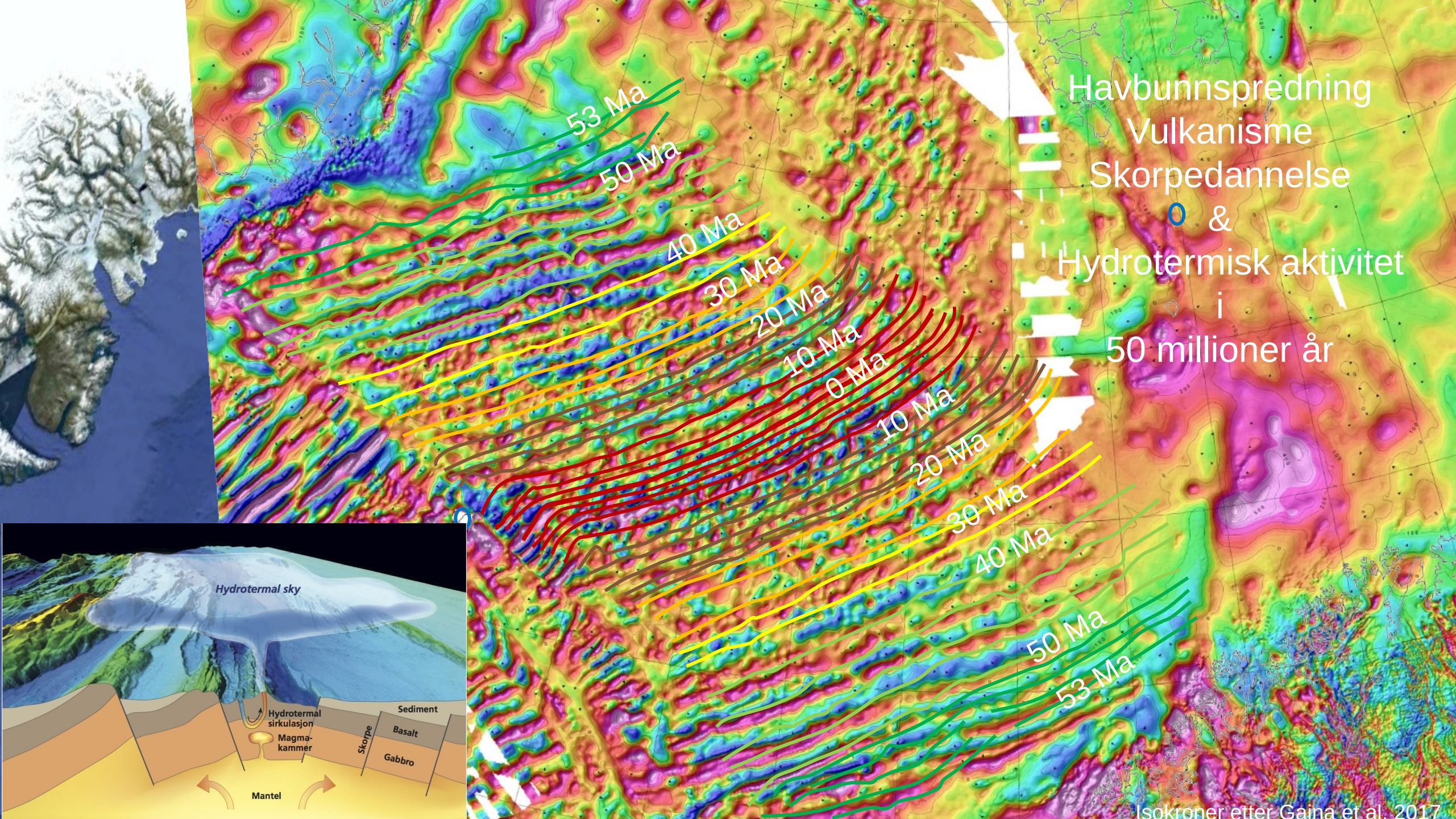
Med bidrag fra Ingunn Thorseth, Ana Marques, Sabina Palinkas,  
Tamara Maumberger Marv Lilley, Håvard Stubseid,  
Alden Denny, Solveig Onstad, Haflidi Haflidason



- Hydrotermisk felt
- Fossil sulfidavsetning
- Hydrotermisk sky
- Manganskorpe

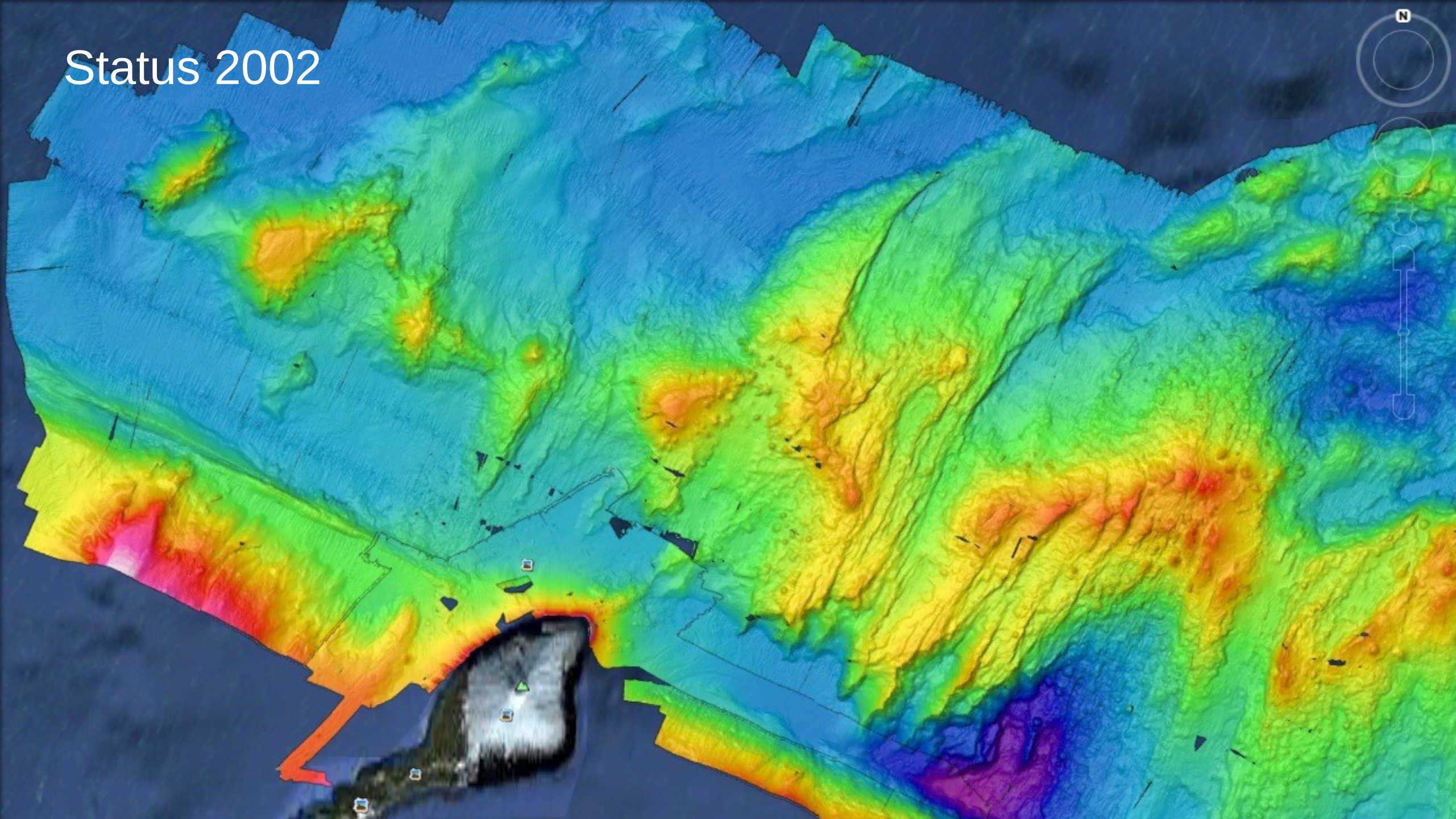


# Kjente hydrotermiske områder og ulike typer Mineralavsetninger i Norskehavet

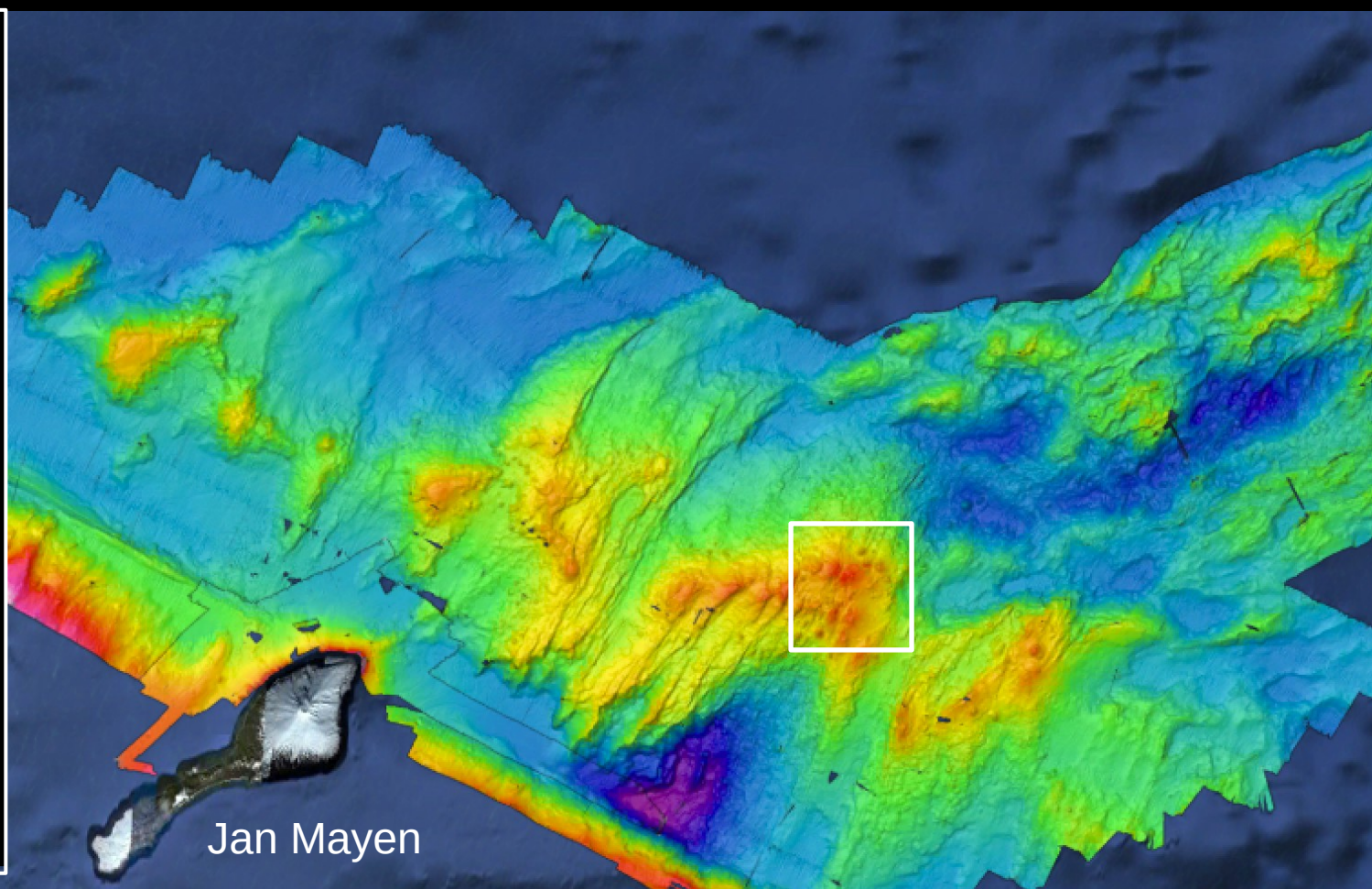
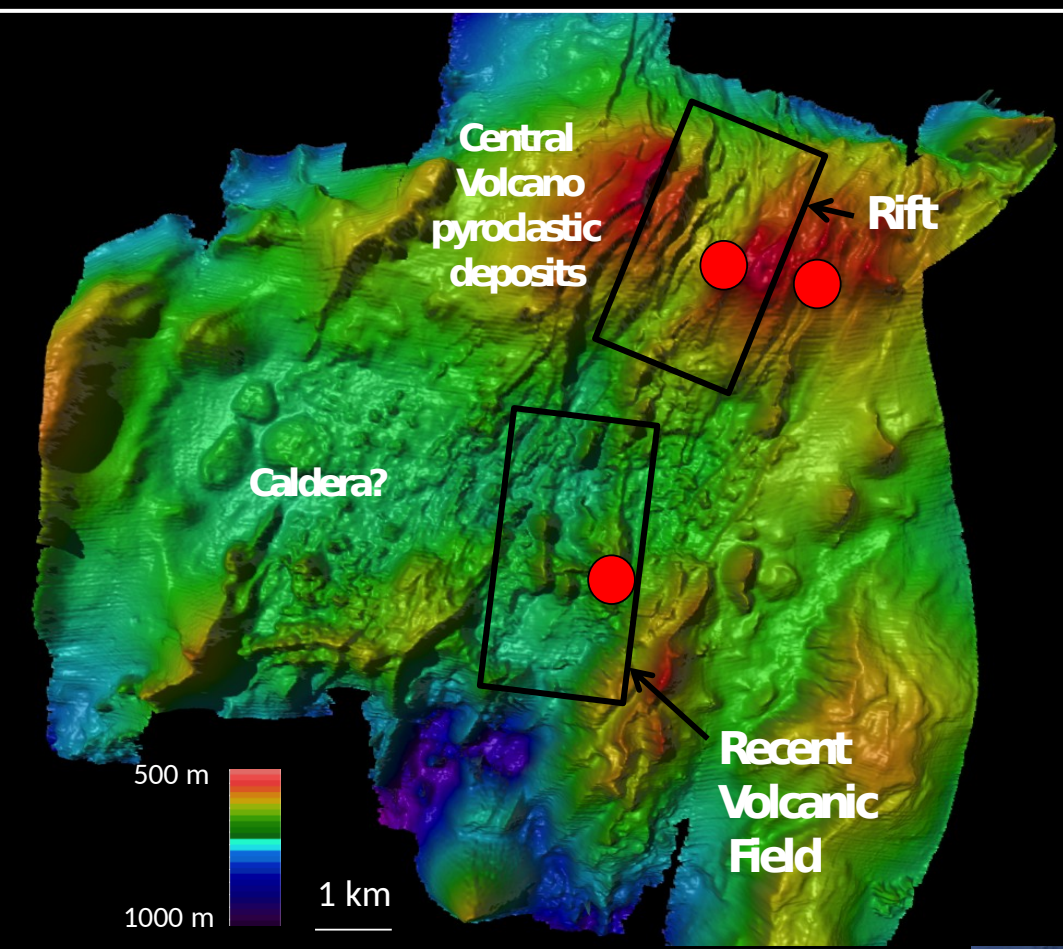




Status 2002

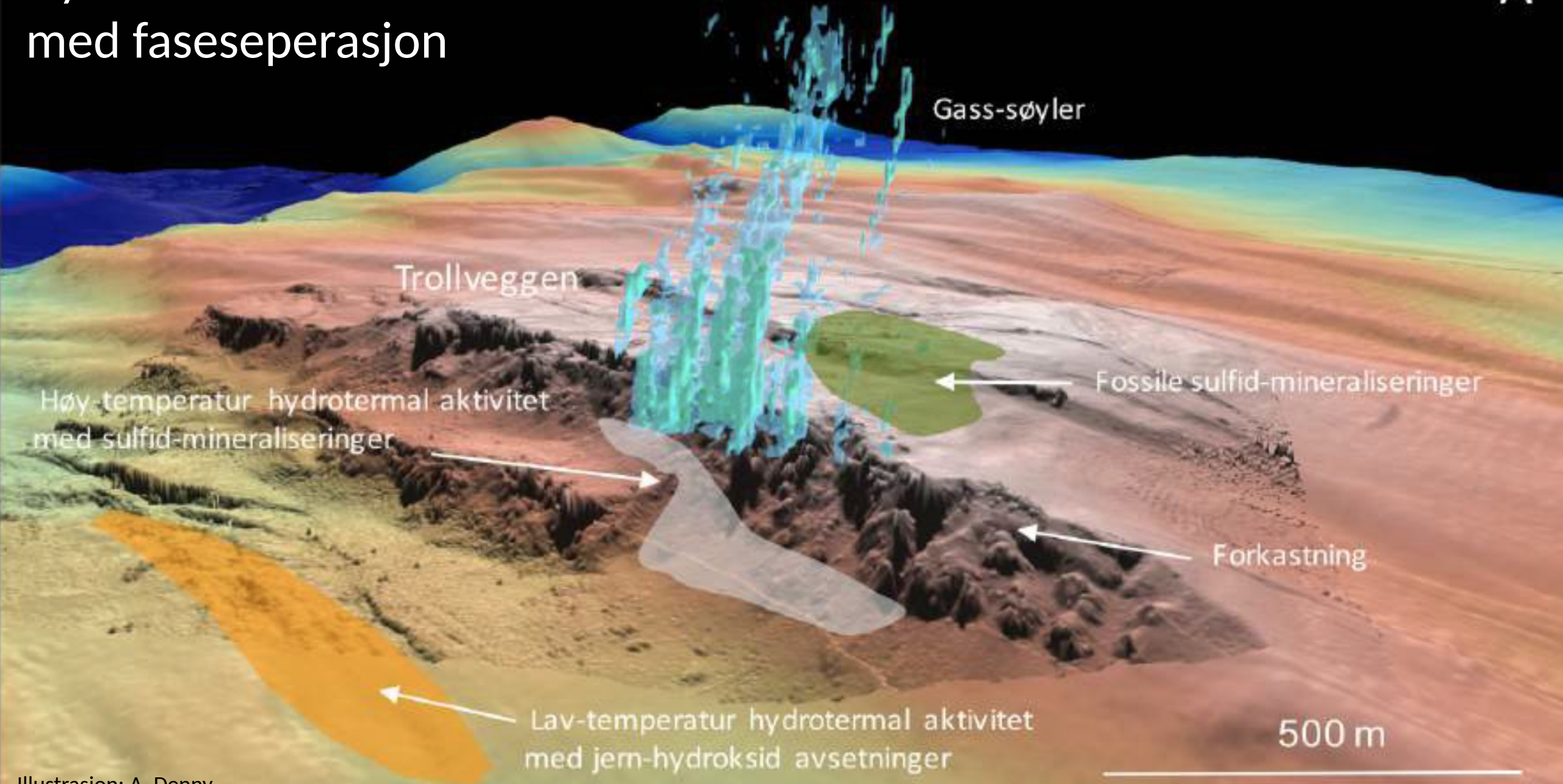


# Undersøkelse av de grunne områdene av Mohnsryggen - oppdagelse av Jan Mayen feltene i 2005



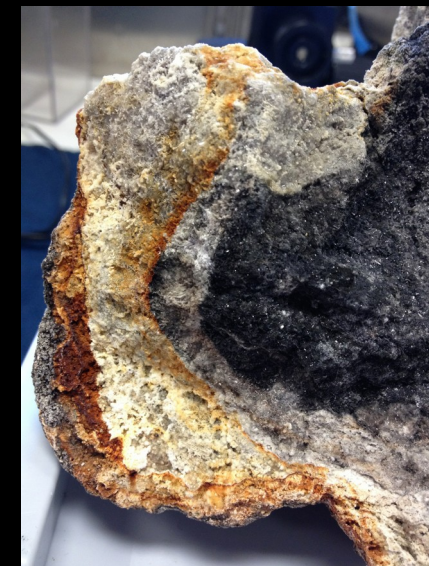
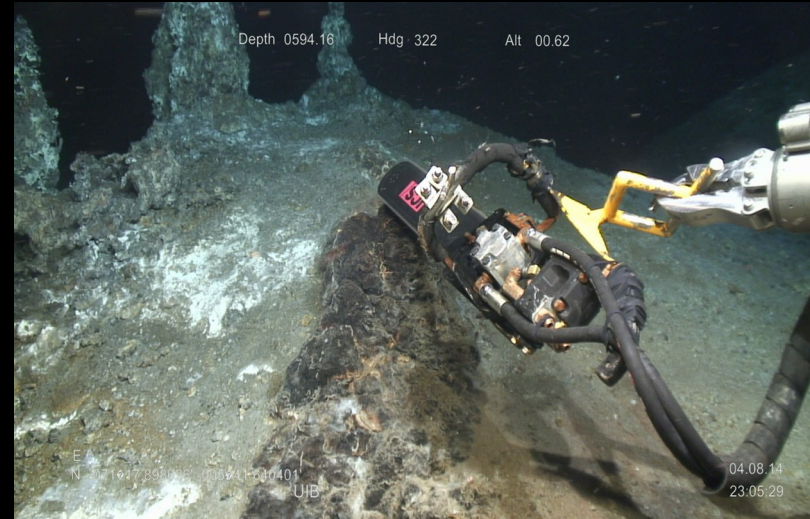
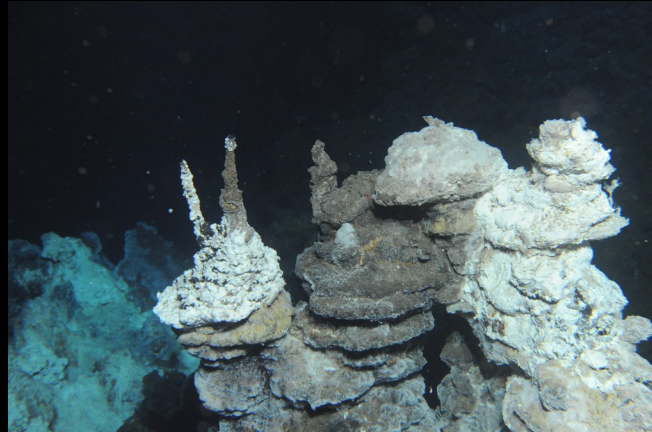
# Hydrotermisk aktivitet med fase-separasjon

A



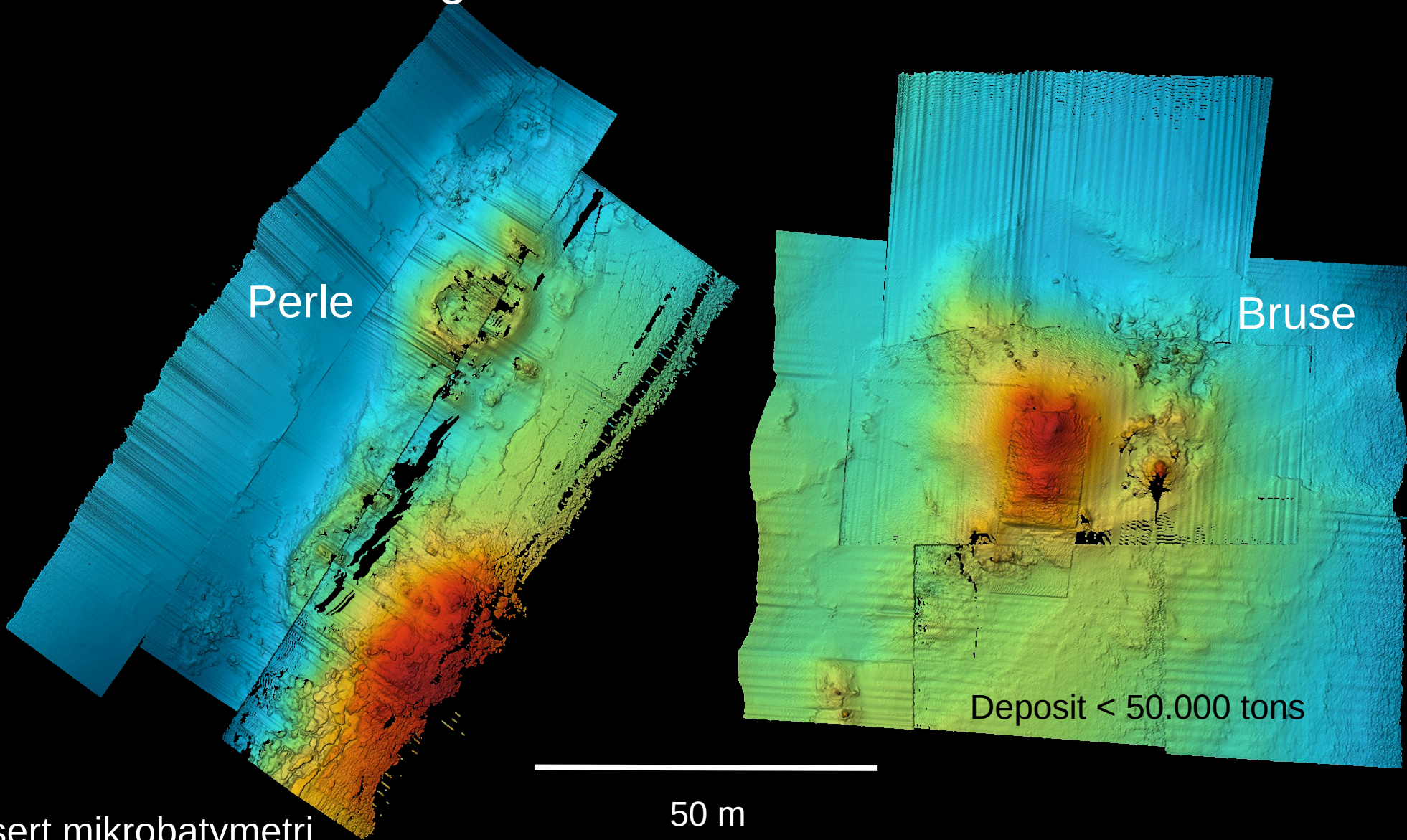
Illustrasjon: A. Denny

# Skorsteiner og mineralavsetninger



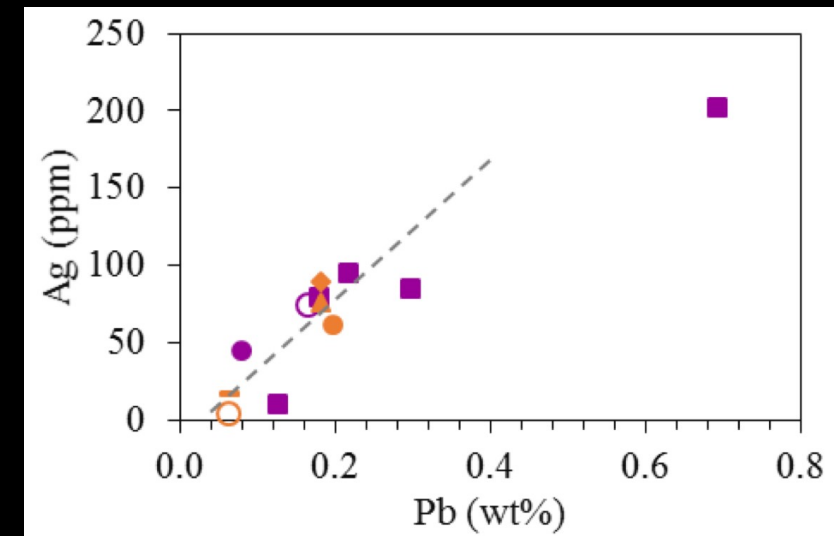
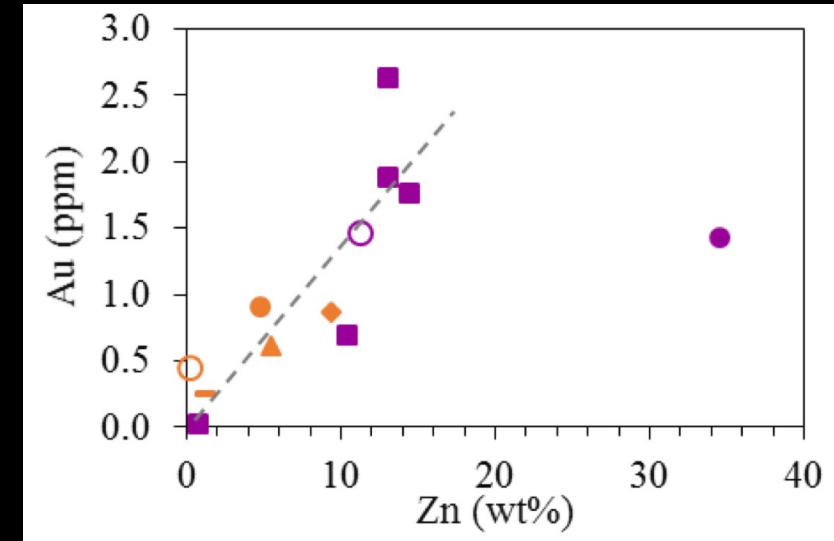
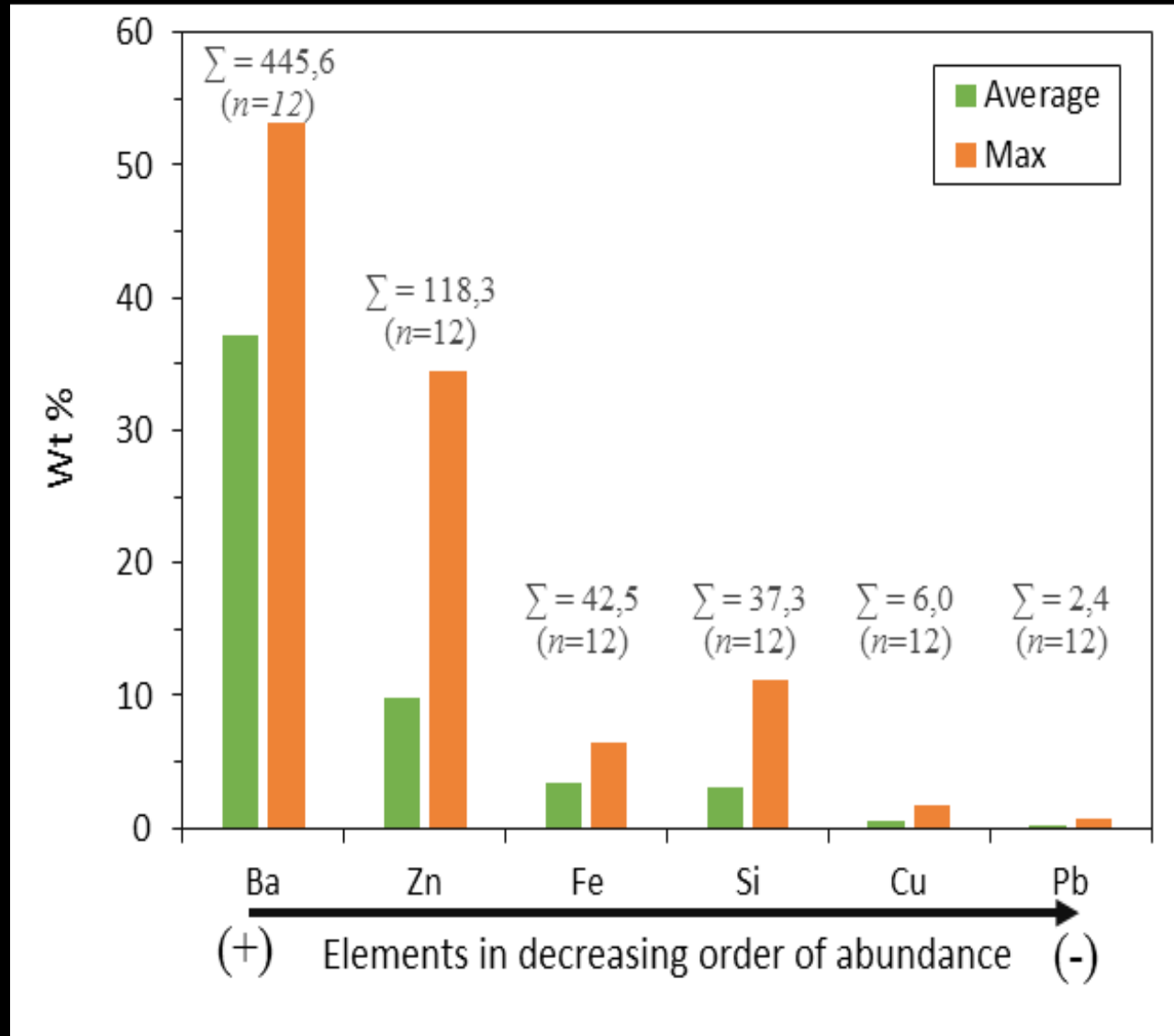


# Metallfattige hydrotermiske fluider og små mineralavsetninger



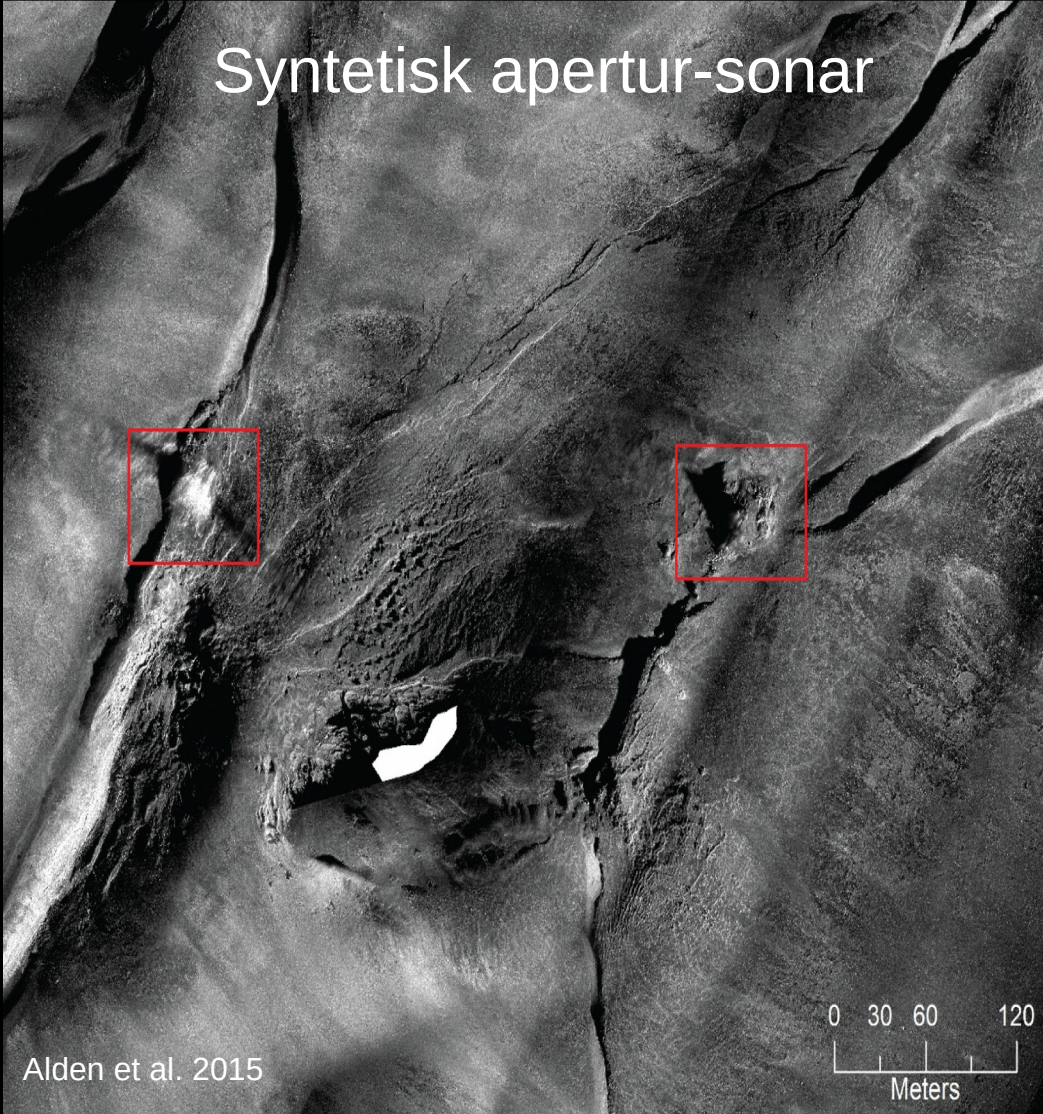
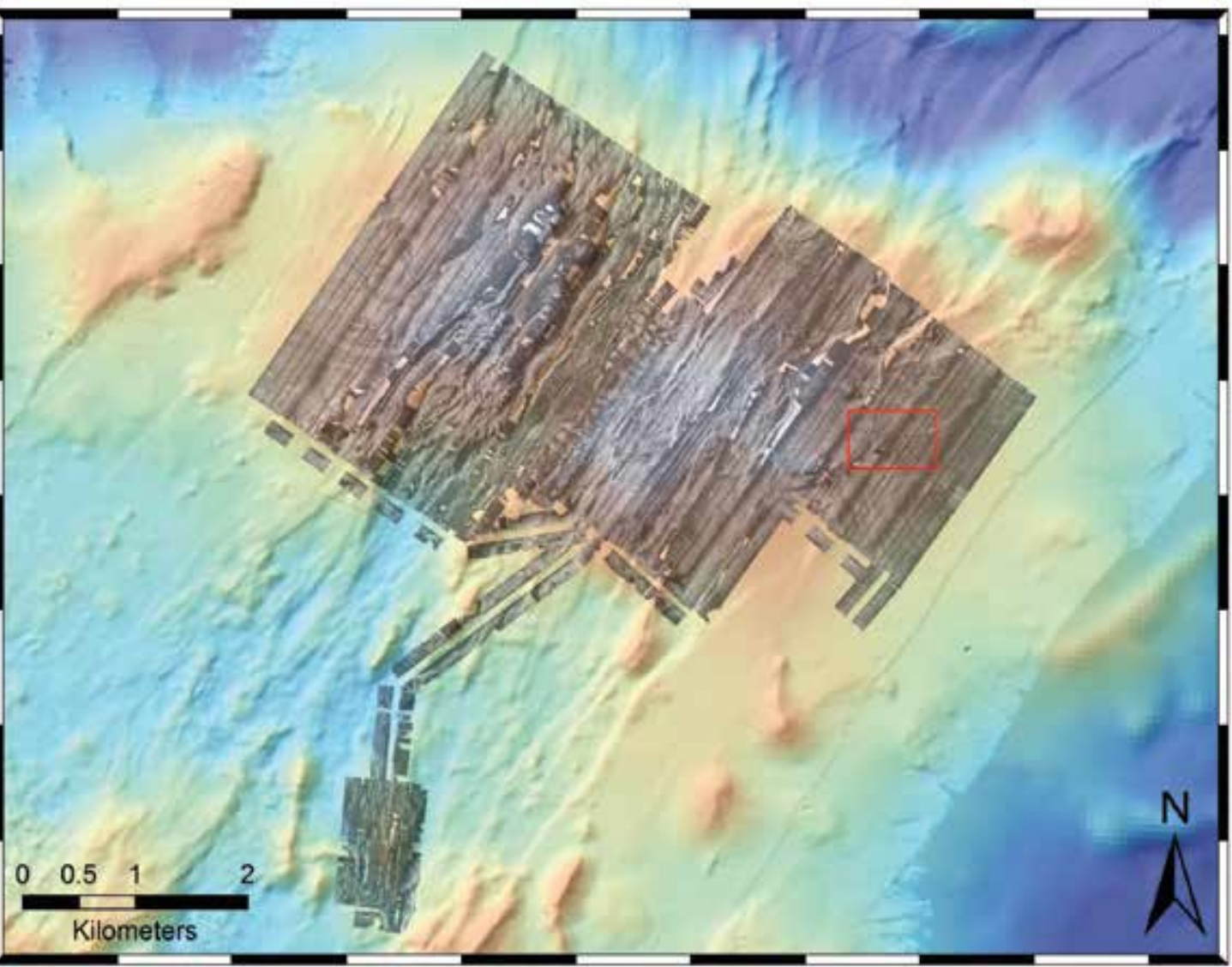
ROV-basert mikrobatymetri

# Mineralavsetningene er anriket i sink



# Utpøringsområde for AUV basert kartlegging

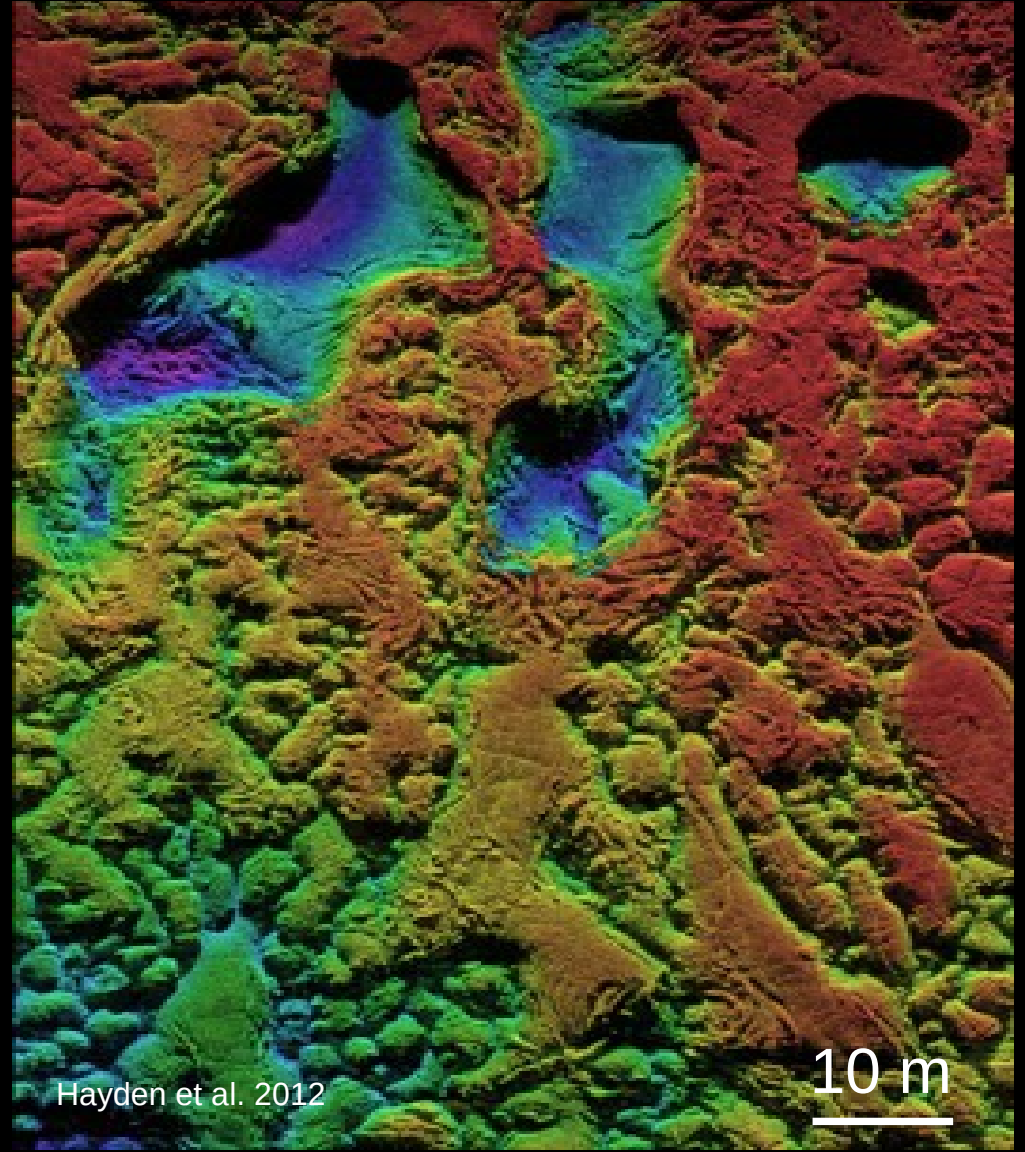
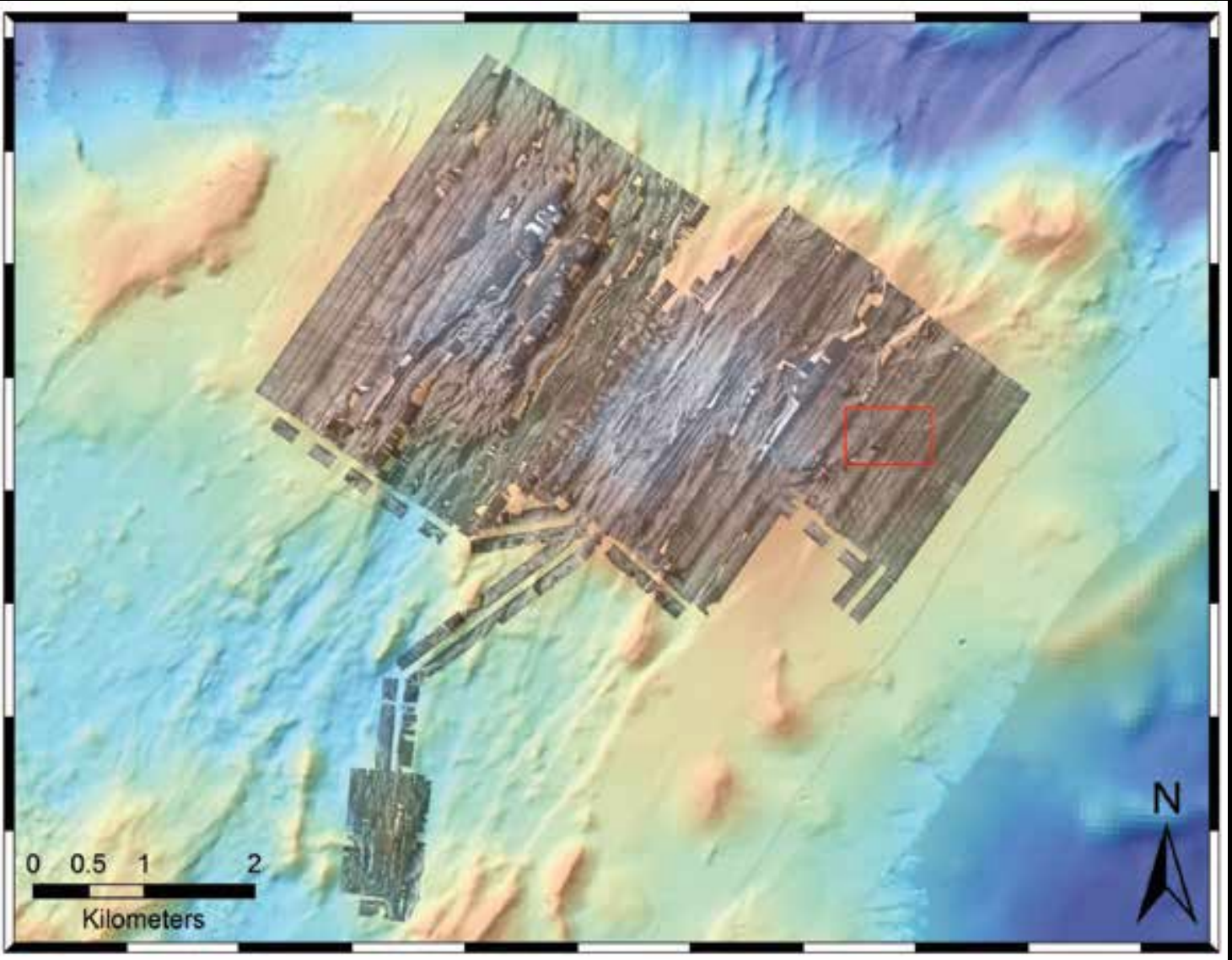
Samarbeid UiB & FFI



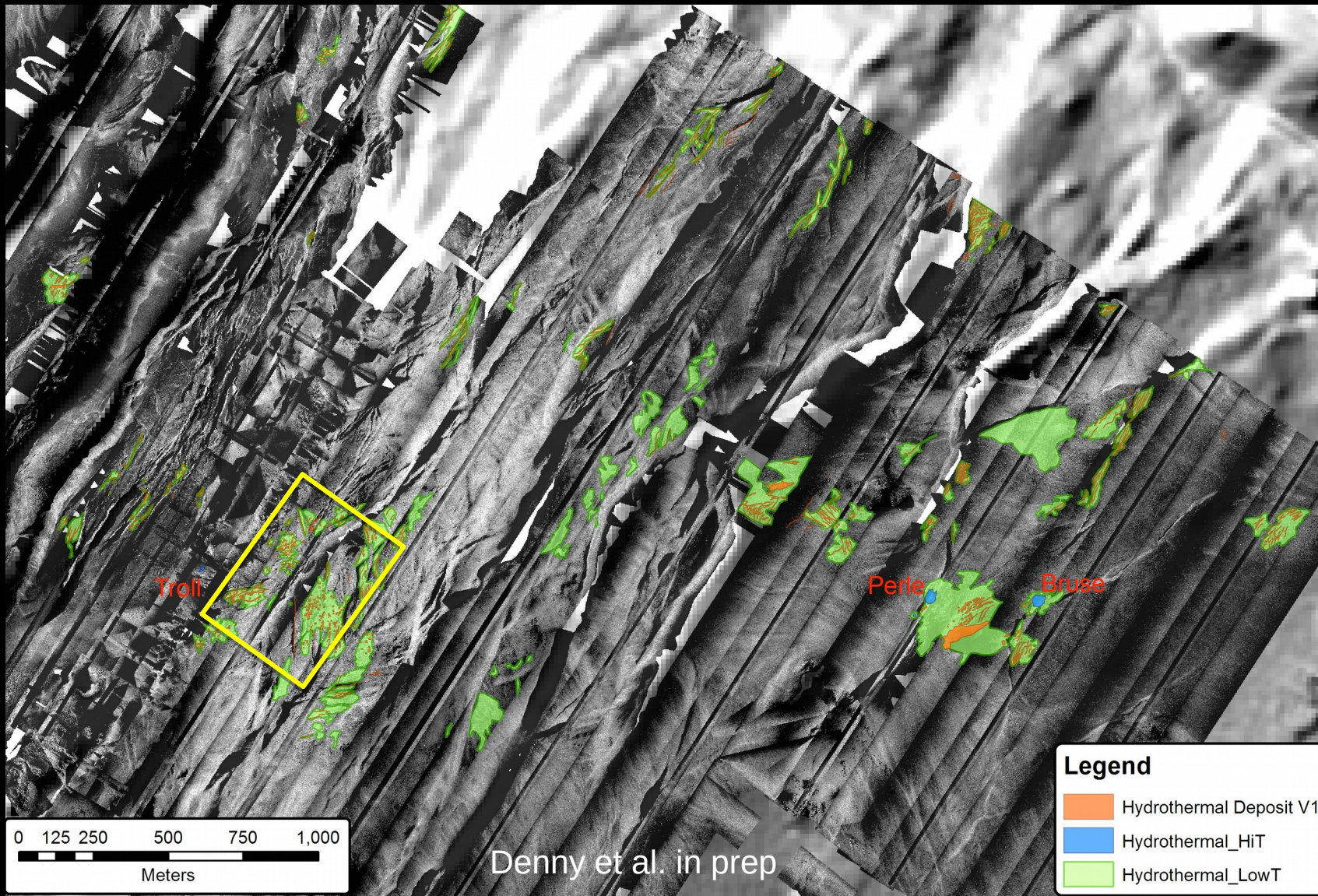
# Utprøvningsområde for AUV-basert kartlegging

Samarbeid UiB & FFI

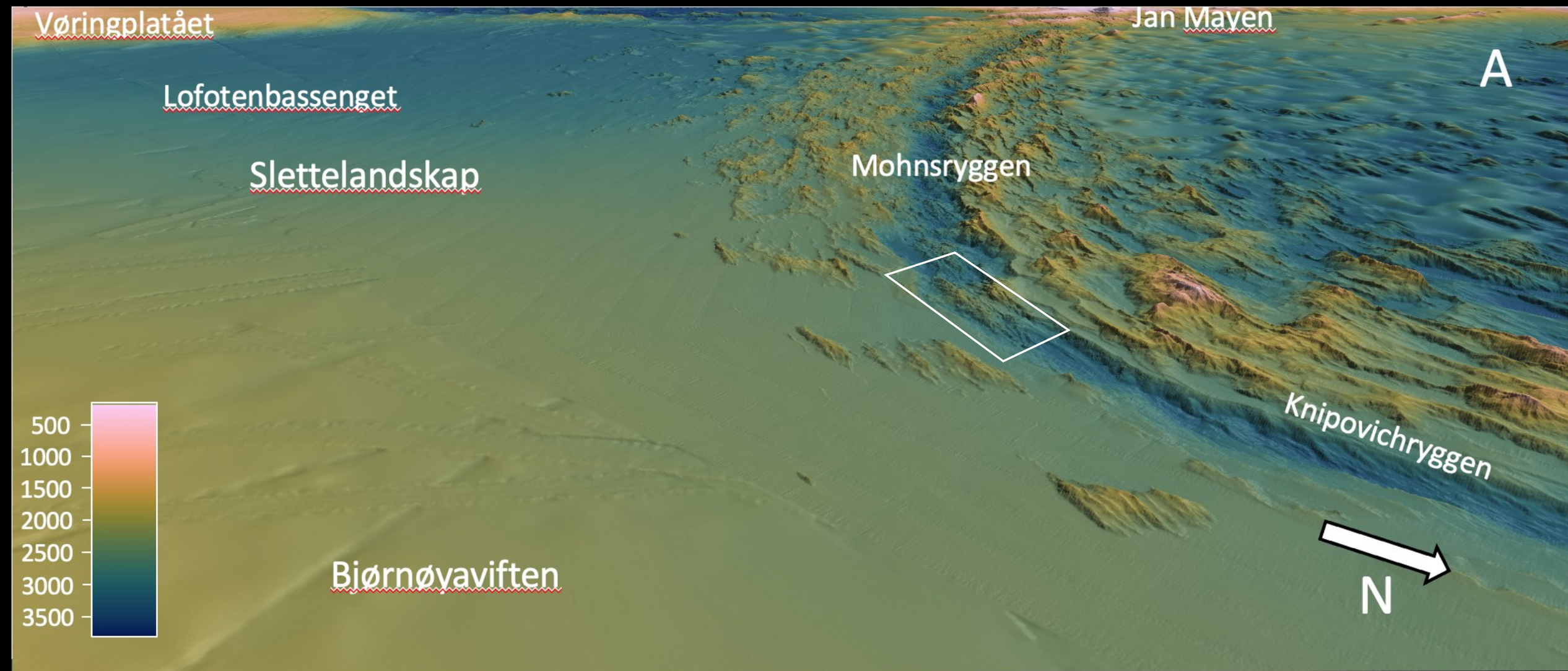
Batymetri ved interferometrisk SAS



# Kvantifisering av mineraliserte områder ved fjernmåling



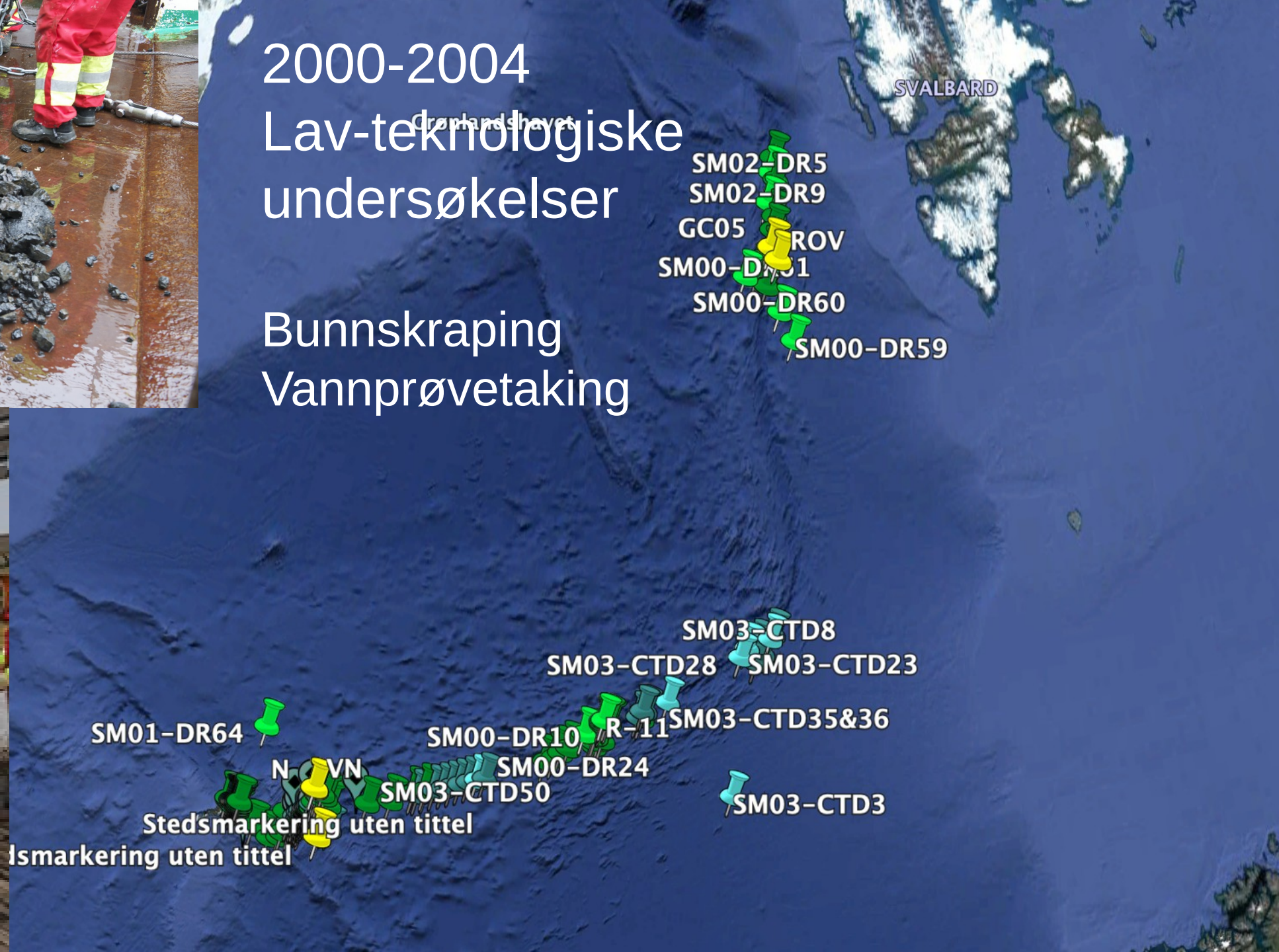
# Undersøkelser av de dype delene av ryggsystemet



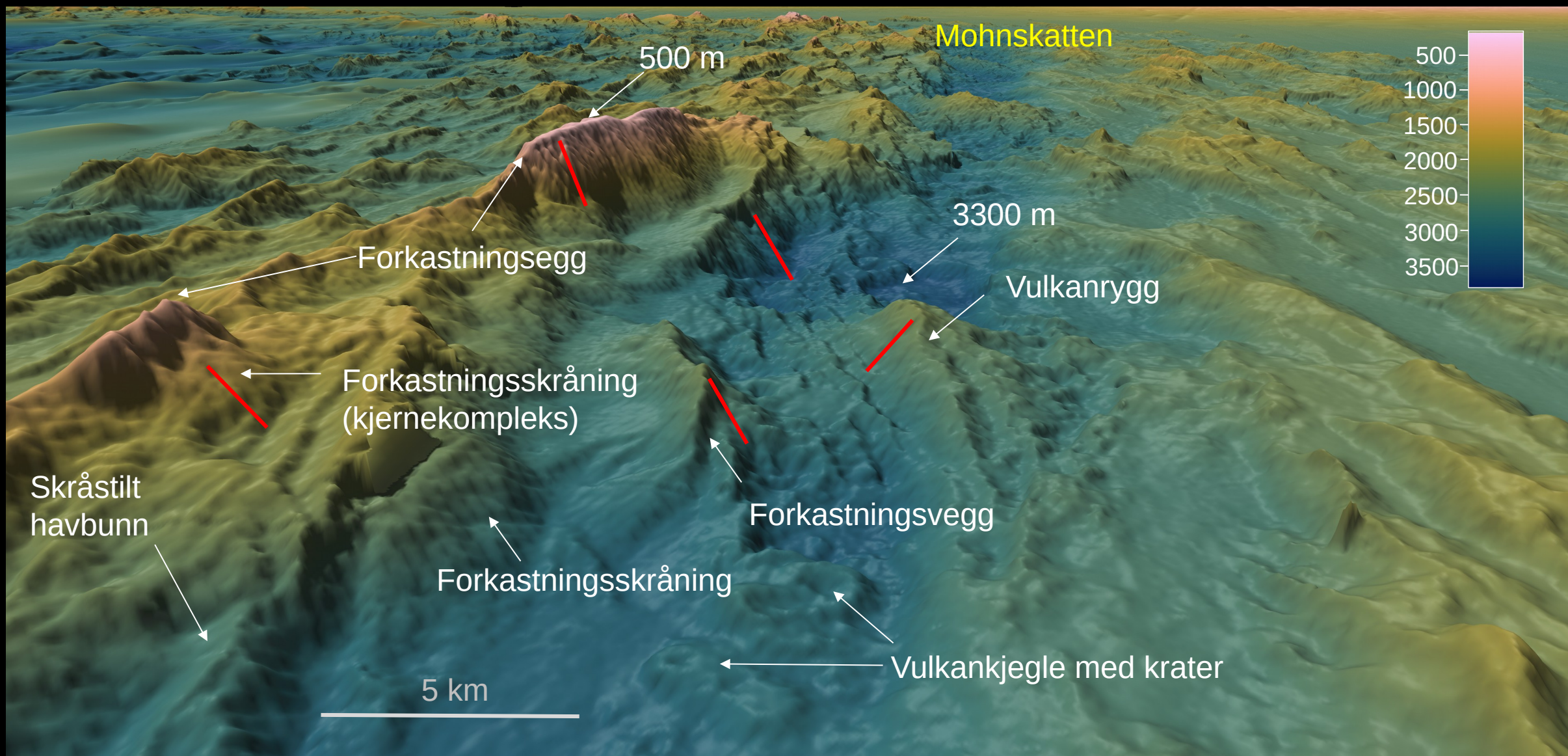


# 2000-2004 Lav-teknologiske undersøkelser

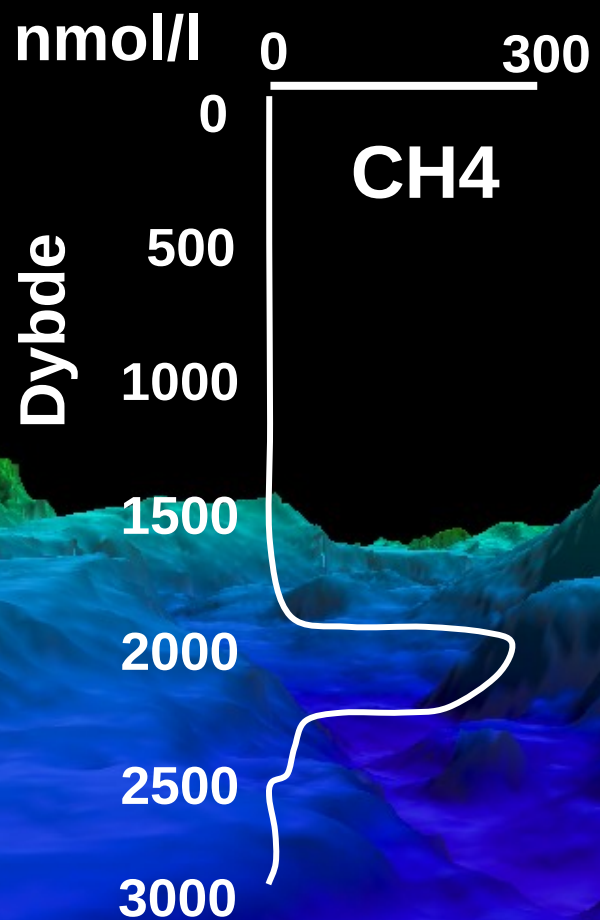
Bunnskraping  
Vannprøvetaking



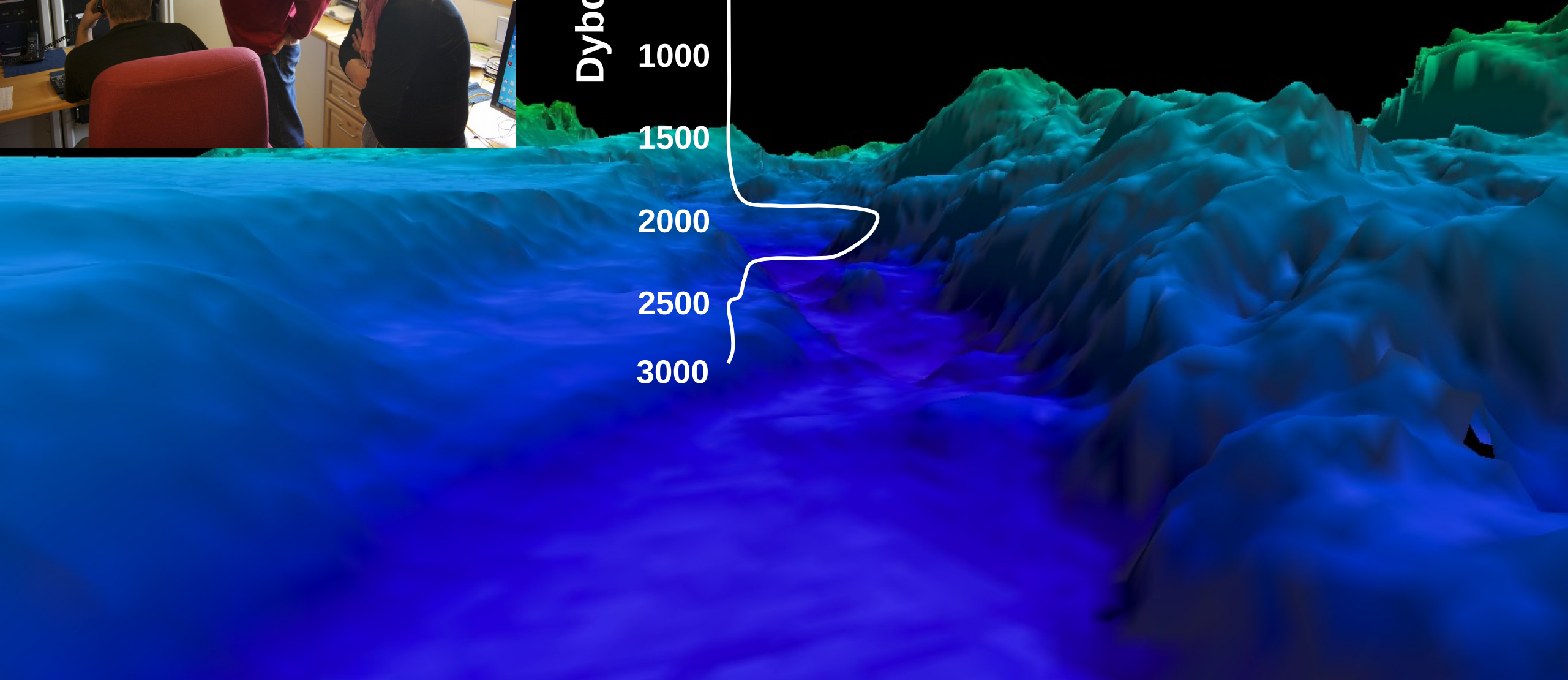
# Påvisning av mineraliserte forkastningsvegger og skråninger



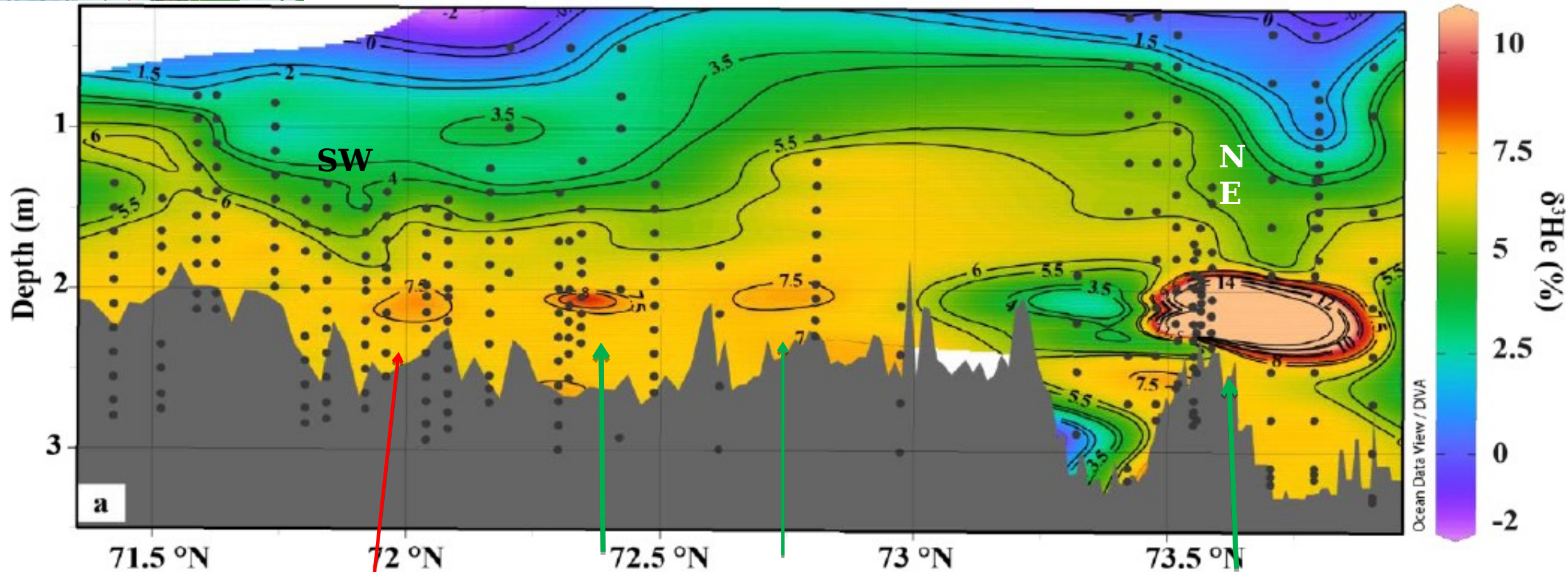
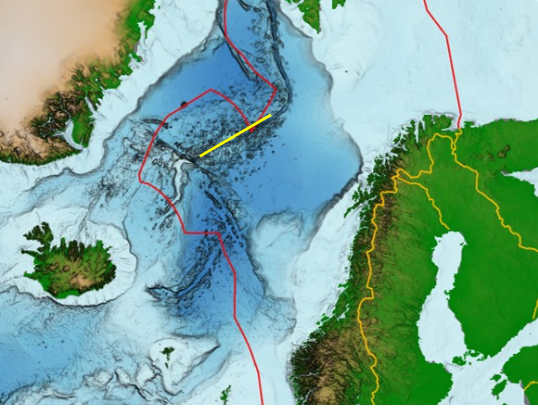




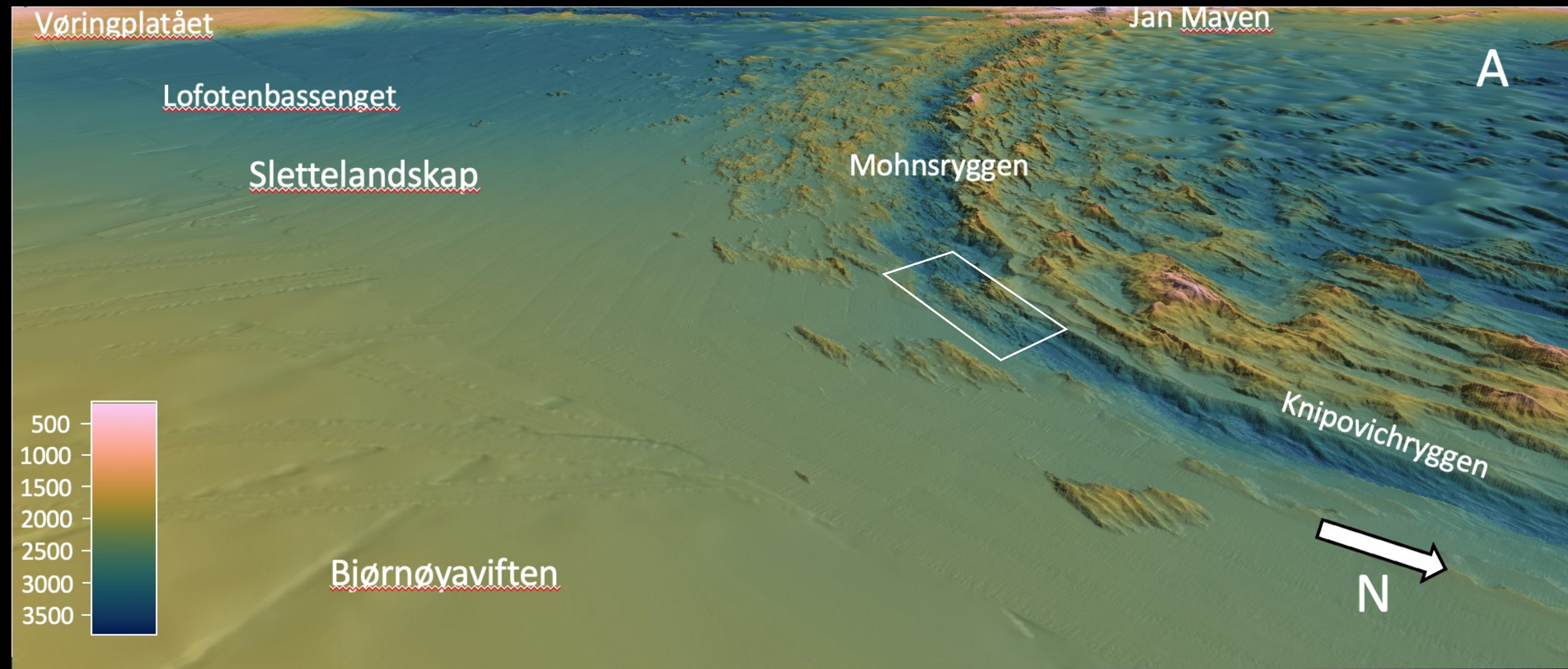
Søk etter hydrotermal aktivitet i vannsøylen



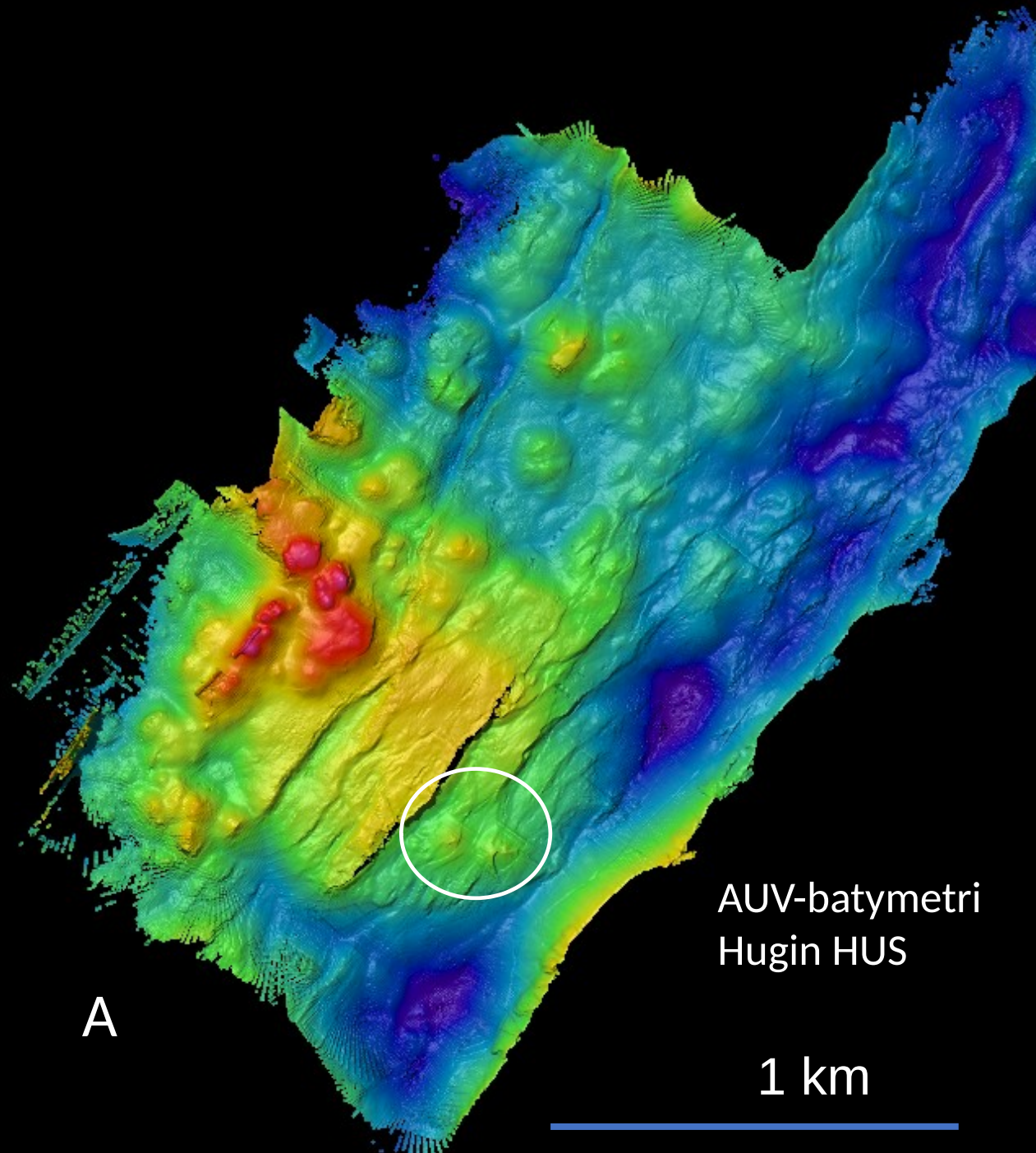
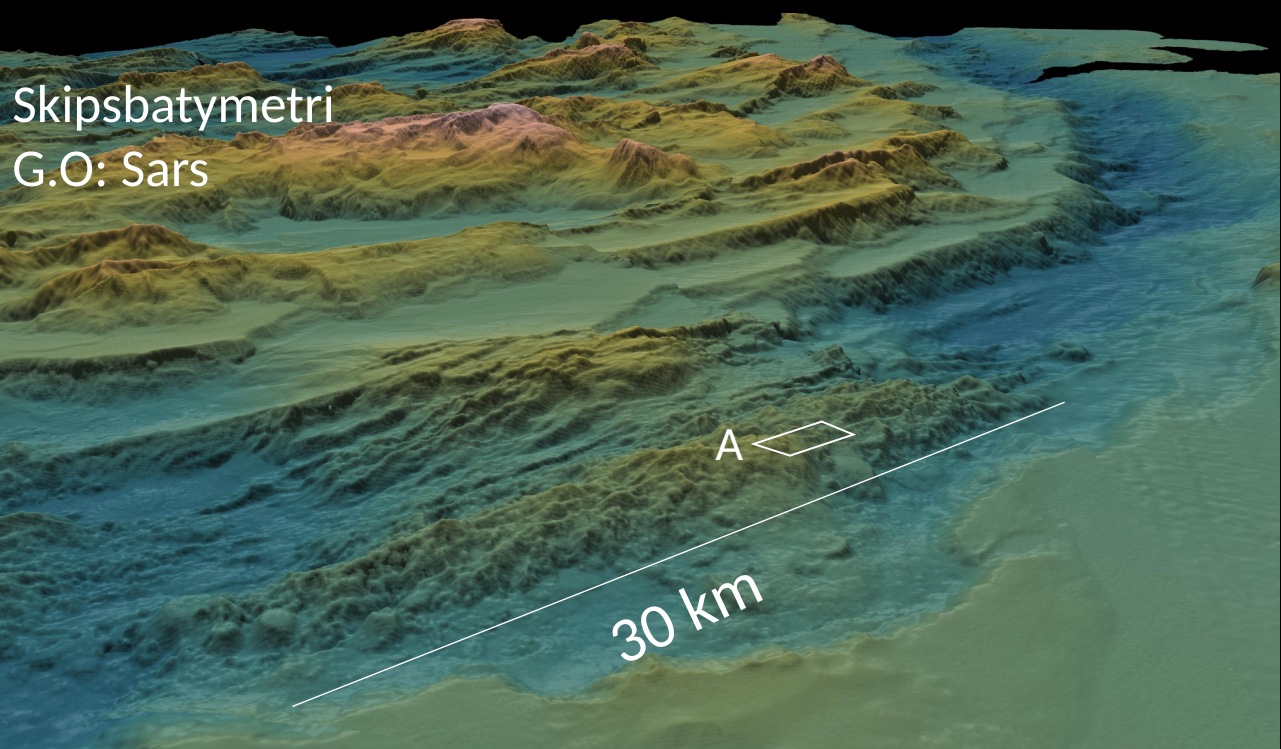
# Hydrothermal aktivitet langs Mohnsryggen - vannsøyledata



# Oppdagelsen av Lokeslottet i 2008



# Detaljkartlegging av Lokeslottet



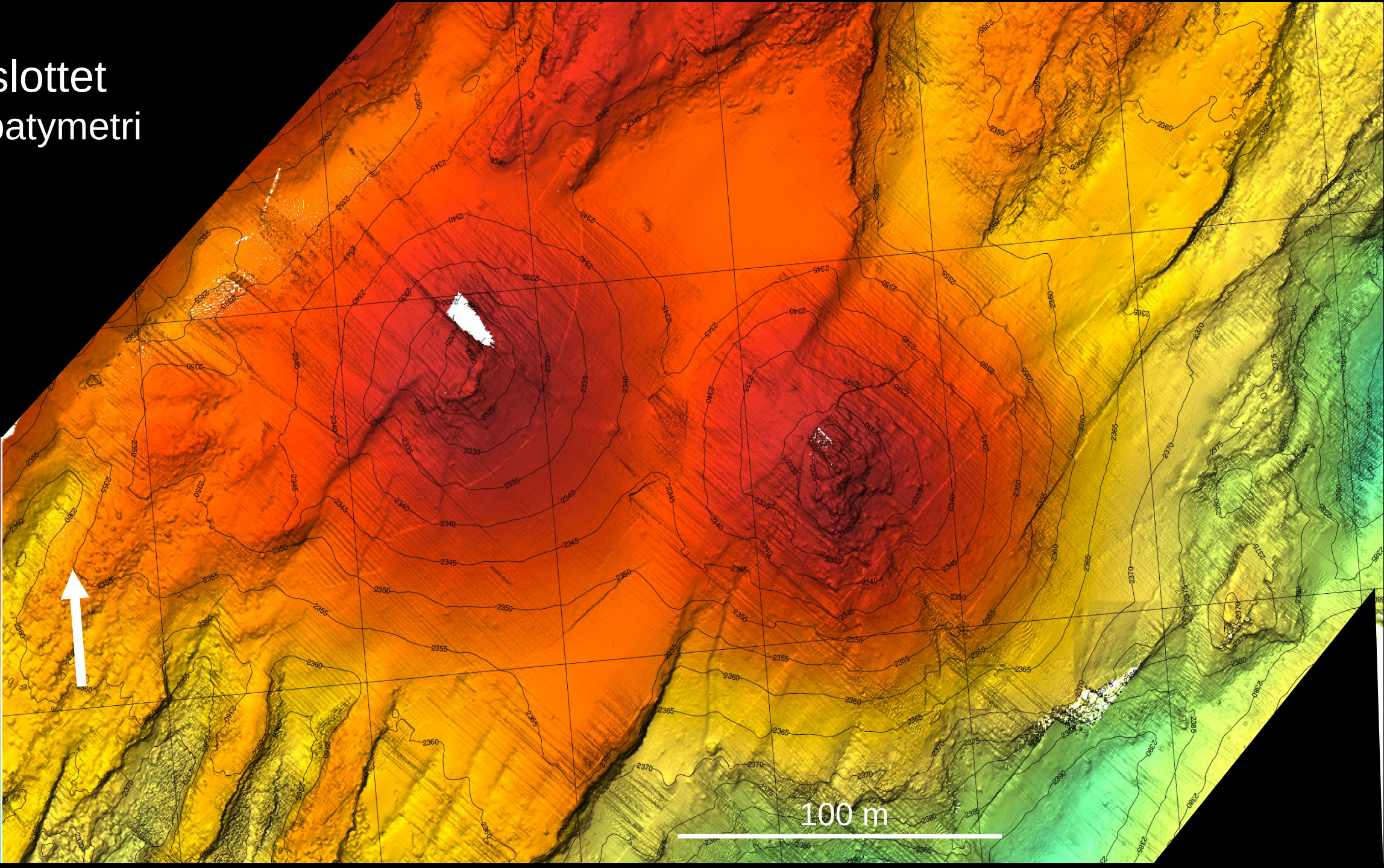
# Lokeslottet ROV-batymetri

2330

2350

2370

2390

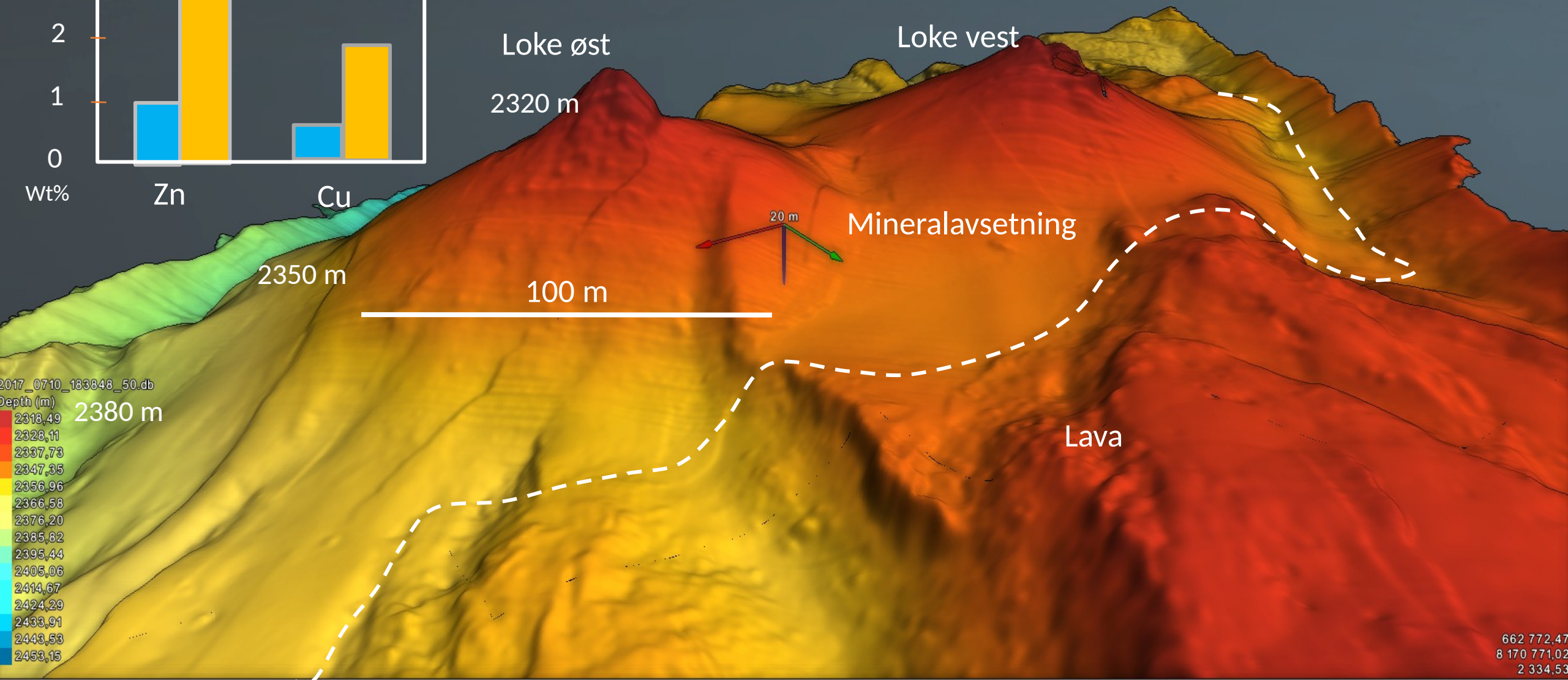
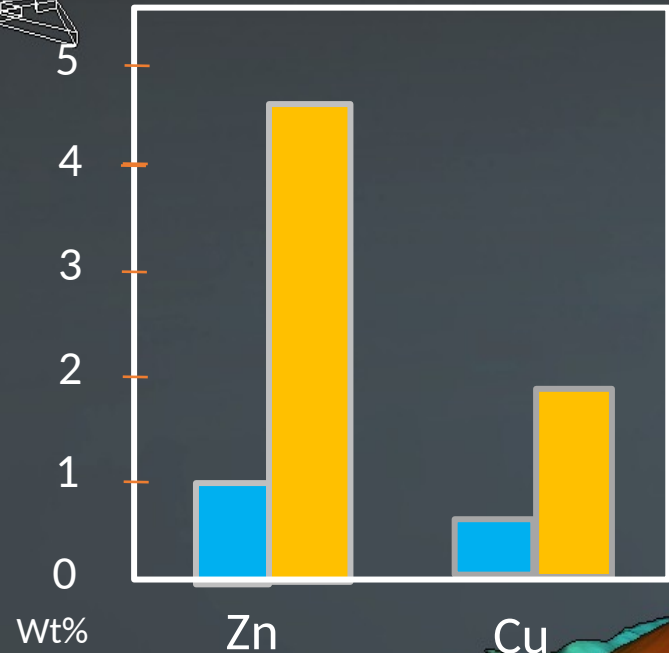


100 m



# Lokeslottet

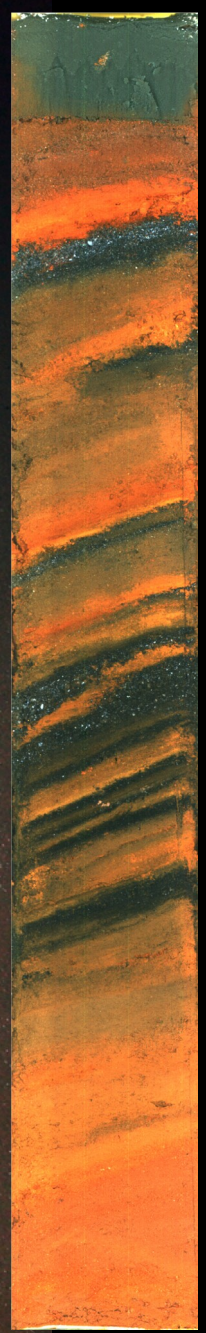
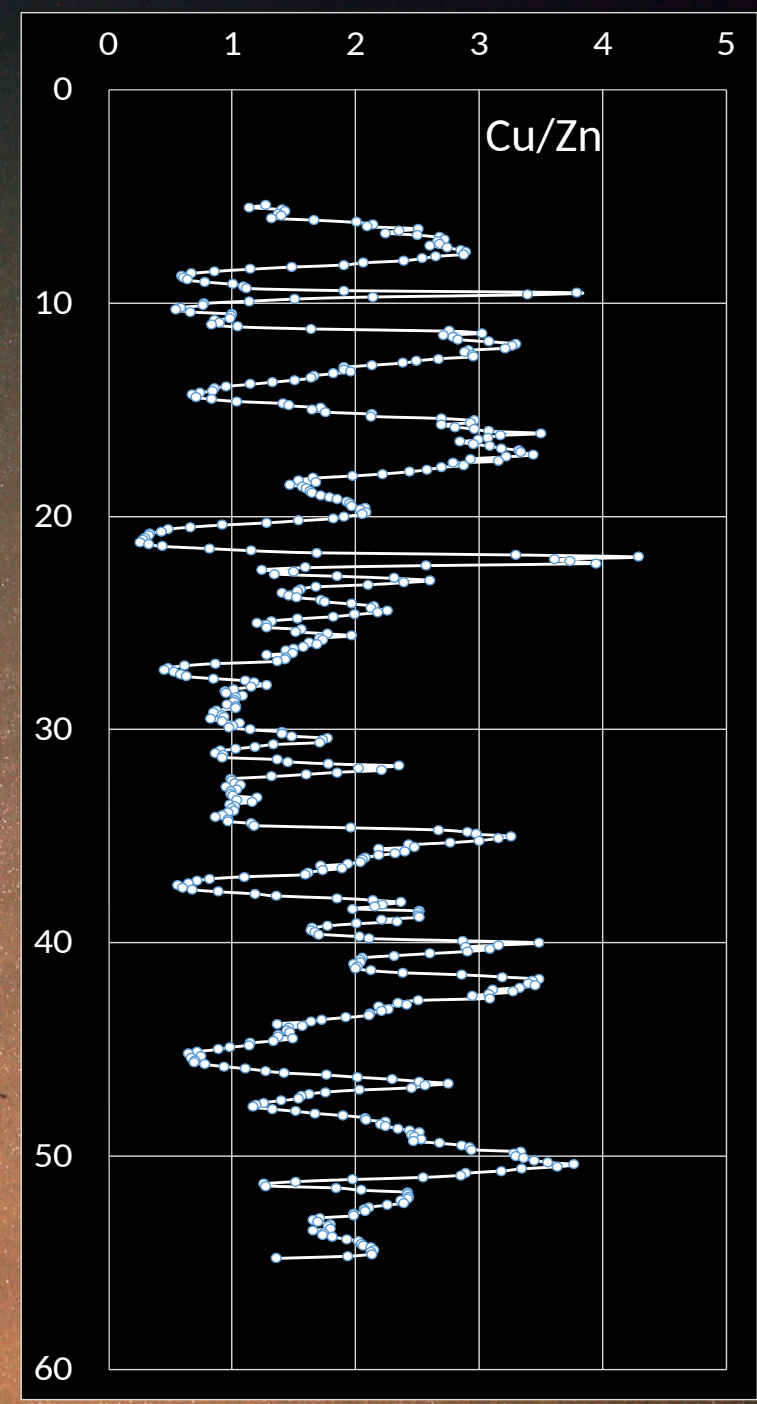
Hydrotermisk vann:  
Temperatur: 320 °C  
pH-5.7



Omkring 10.000 år med hydrotermisk aktivitet -  
Variasjon i sammensetning med tid

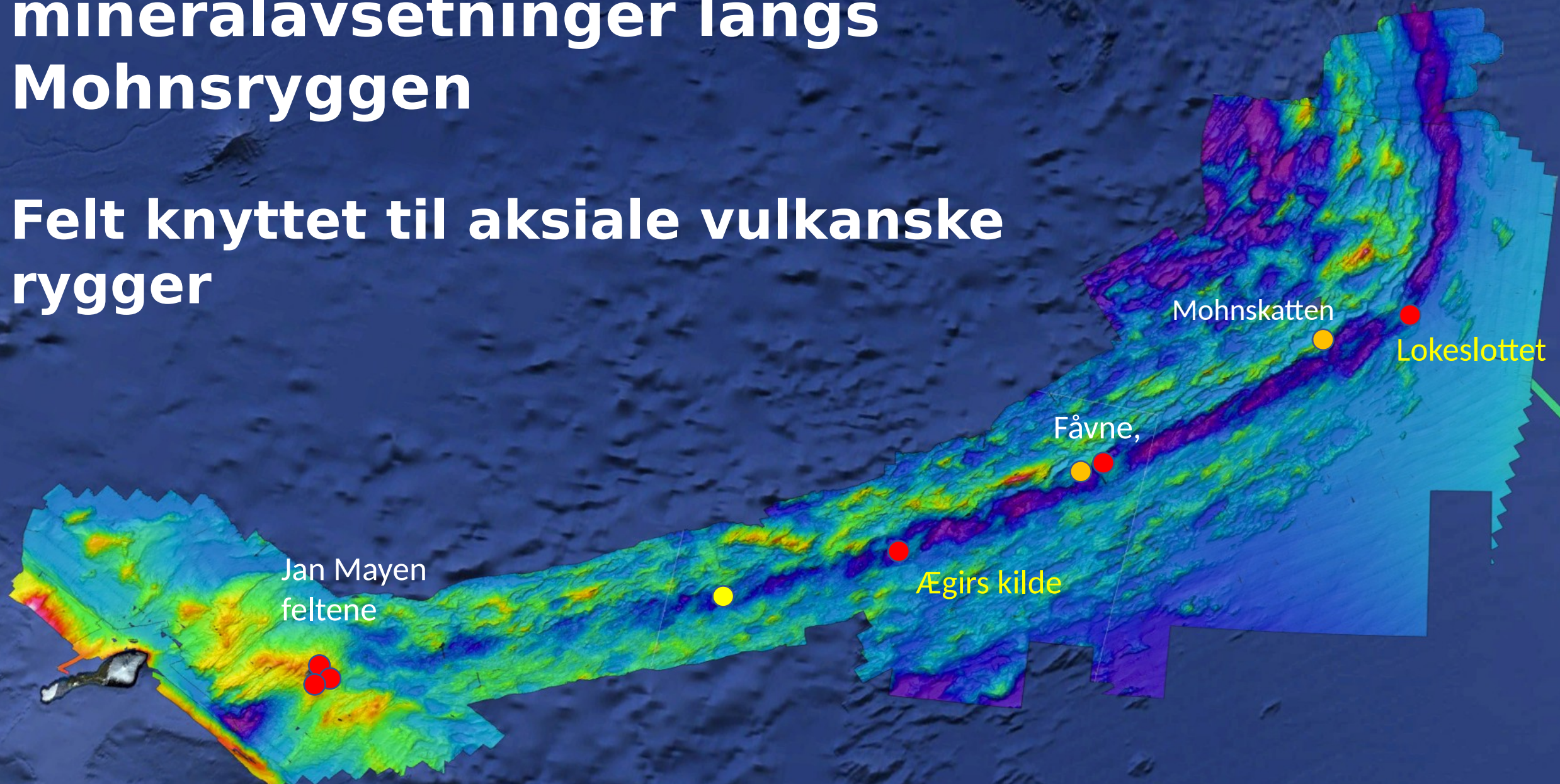


Dybde under havbunnen i cm



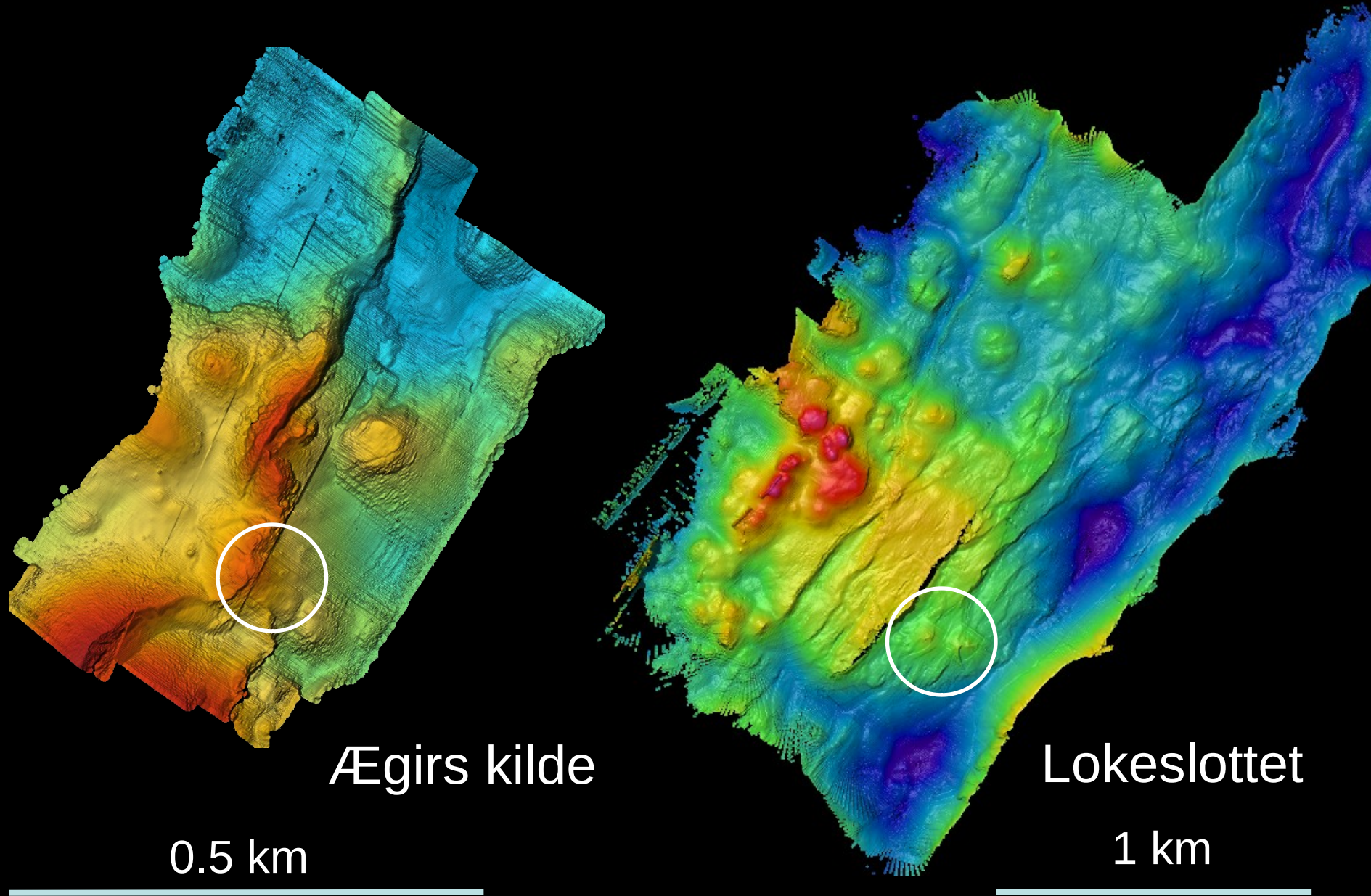
# Hydrotermisk aktivitet og mineralavsetninger langs Mohnsryggen

Felt knyttet til aksiale vulkanske rygger



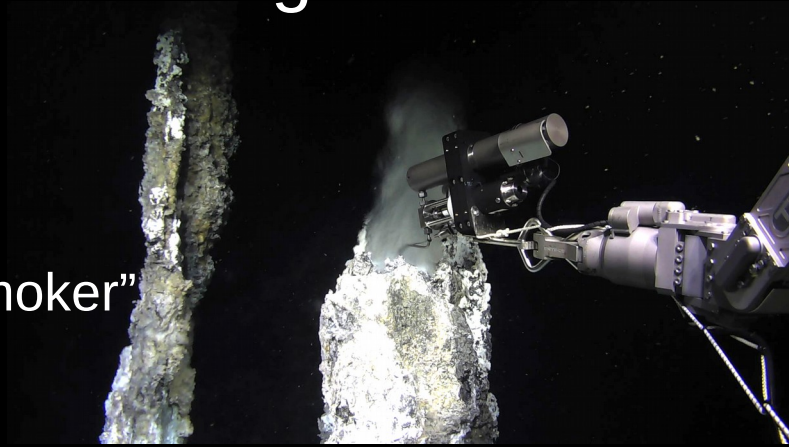


# Hydrotermiske felt knyttet til aksiale vulkanske rygger



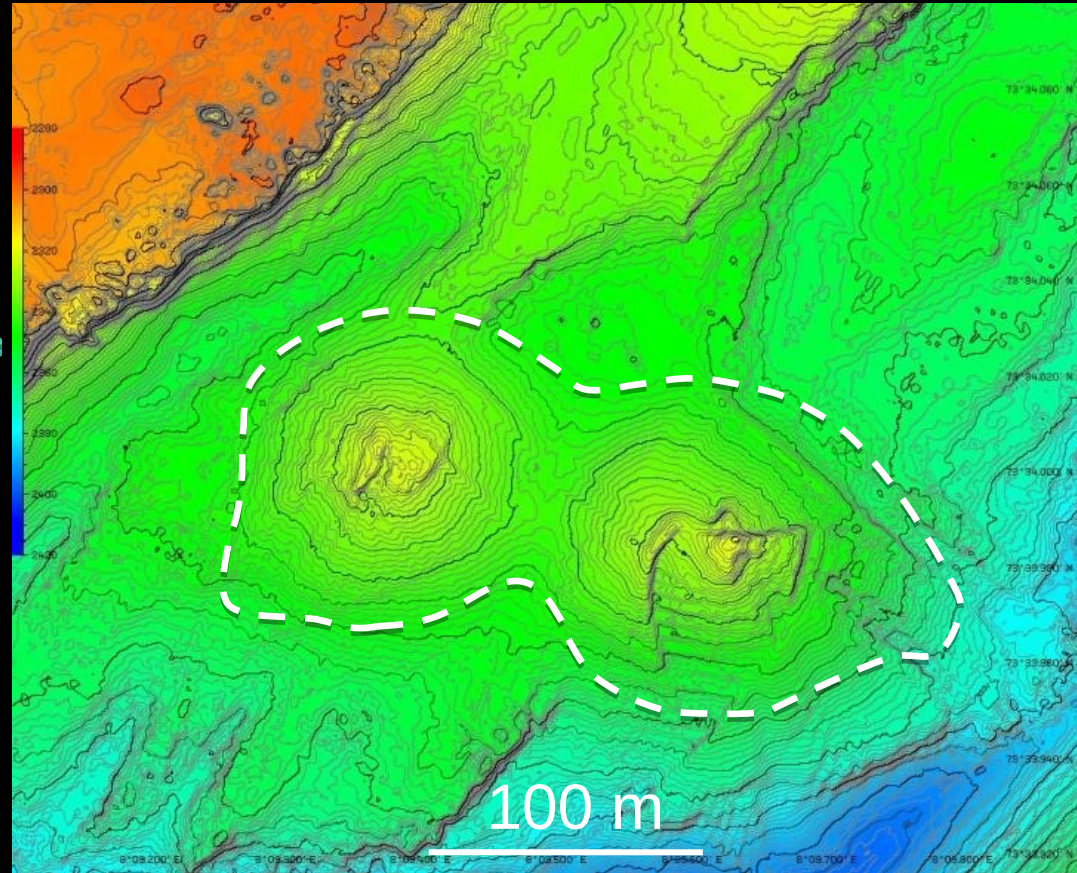
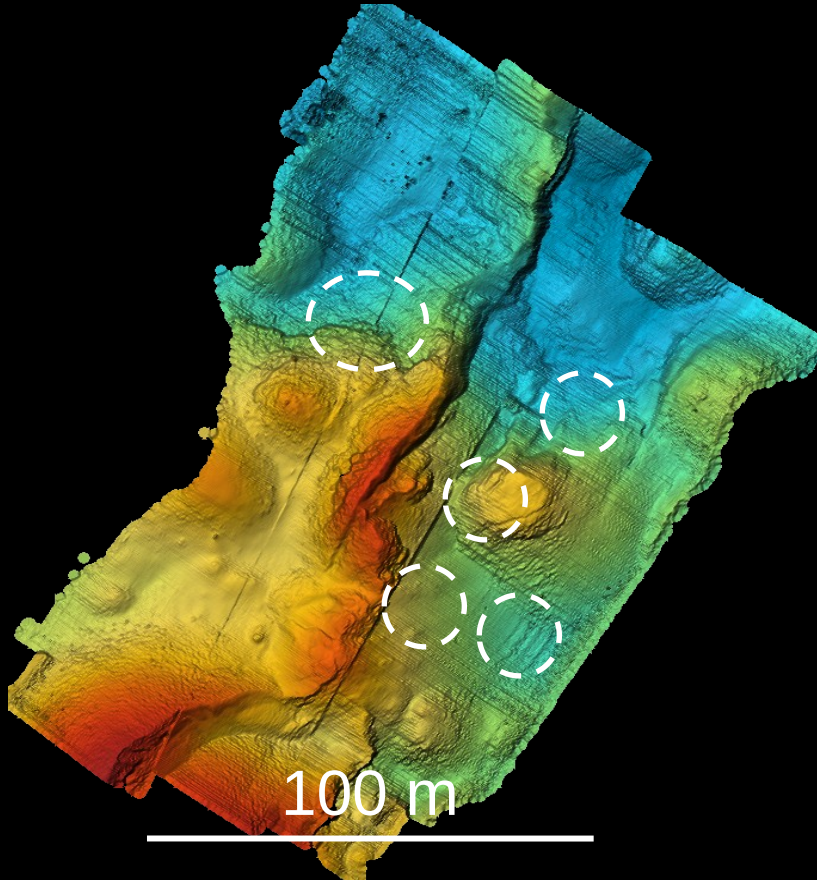
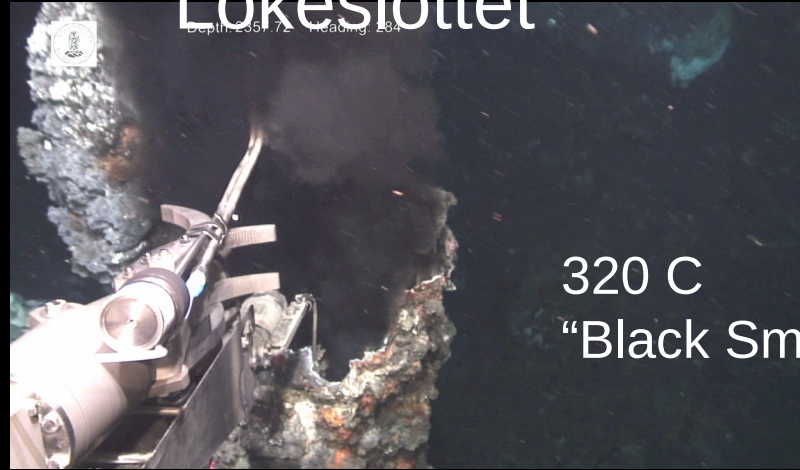
# Ægirs kilde

280 C  
"White Smoker"



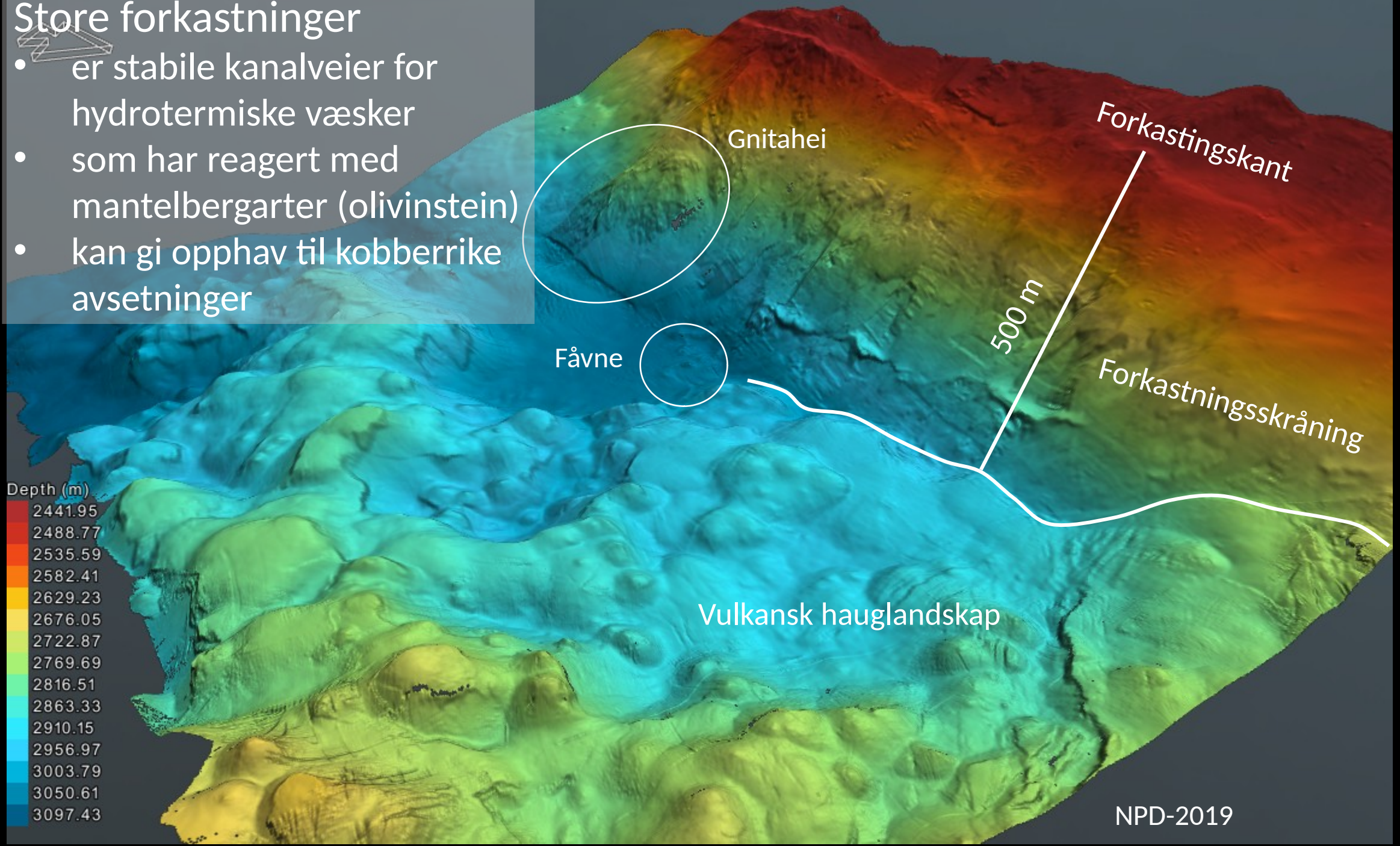
# Lokeslottet

320 C  
"Black Smoker"



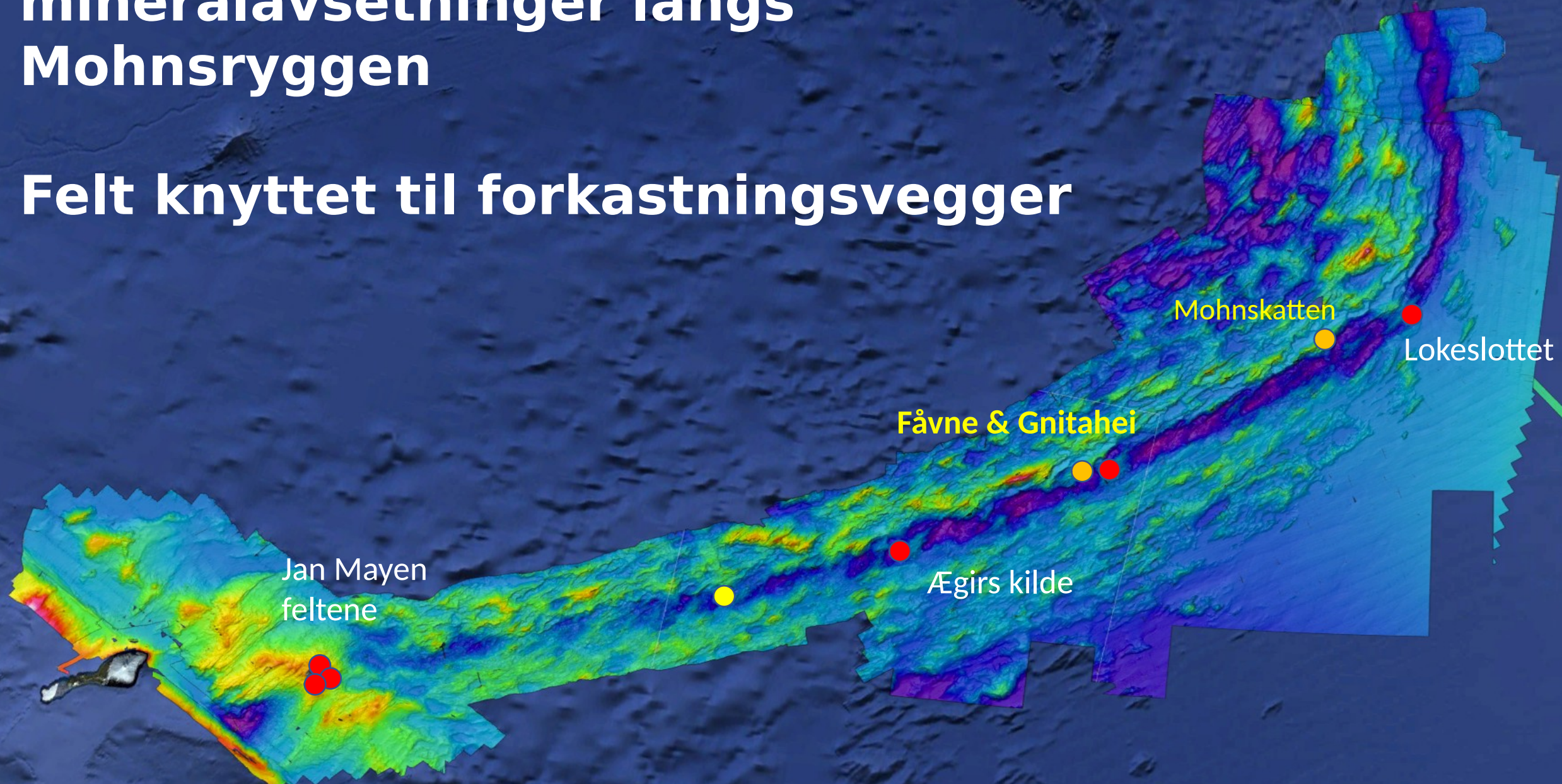
# Store forkastninger

- er stabile kanalveier for hydrotermiske væsker
- som har reagert med mantelbergarter (olivinstein)
- kan gi opphav til kobberrike avsetninger

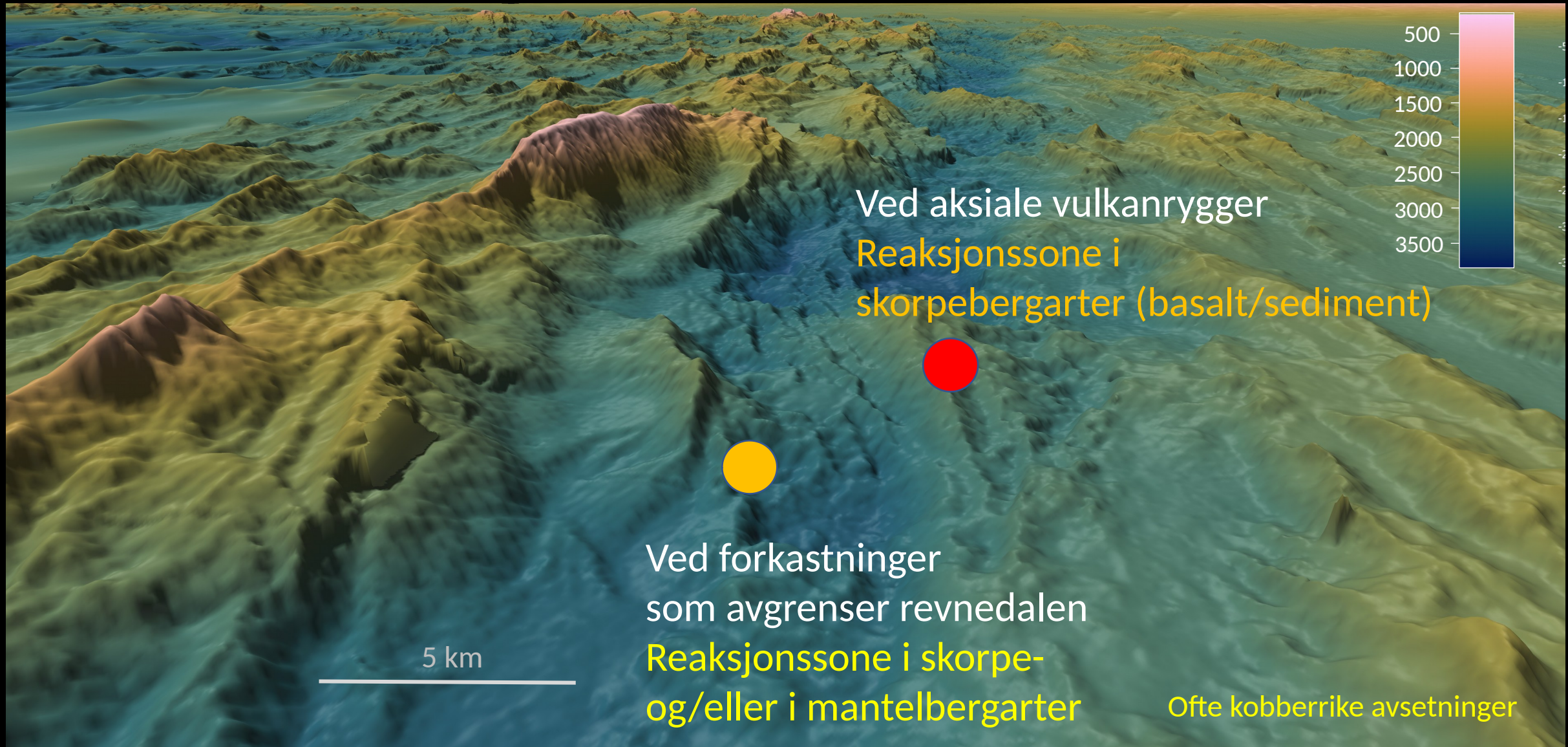


# Hydrotermisk aktivitet og mineralavsetninger langs Mohnsryggen

## Felt knyttet til forkastningsvegger

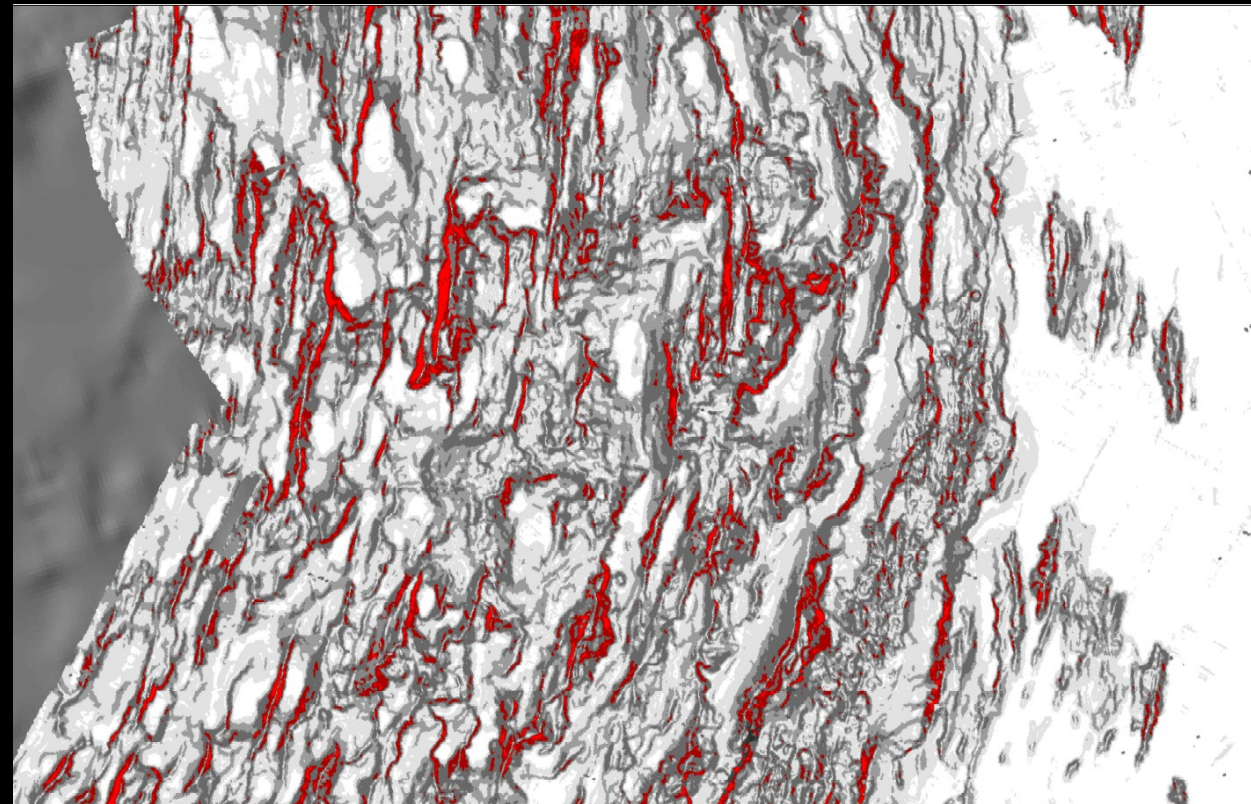
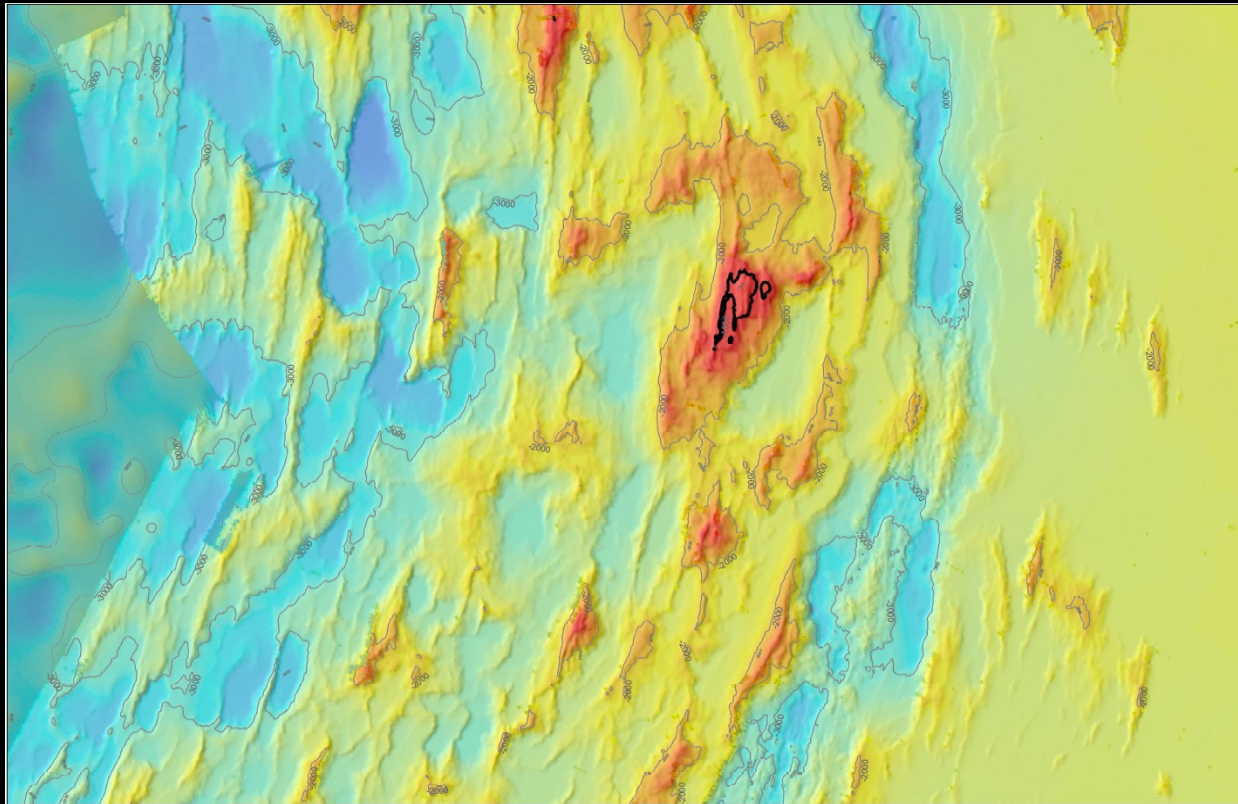


# Hydrotermisk aktivitet knyttet til to ulike geologiske miljø



# Gradientanalyse av Mohnsryggens nordvestflanke

10% av området har gradienter over  $20^\circ$  og representerer fossile forkastningskråninger. Dette arealet har et potensiale for relativt kobberrike mineralavsetninger



# Hydrotermisk aktivitet og metalliske mineralavsetninger i Norskehavet

