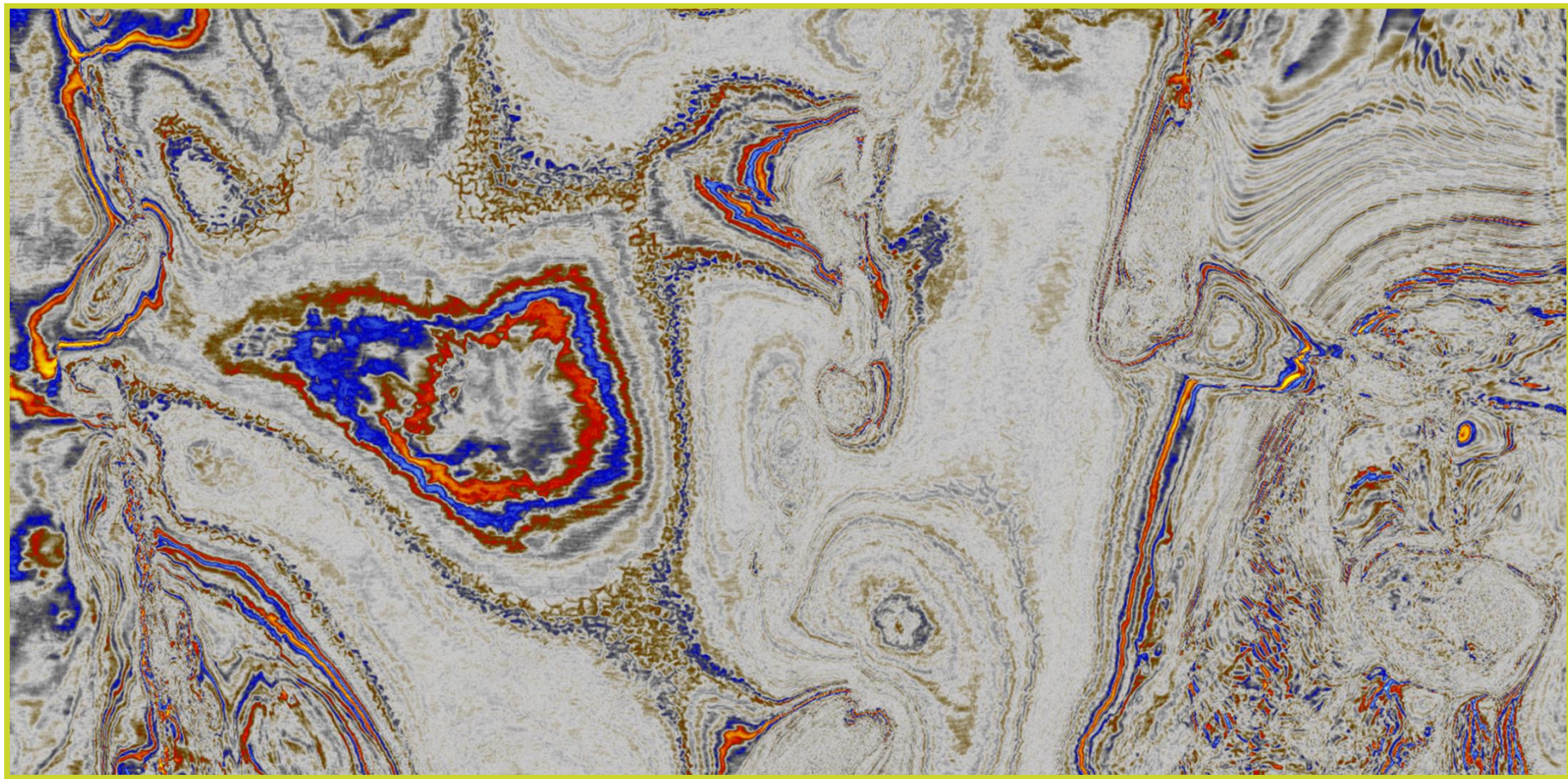


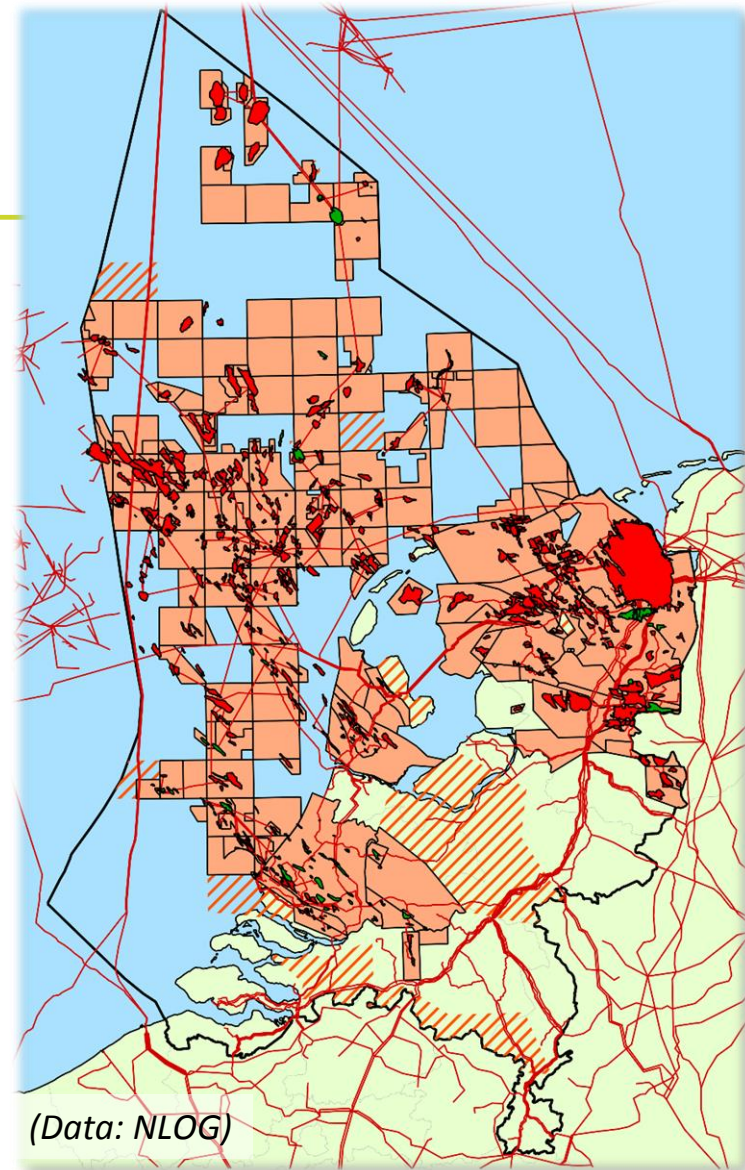
Reflections on seismic acquisition!

Symposium Precursor



About EBN

- EBN invests in exploration and production of natural gas and oil on behalf of the Dutch State.
- All profits of EBN are transferred to the Dutch government.
- Number of employees: ~80
- Based in Utrecht
- Production: ~0.3 mln BOE/d (2015)
- State revenues: ~2.1 mrd € (2015)

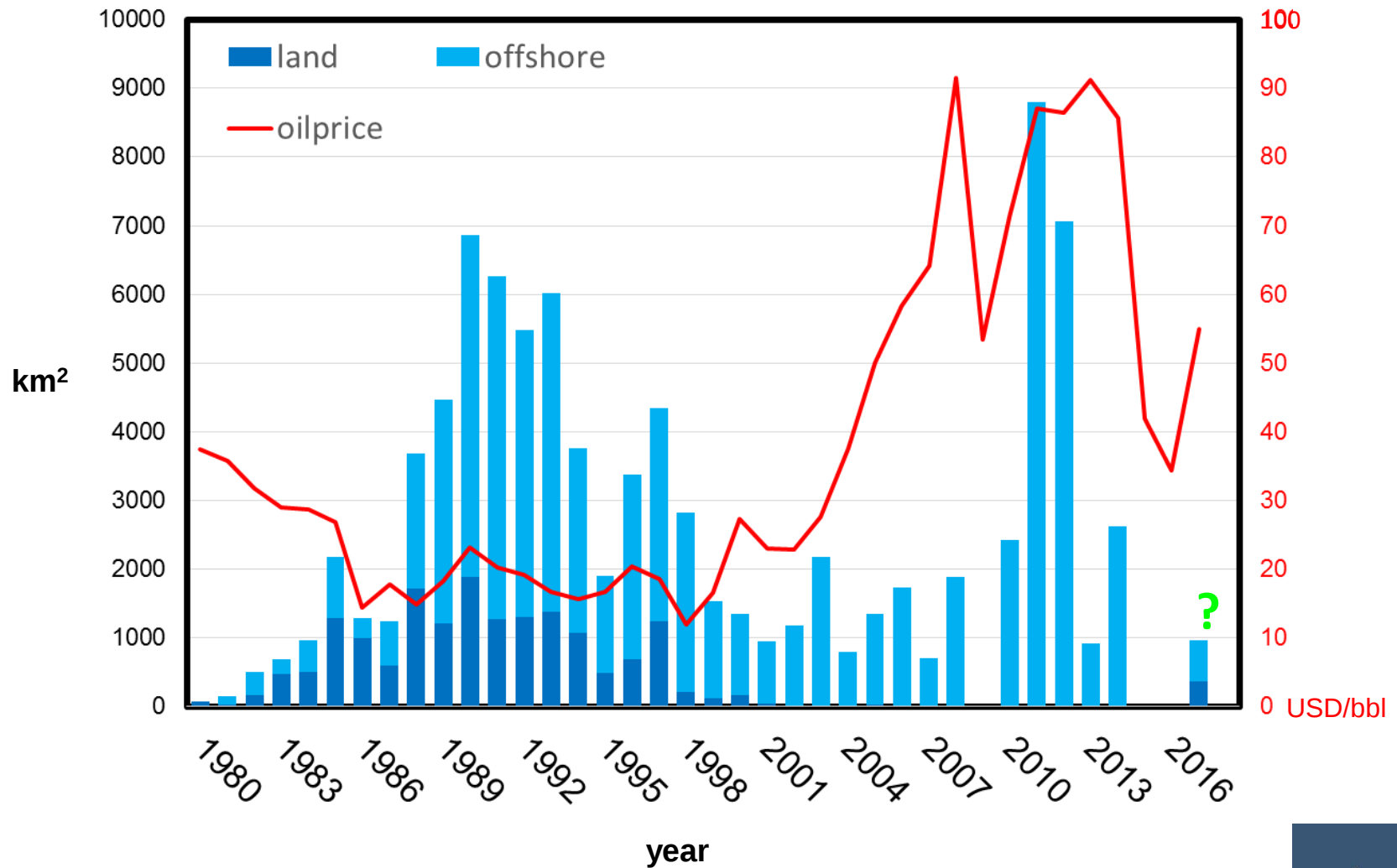


Netherlands: lots of data...

- Total of 3D surveys: ~91,000 km²
- 3D Seismic Coverage: ~55,000km²
- Average age: ~19 yrs
- reshoot factor: ~50%



3D Seismic Acquisition in NL (km² / y)

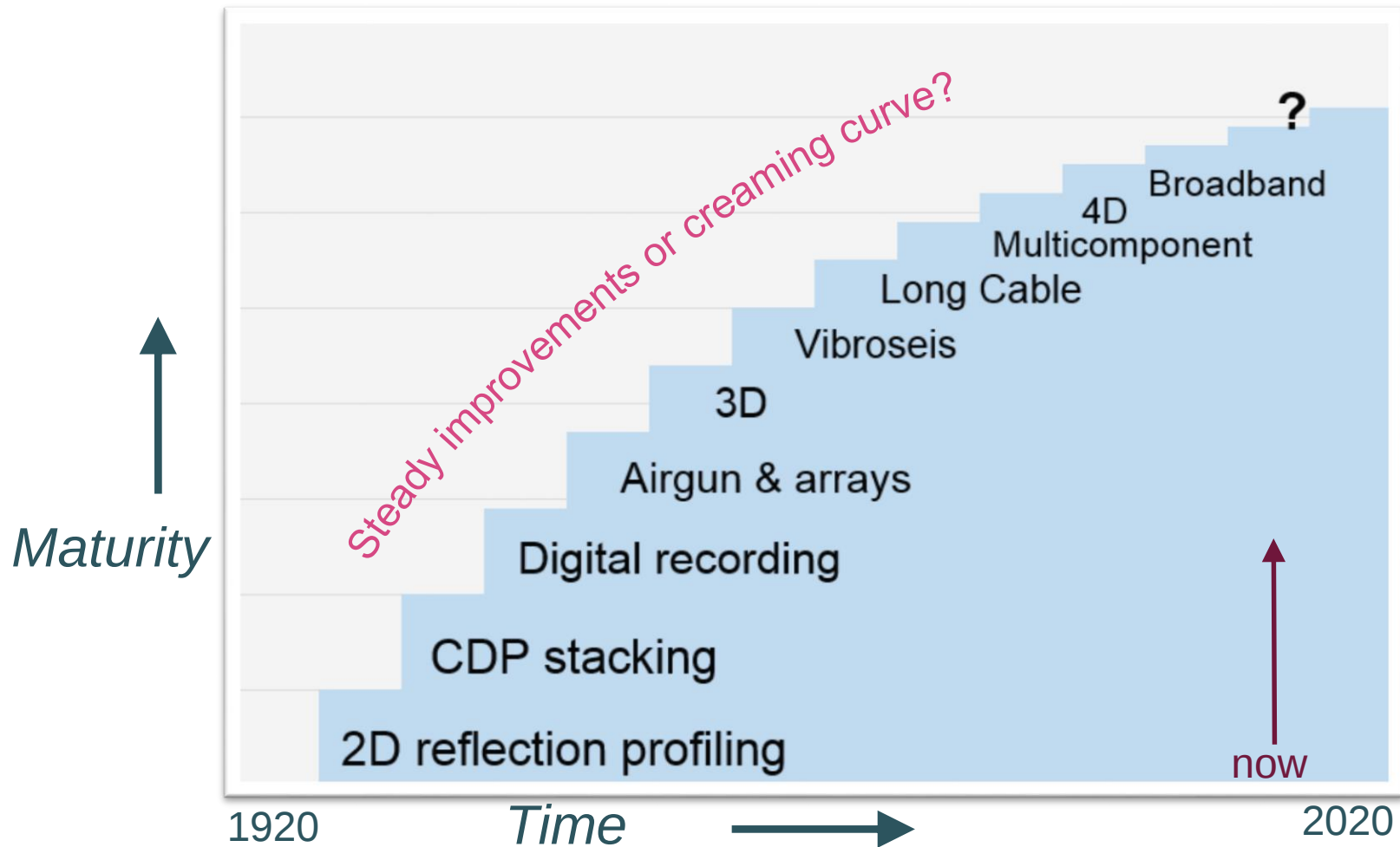


data: NLOG.nl, AAPG

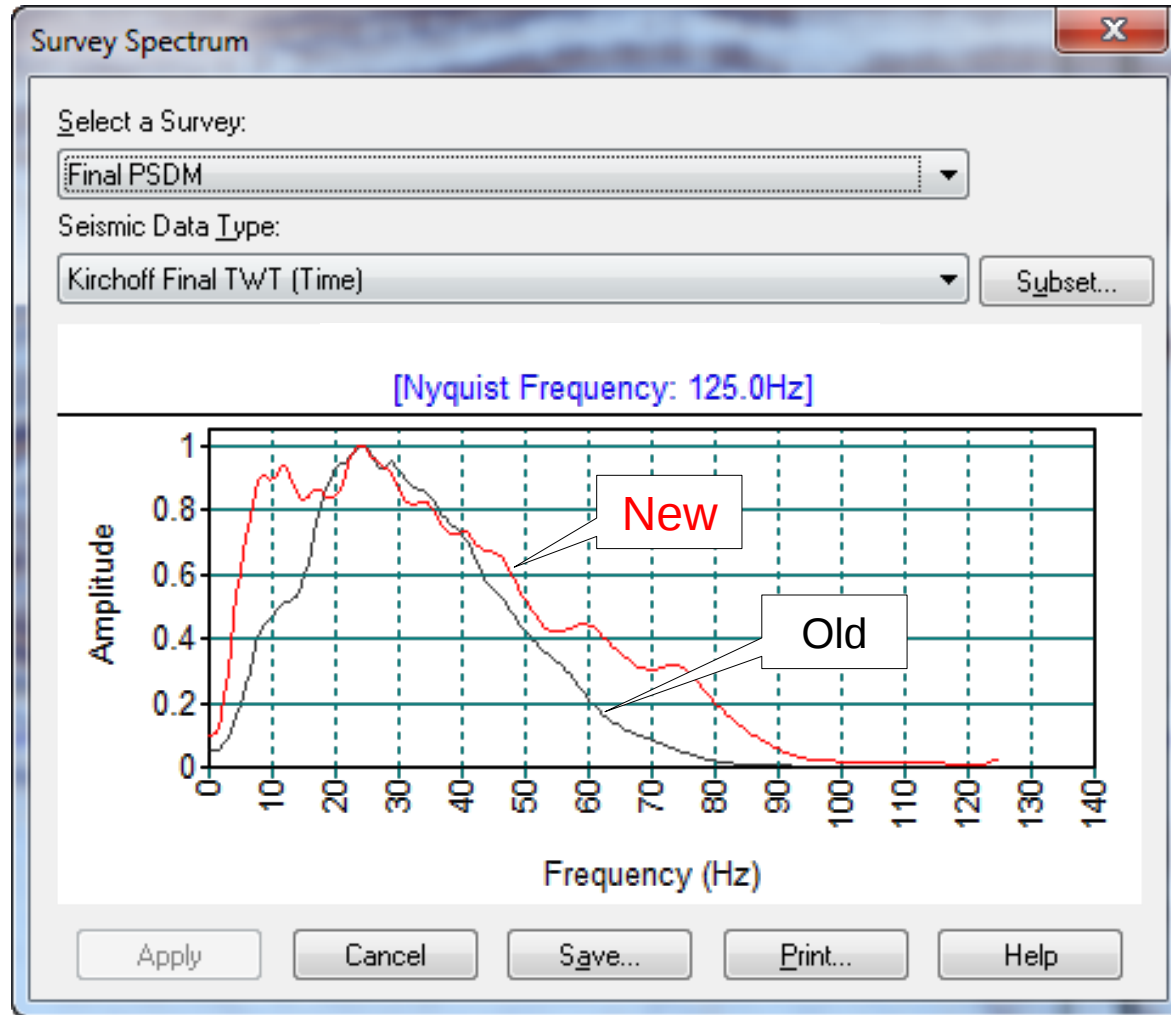
www.ebn.nl

ebn

Seismic Acquisition: Technology Evolution



Trends in seismic acquisition: *broadband*

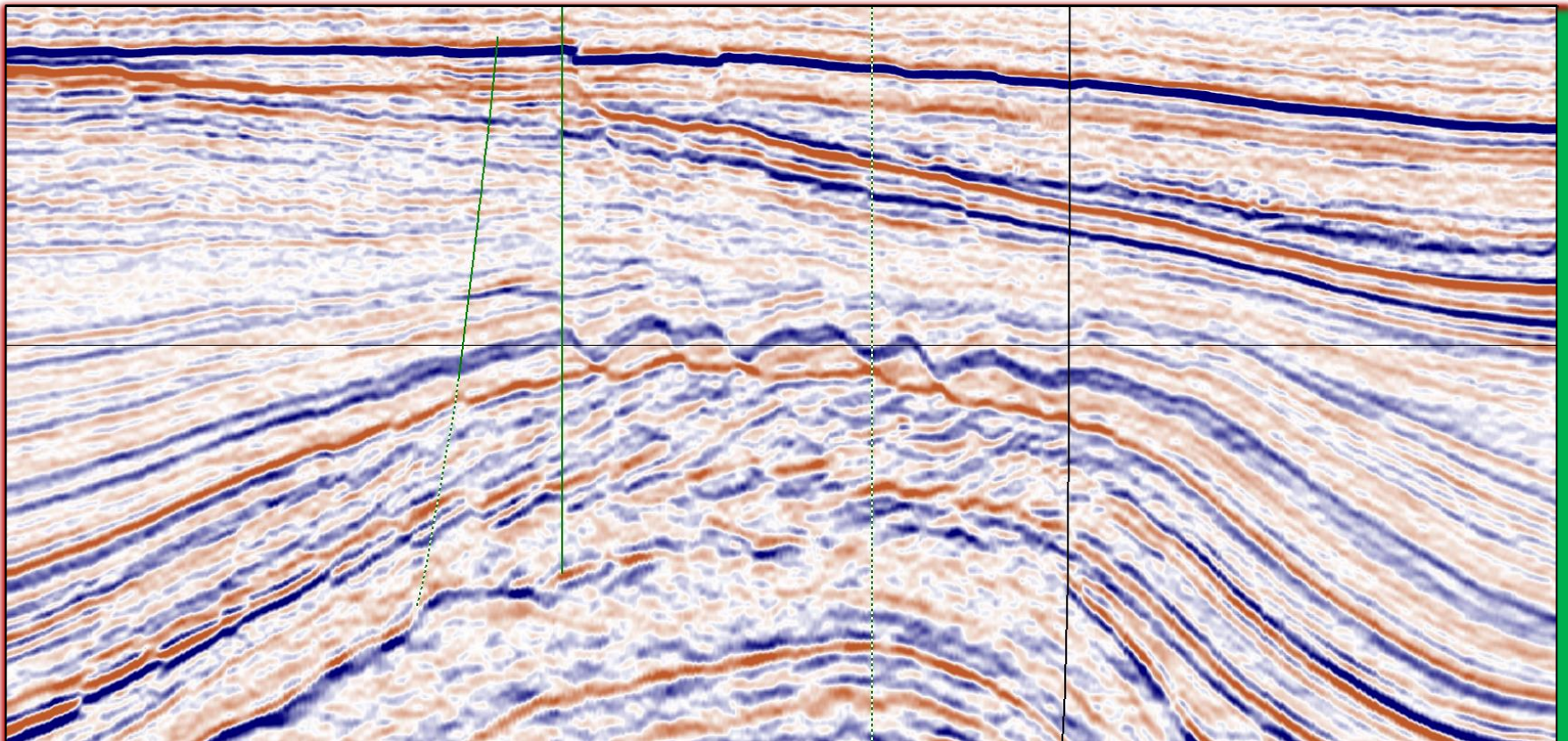


Spectral data
from Sterling 3D
Broadband
survey 2014

Broadband: imaging improvements

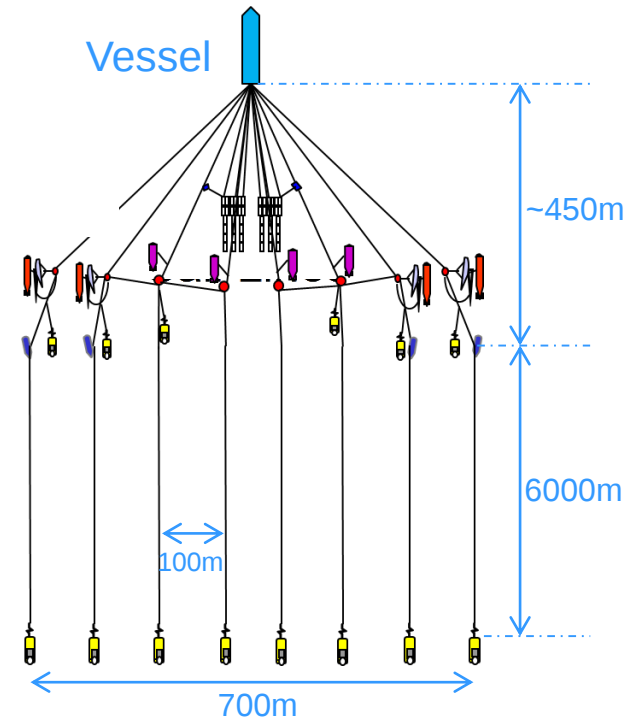
conventional

broadband



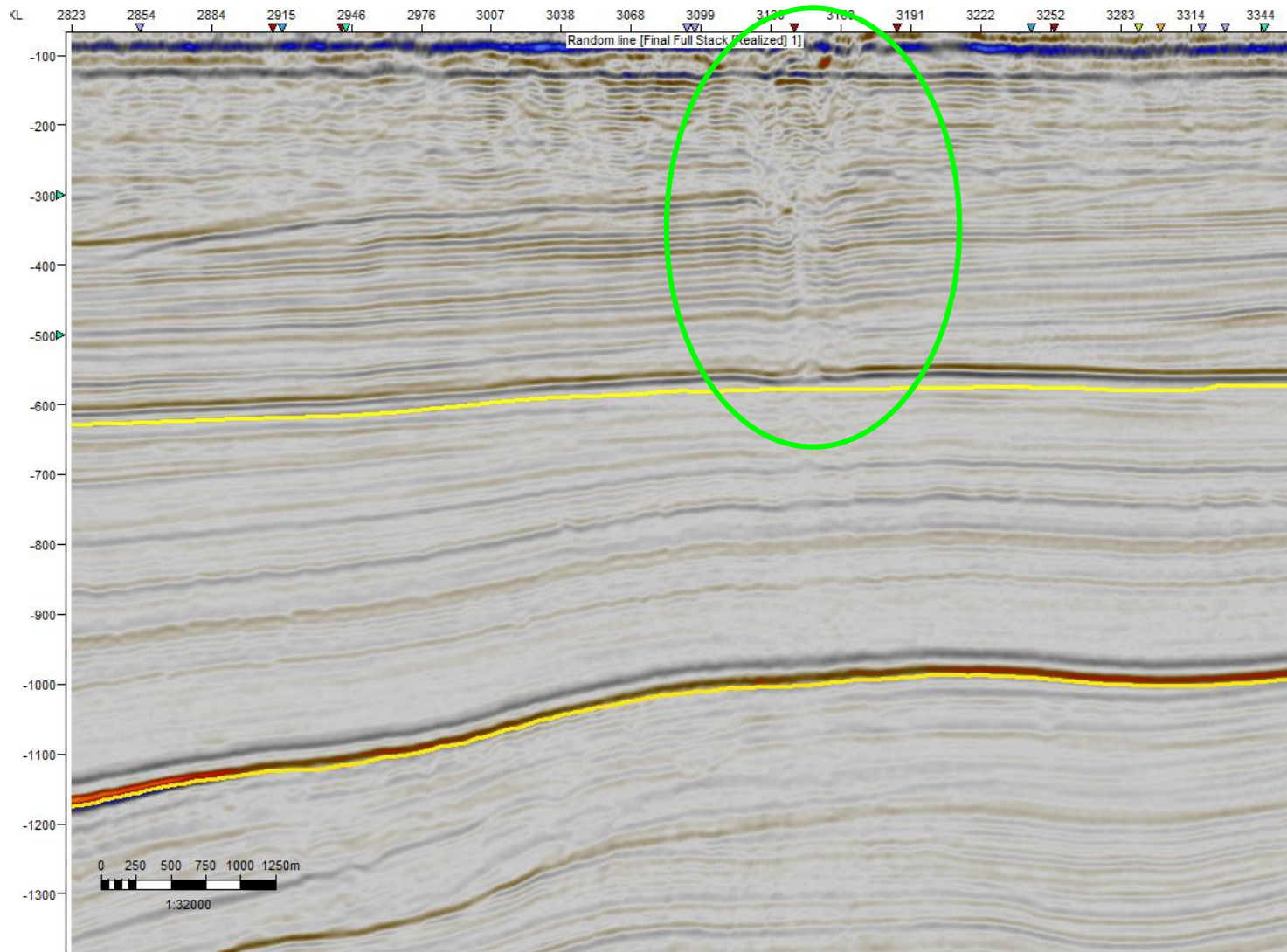
Fregat

Addressing access challenges



Continuous Line Acquisition (WesternGeco):
offering wide azimuth
and solving access, infill and fold issues

Noise or what...?

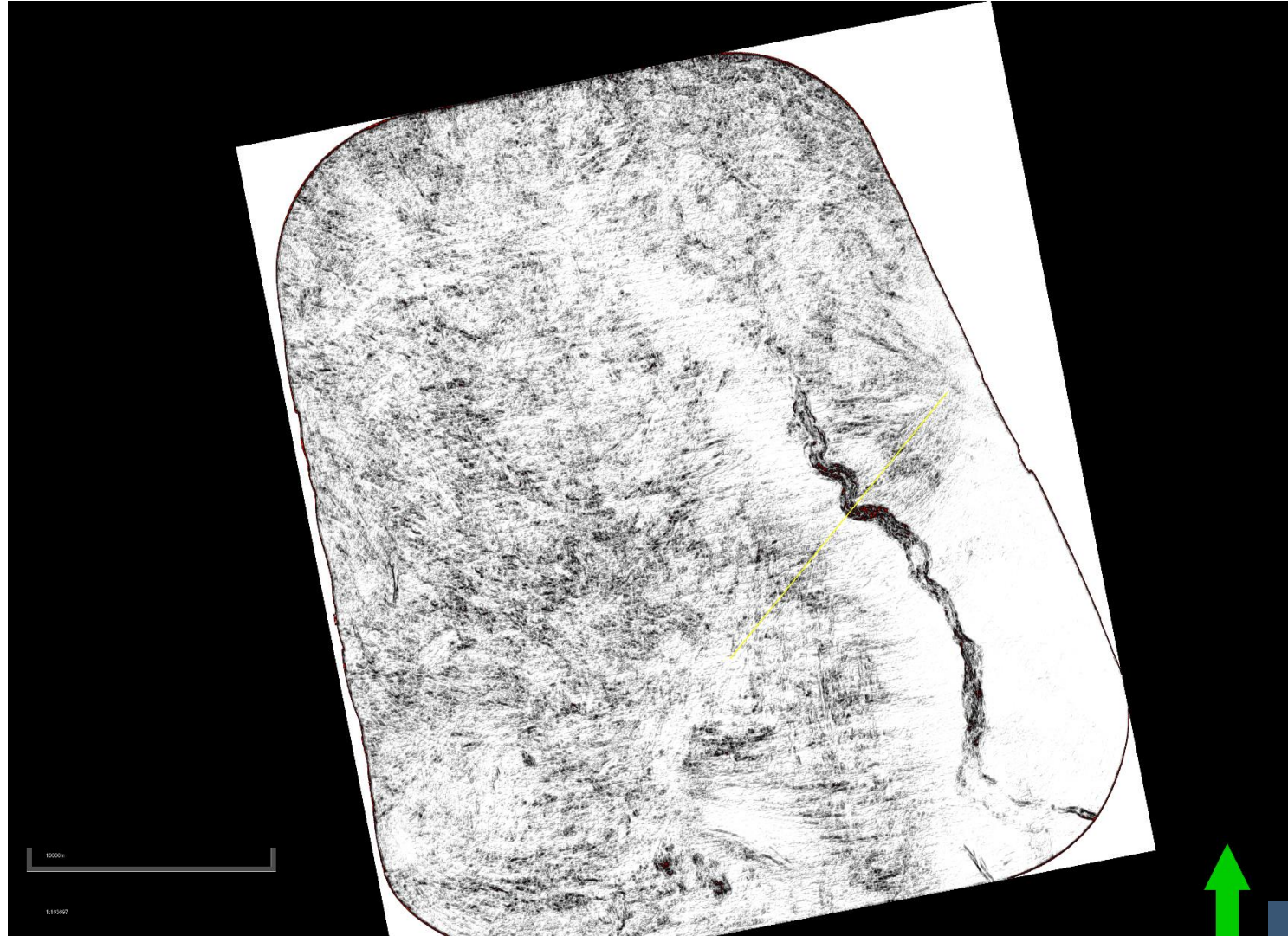


Courtesy Hansa Hydrocarbons

www.ebn.nl

ebn

Real geology revealed!

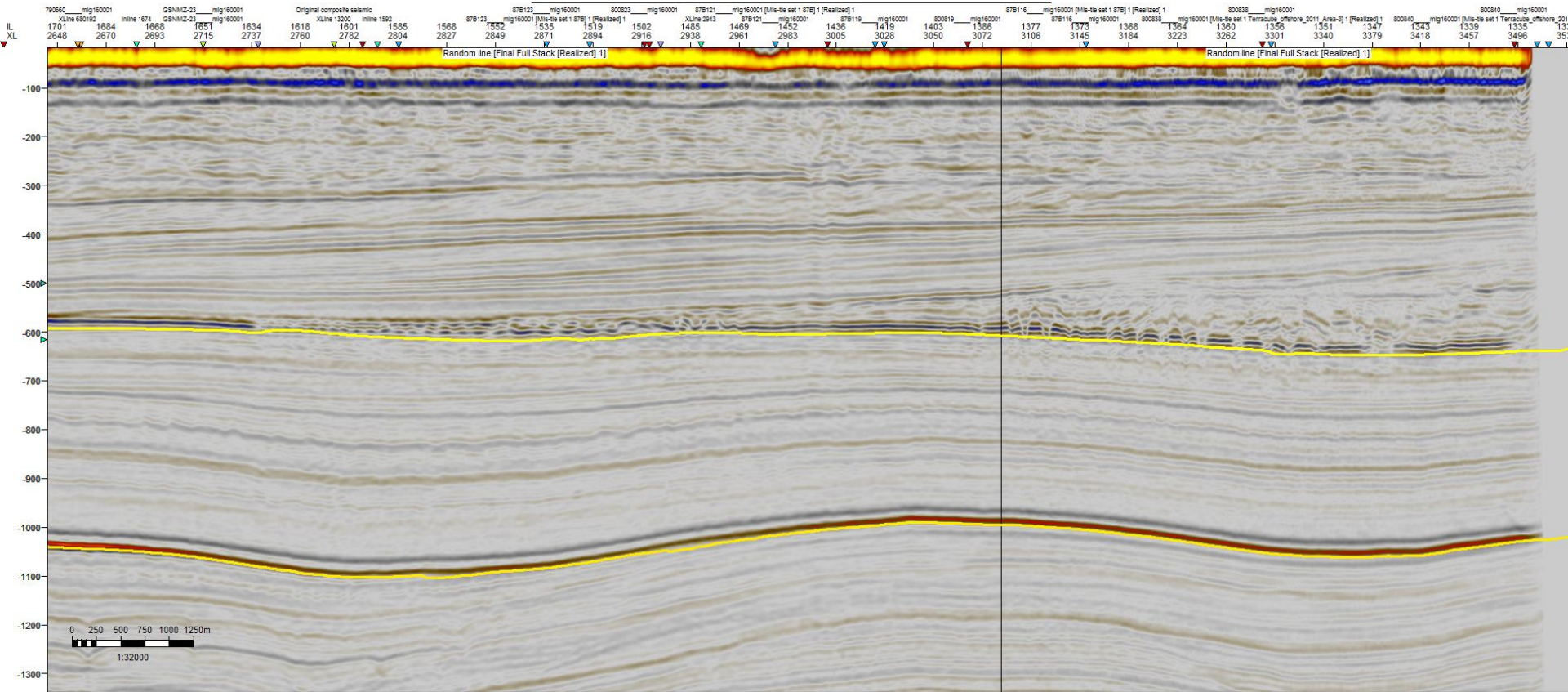


Courtesy Hansa Hydrocarbons

www.ebn.nl

ebn

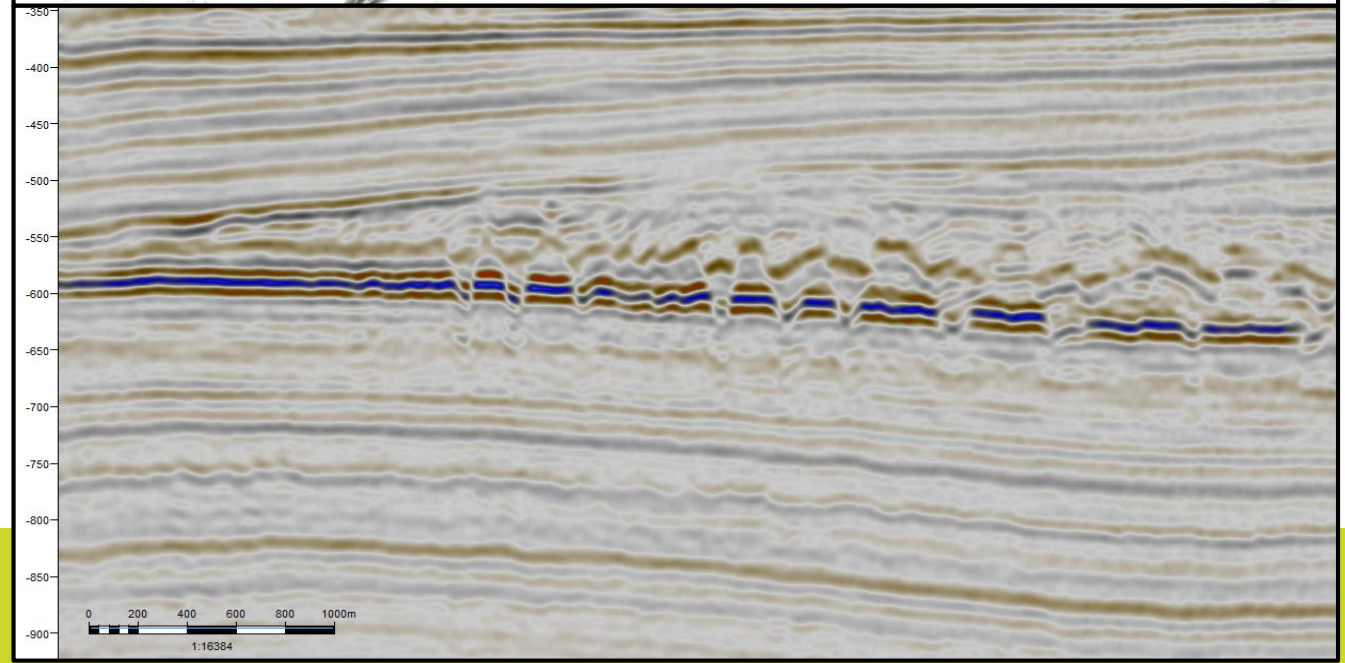
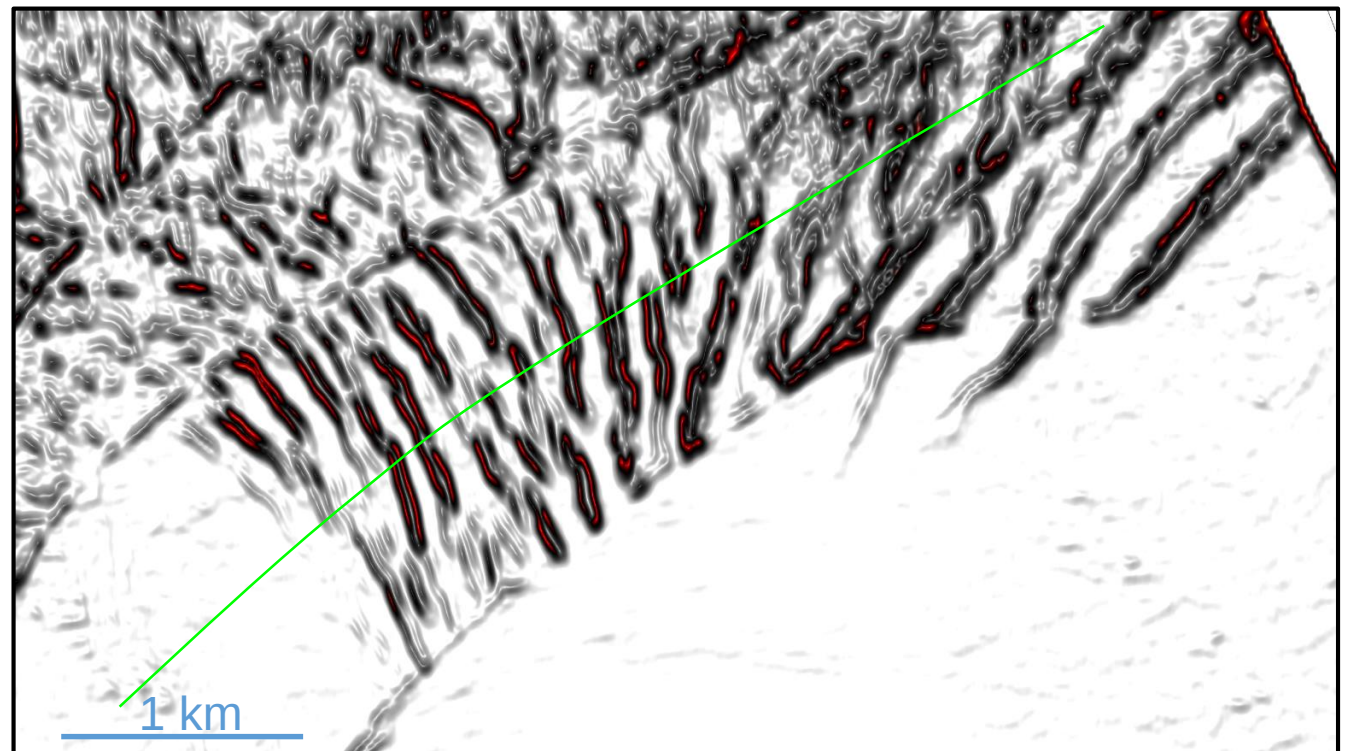
Noise or what...?



Gravity slides

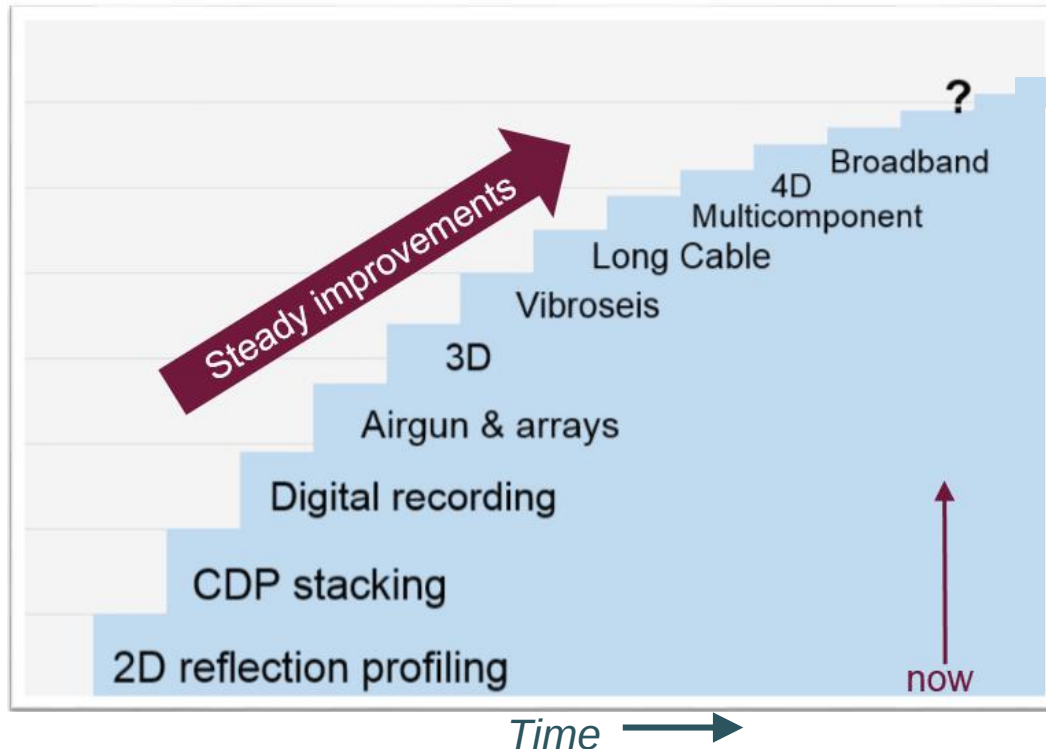
with detailed
horst-graben
tectonics

(coherency cube)



Courtesy Hansa Hydrocarbons

Trends in seismic acquisition

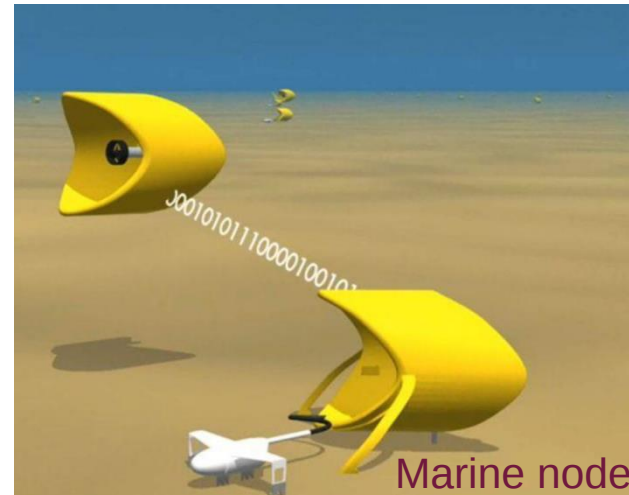


1. Bandwidth
2. Rich azimuth
3. Illumination analysis
4. Multiple component
5. Vector fidelity
6. Ghost-free
7. OBC
8. Coupling
9. Nodes & Drones
10. Turnaround time
11. Costs per trace
12. Value Of Information
13. EIA (MER)
- 14...

Technology moves on...



Seismic drone



Marine node