

From Micro-Siting to Full-Site Insight: Leveraging UHR3D Geophysics for Offshore Wind Farm Development

Gunhild Myhr

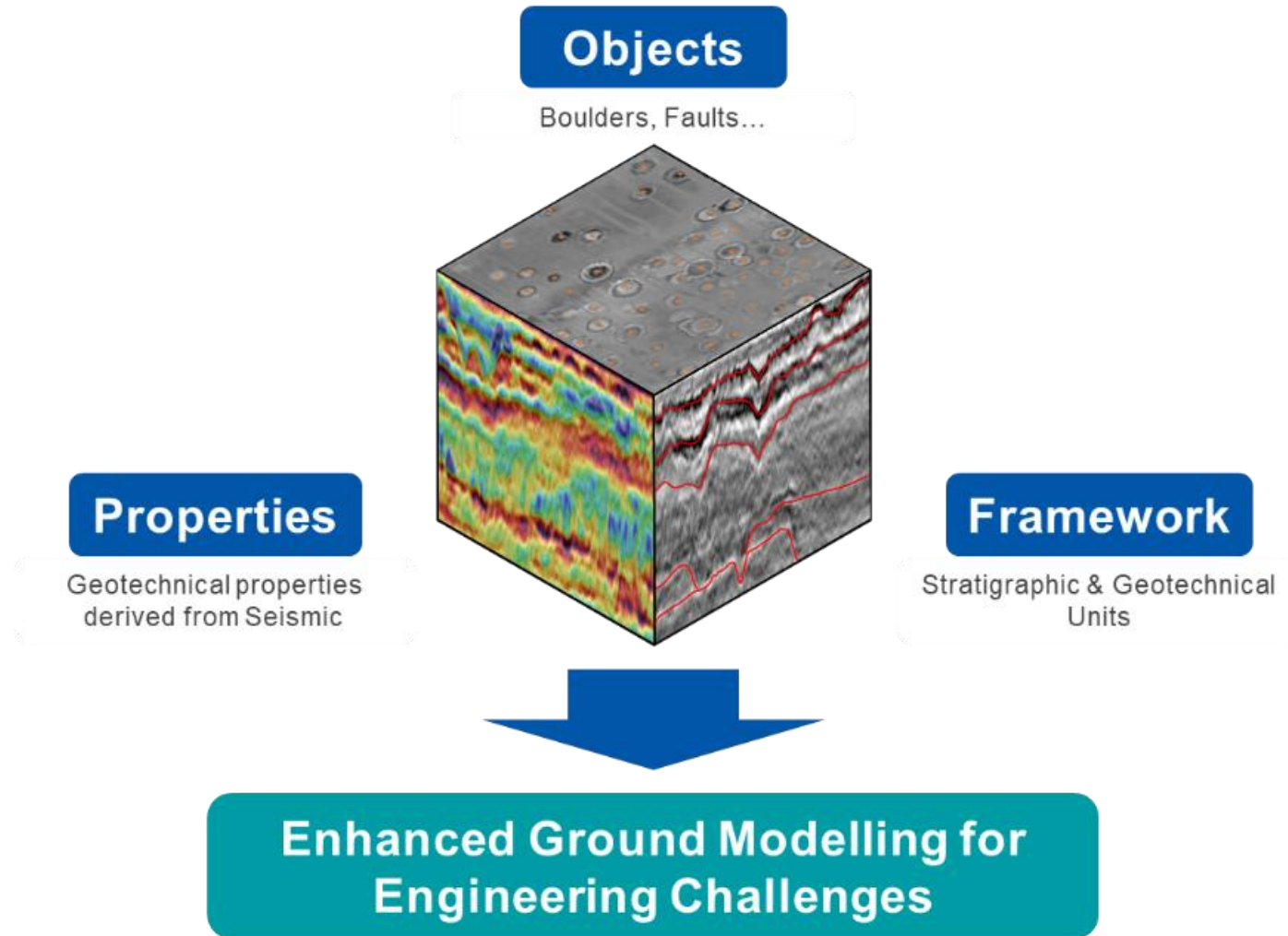
Net-Zero Emissions

23–25 March 2026

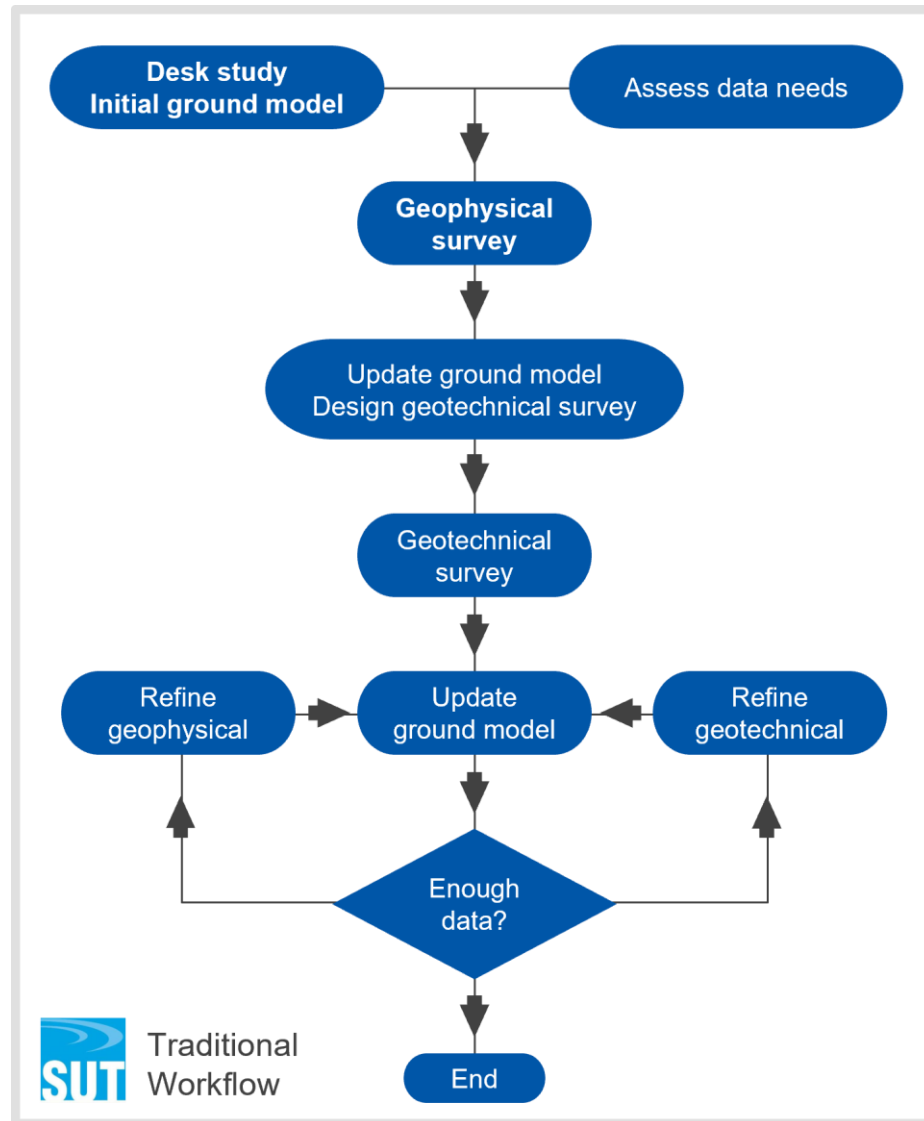
Virtual



Enhanced Ground Modeling for Derisking Development



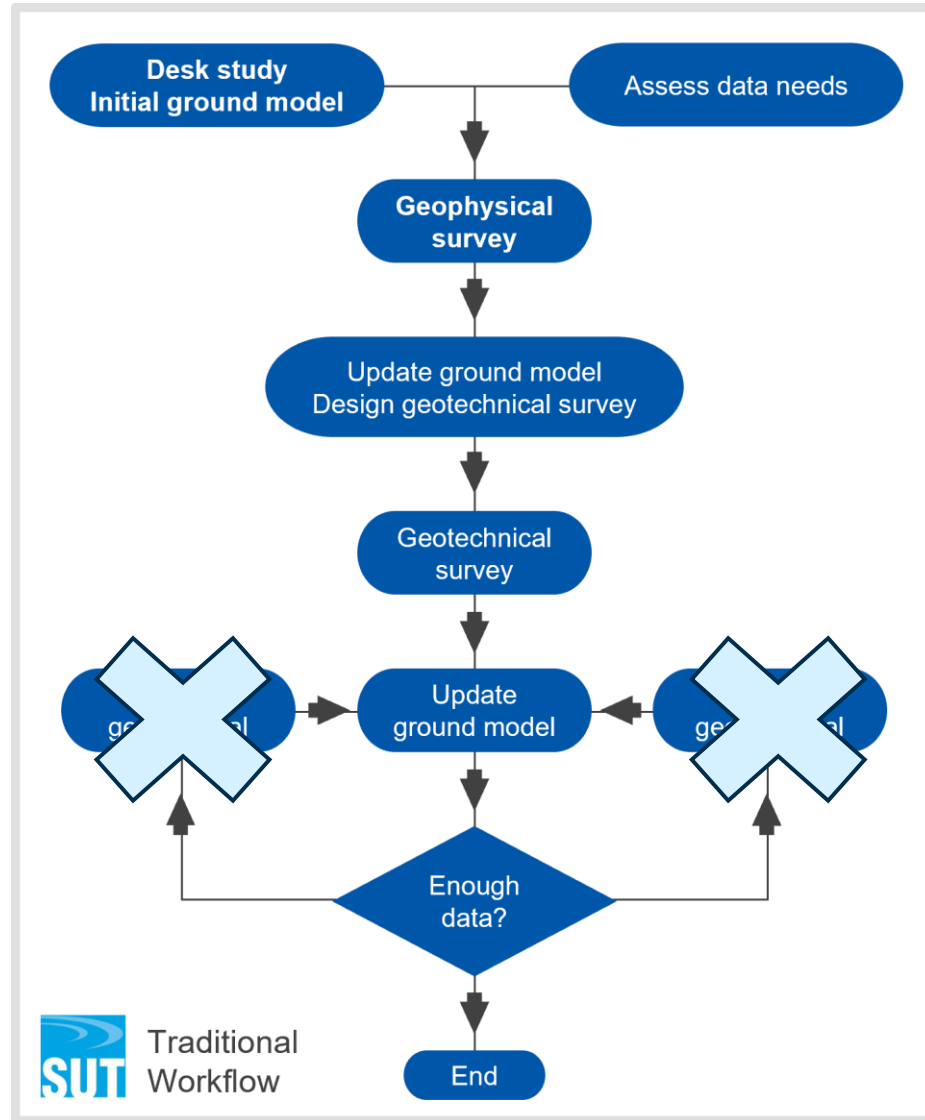
Traditional Site Characterization Workflow



Key Challenges:

- Sub-optimal data acquisition spanning multiple years
- Uncertainty about the spatial variability of geohazards & key subsurface units and properties away from the 2D profiles
- Conservatism in engineering design due to lack of flexibility in the placement of infrastructure driving cost

Site Characterization Workflow using UHR3D Data

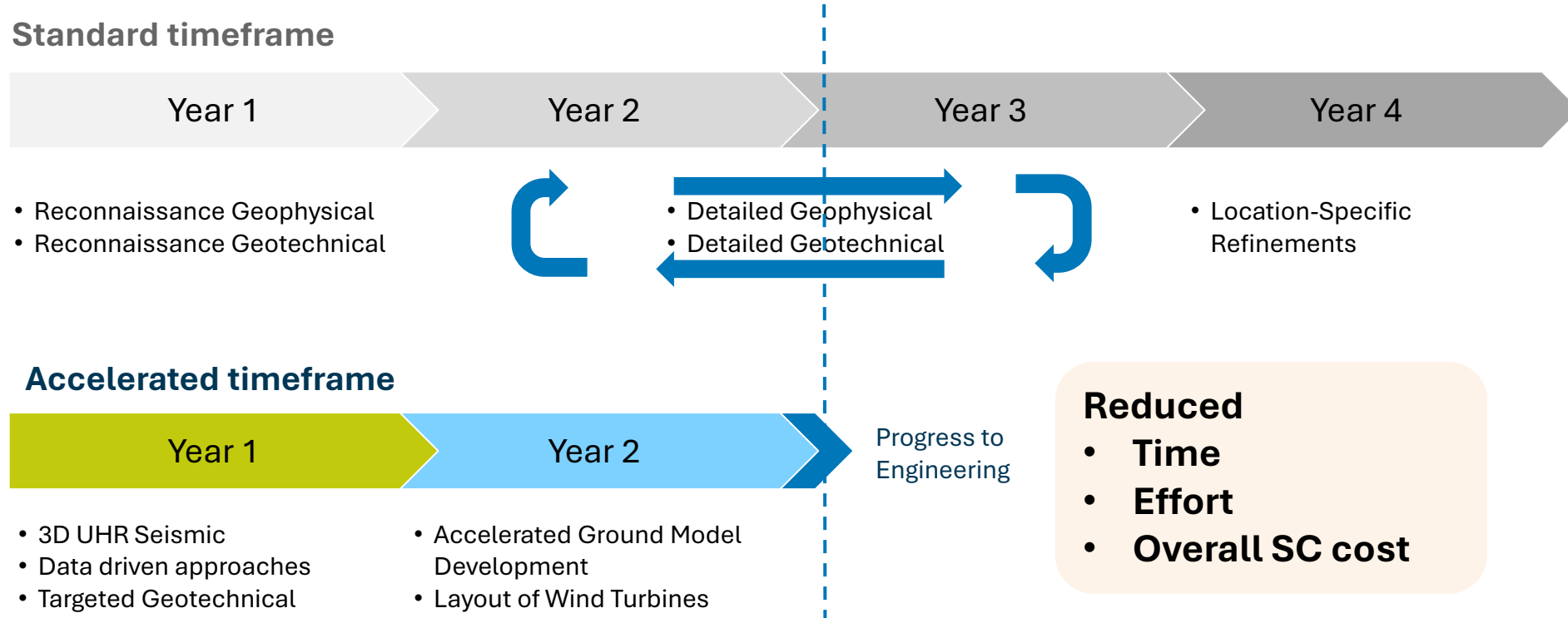


Key Benefits across:

- Faster Project Time
- Better understanding of Subsurface Variability
- Improved Geohazards detection
- Optimized Infrastructure Placement
- Potential less conservative Engineering Design

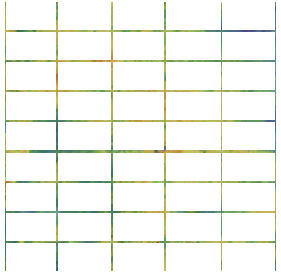
3D site characterization enables faster projects, reduces subsurface uncertainty, improves geohazard detection, and allows more efficient and less conservative engineering design.

Early UHR3D Enables Time and Cost Saving



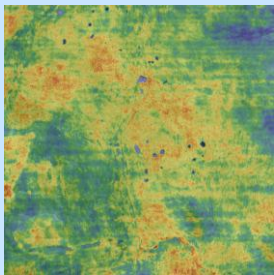
Certainty of Spatial Variability with UHR3D

Enhanced design flexibility is required with many anchor points,
unchartered territory requires significant de-risking



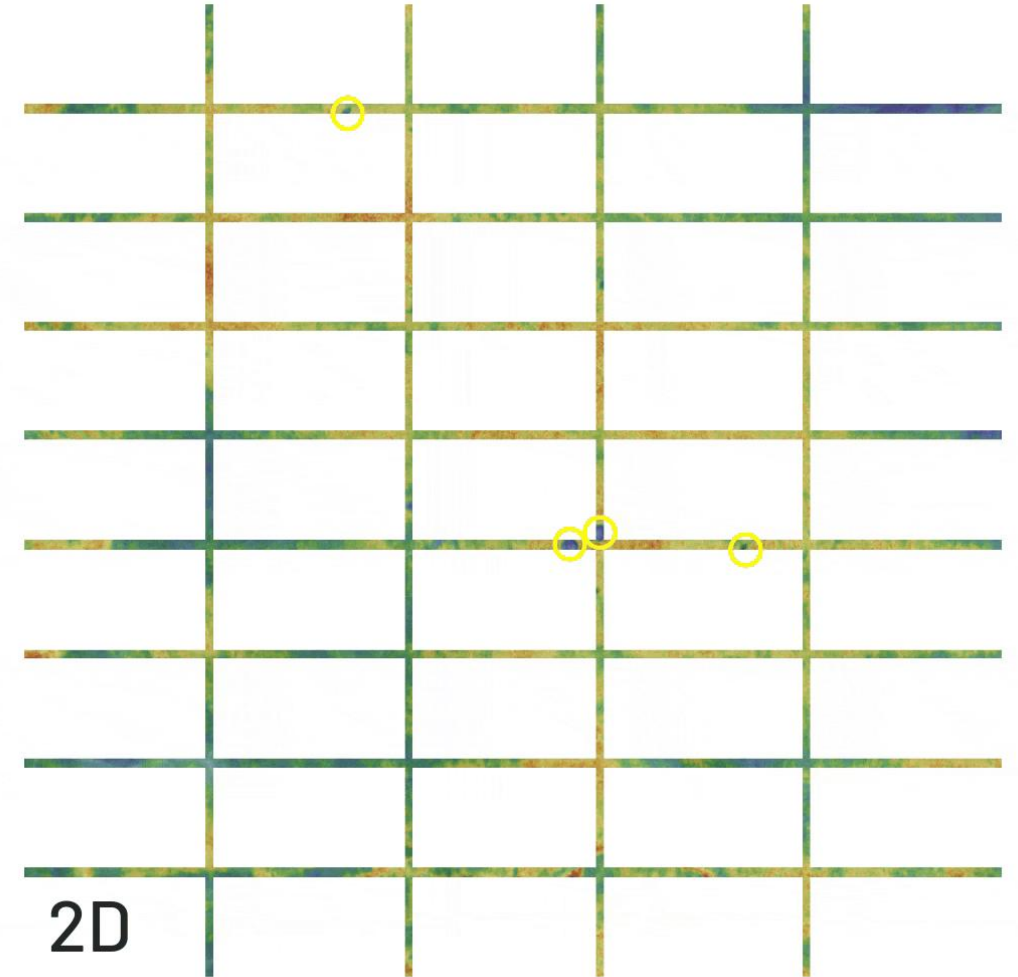
2D provides some insight

Limited understanding of
geohazards with
poor spatial sampling

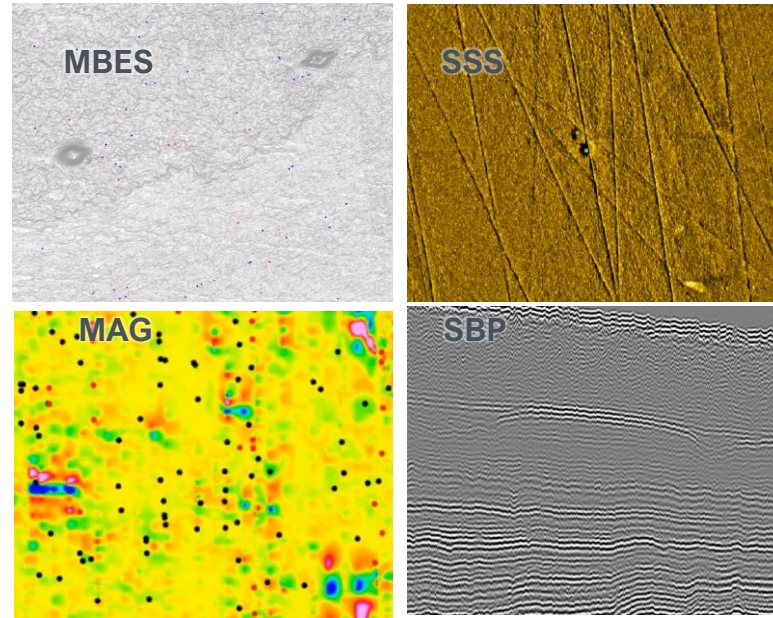
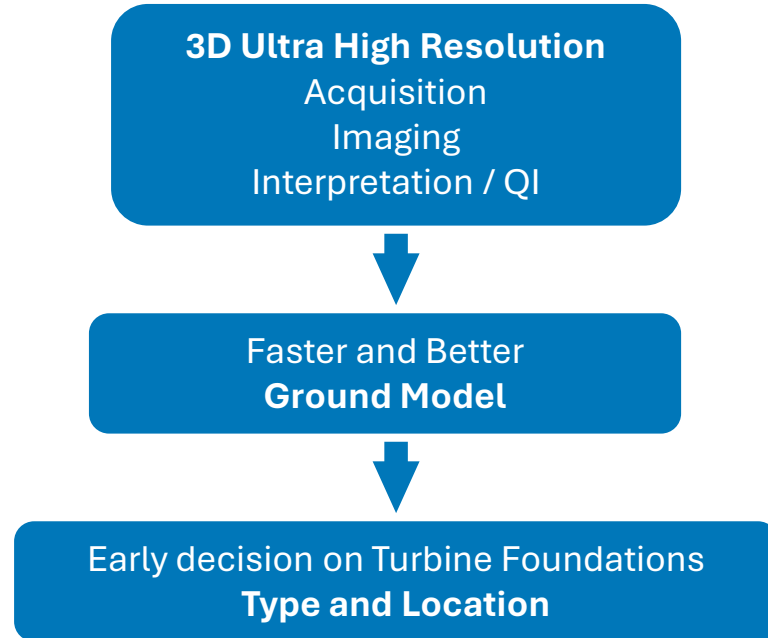


3D provides the full picture

Understand geohazards
earlier and with greater
certainty with UHR3D



Geophysical Methods in an Integrated UHR3D

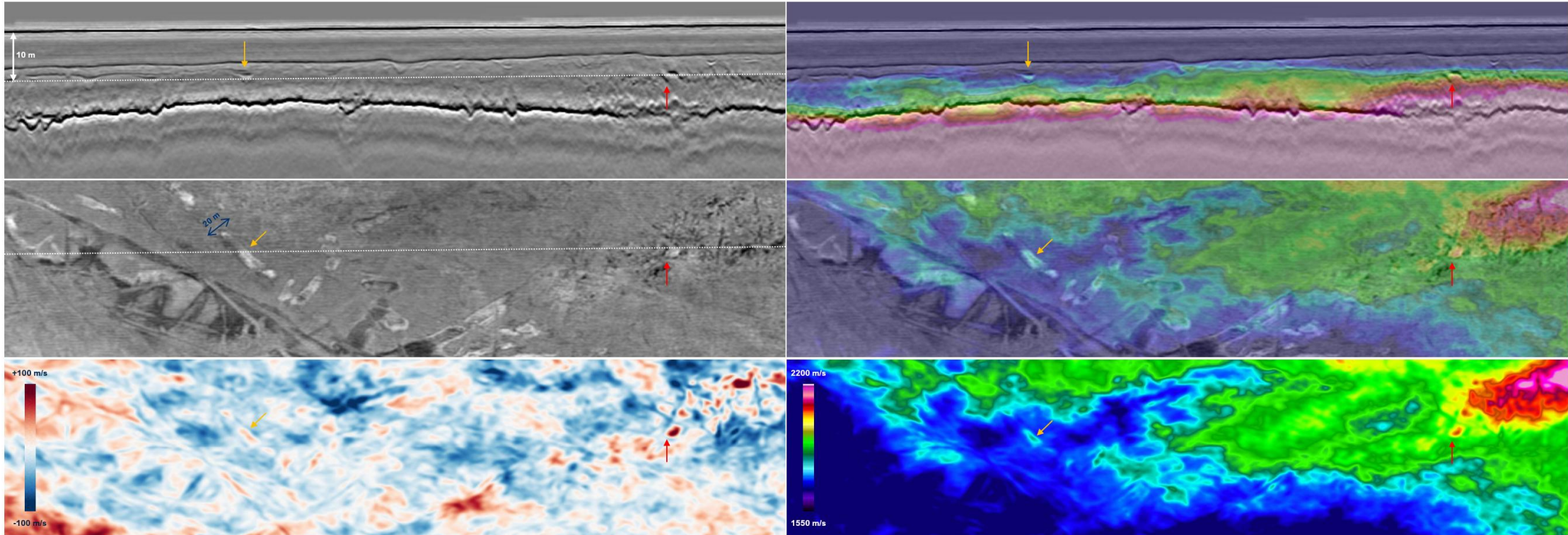


Seabed & Shallow Subsurface

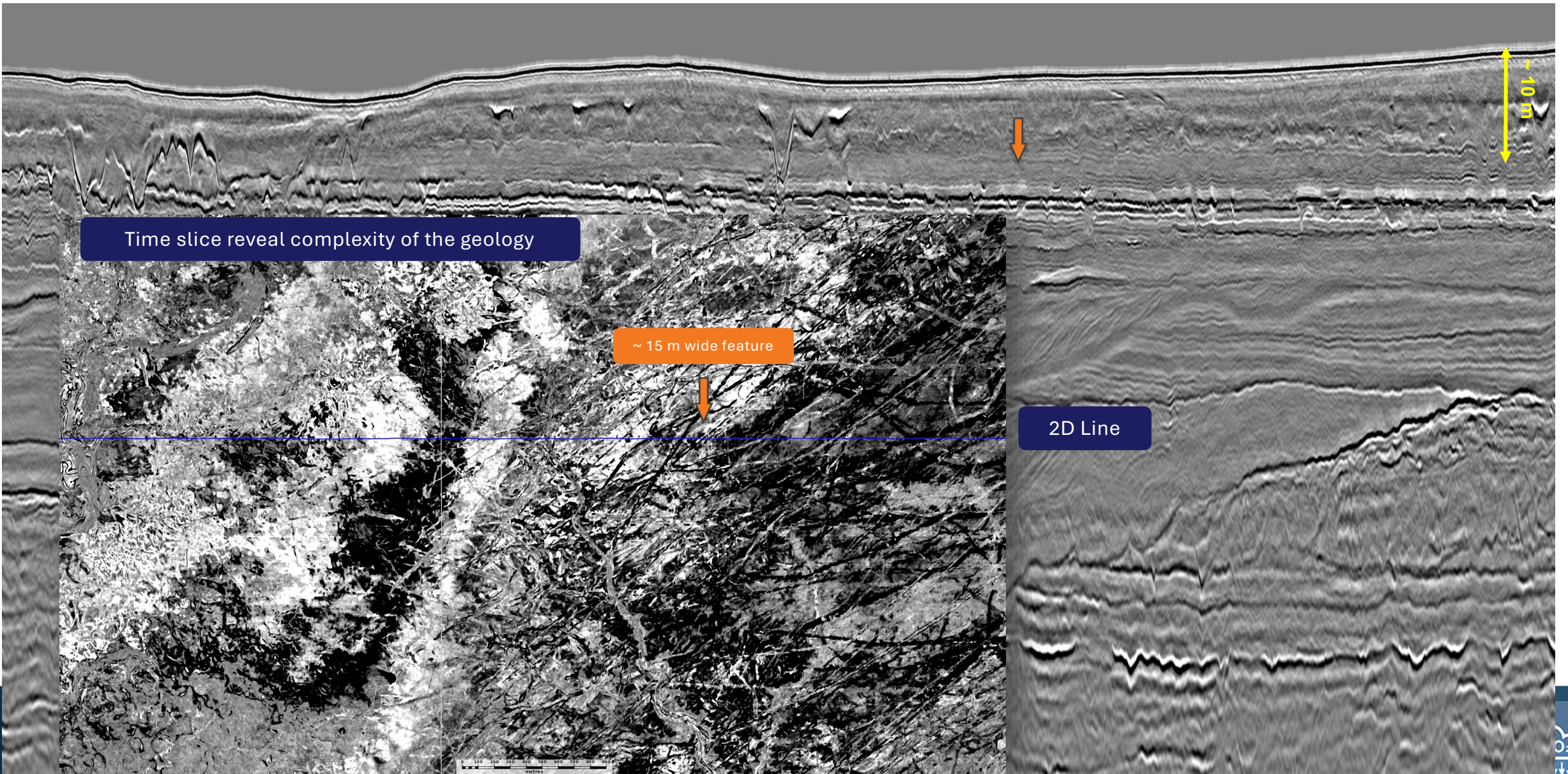
Sensor	Purpose
Sparker Sources / UHR Streamers	3D Imaging of the subsurface at meter/sub-metre scale
Multibeam Echo Sounder (MBES)	Bathymetric mapping of sea-bed depth, morphology and features
Side Scan Sonar (SSS)	Mapping of seabed objects and features
Sub Bottom Profiler (SBP)	Near-surface 2D imaging at sub-meter scale
Magnetometer (MAG)	Detection and mapping of ferrous objects

Subsurface

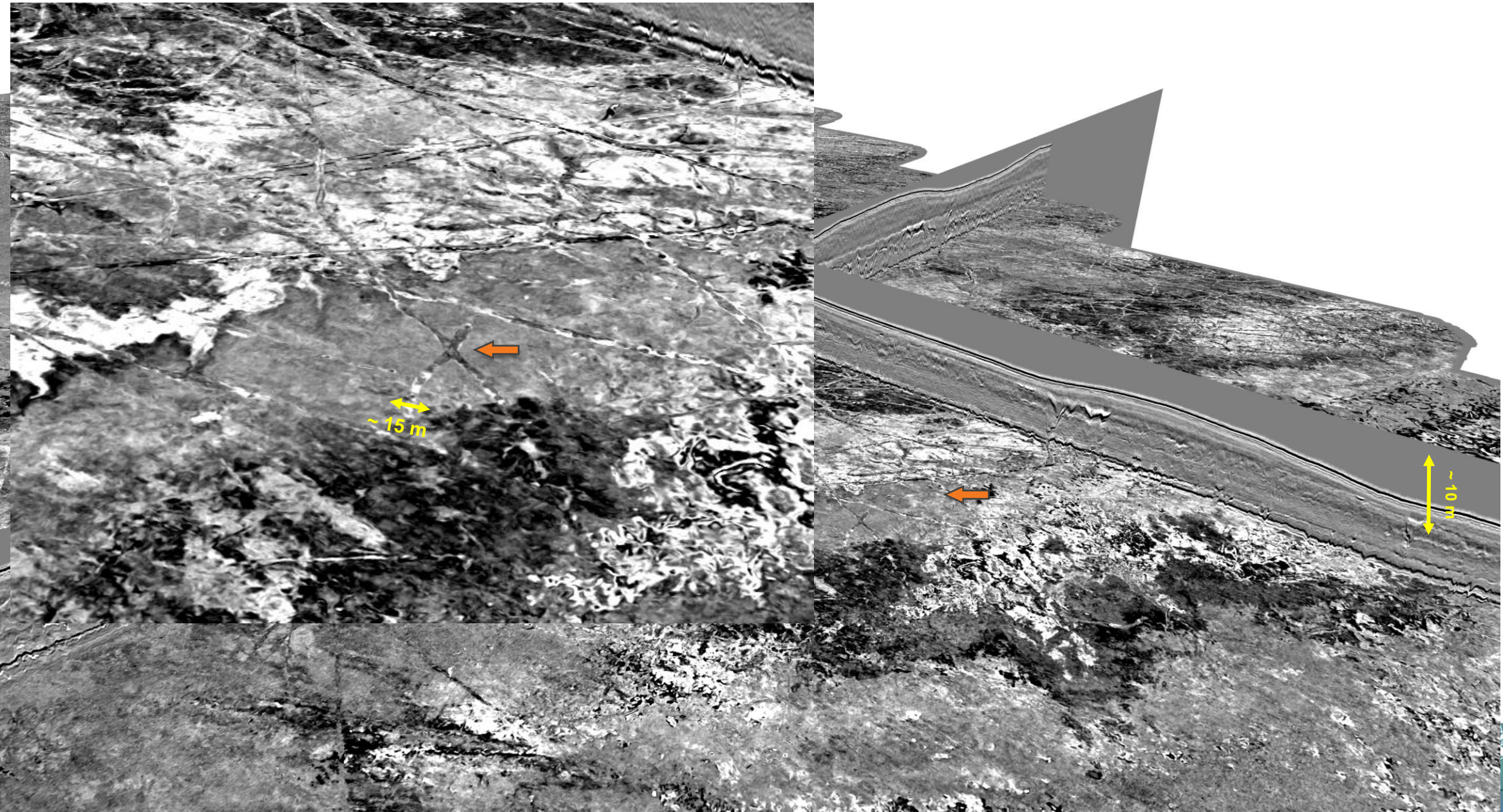
Detailed Soil Property Delineation with Imaging



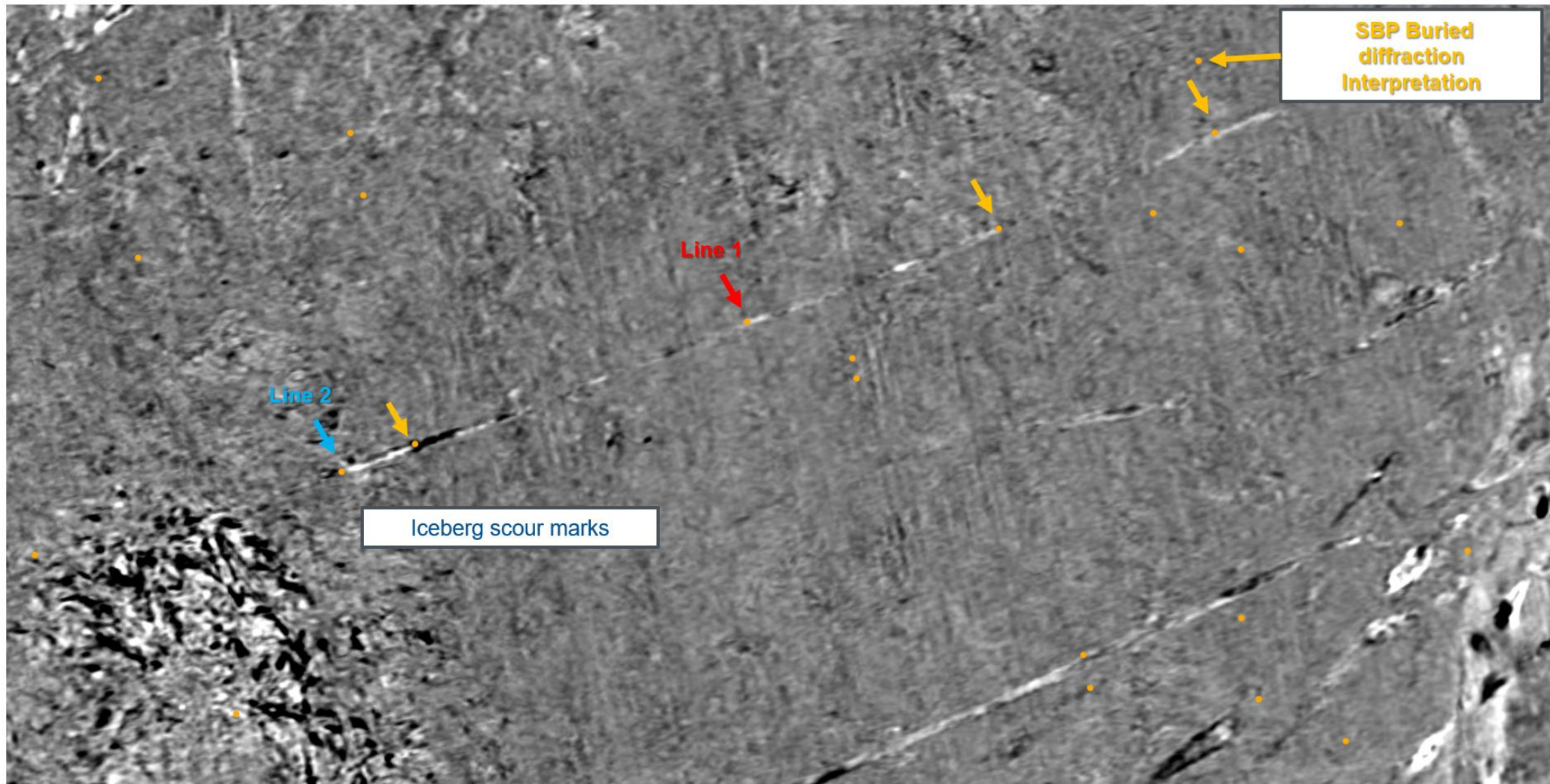
3DUHRS – Cross Section



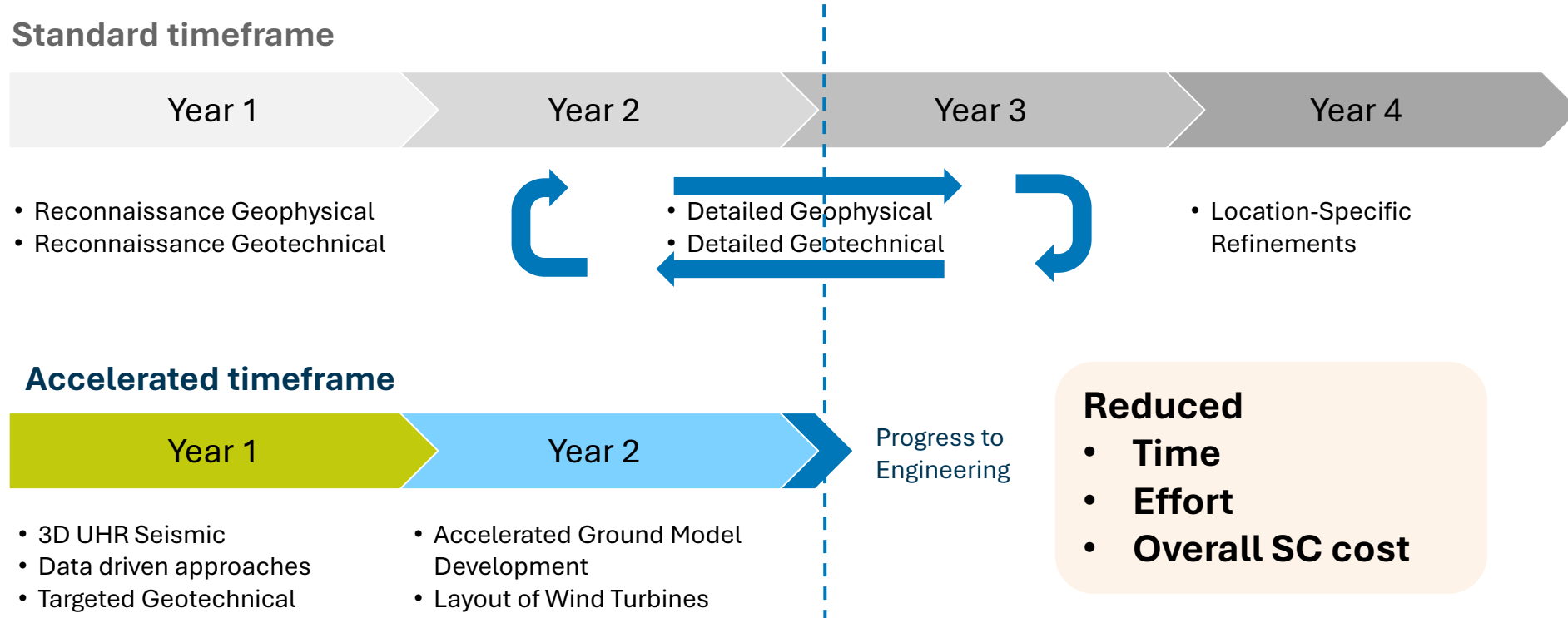
3D View – Time Slice ~10m below seabed



Realistic Geohazard Assessment



Early UHR3D Enables Time and Cost Saving



Optimized Site Characterization for Project Development



TGS integrated Geophysical Survey: in action

- A single pass integrated 3D UHR survey enables seabed and subsurface soil units to be delineated, soil properties estimated, and hazardous features identified
- A decrease in the number of geophysical surveys that need to be undertaken to characterize the static properties of a site
- High quality UHR3D data and a limited sample of geotechnical data enable key soil properties to be estimated
- Optimization of geotechnical surveys is enabled with the QGM being a key decision tool
- Incorporation of an integrated UHR3D survey should enable the overall time and cost to characterize sites to be reduced

Thank You

Gunhild.Myhr@tgs.com