Integrated Geohazard Assessment – The Case for Correlation, Calibration and Careful Consideration

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6 December 2011
FORCE Seminar, Stavanger

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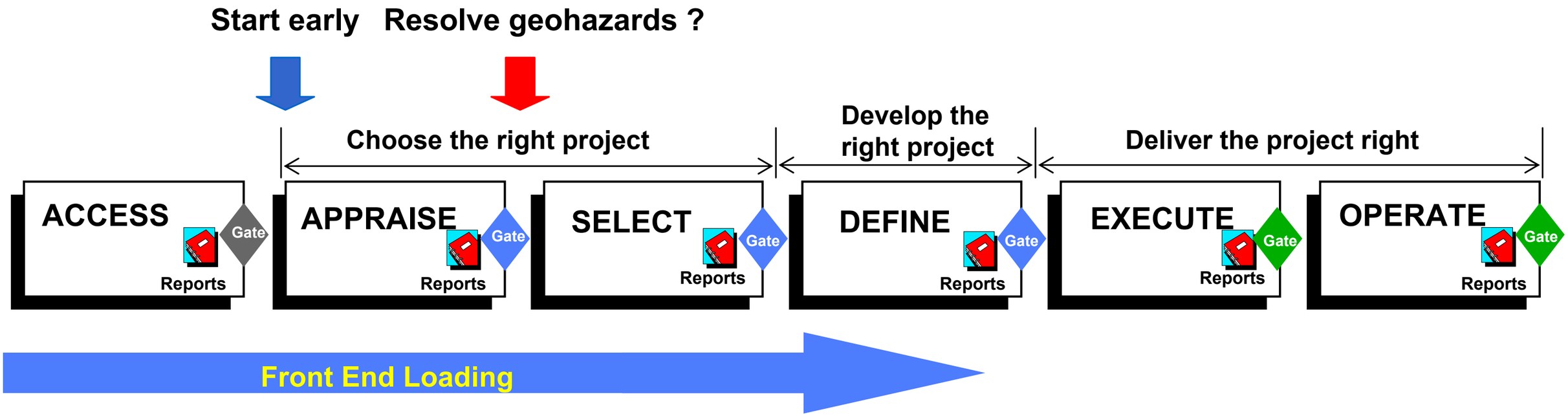
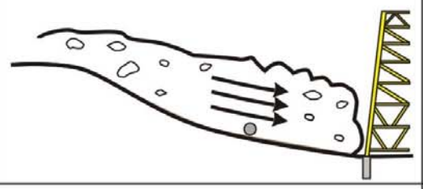
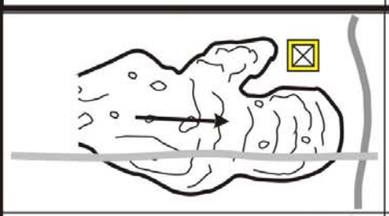
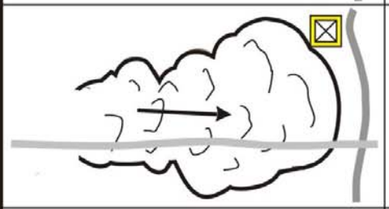
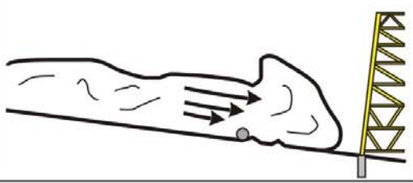
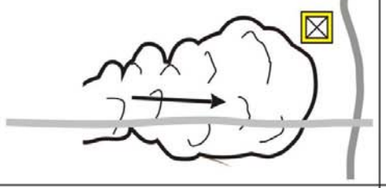
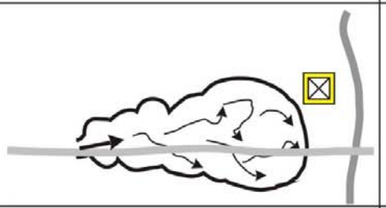
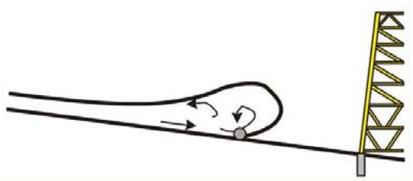
- Importance of Multi-Disciplinary Approach for Correlation
- Calibration of Geophysics by Detailed Geohazard Core Logging
- Case Studies
- Outlining the Need for Careful Consideration
- Conclusions

Geohazard Assessment – Project / Time Context

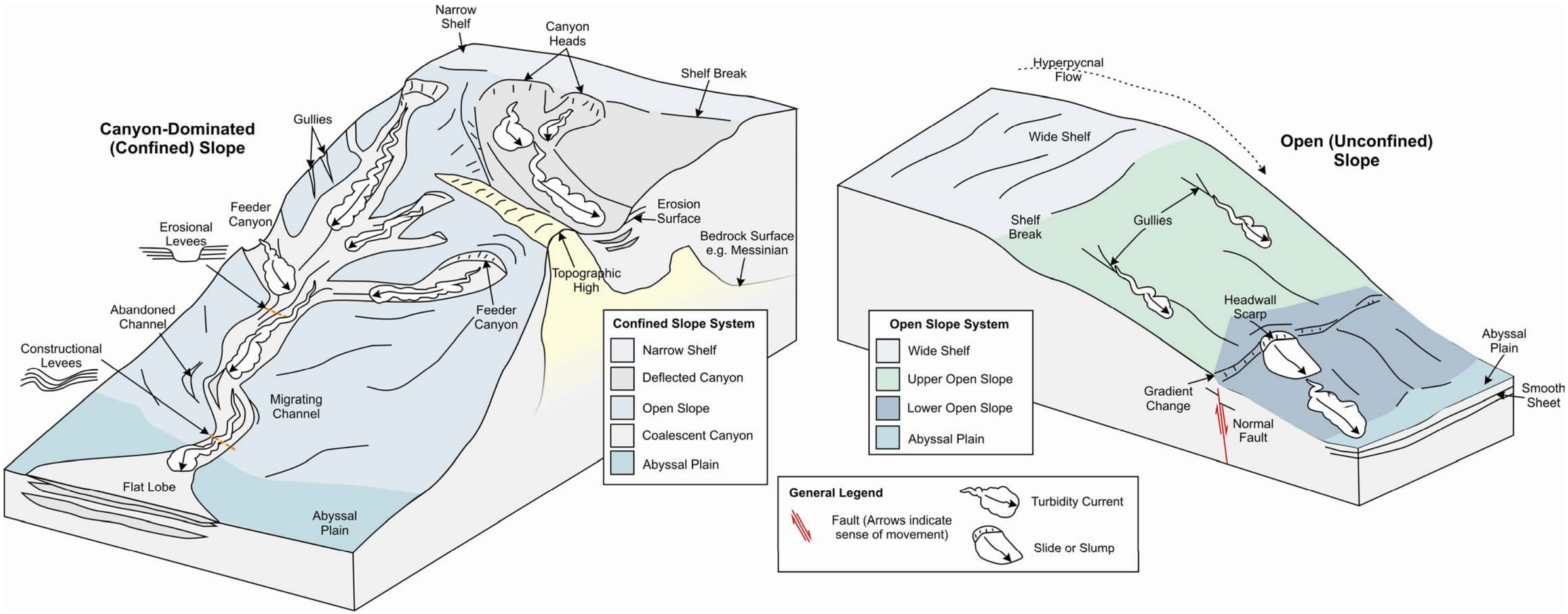


Determine business opportunities aligned with portfolio	Determine project feasibility and alignment with business strategy	Select the preferred project option(s)	Finalize project scope, cost and schedule and get project funded	Produce an operating asset consistent with scope, cost and schedule	Evaluate asset to ensure performance to specifications and maximum return to the shareholders

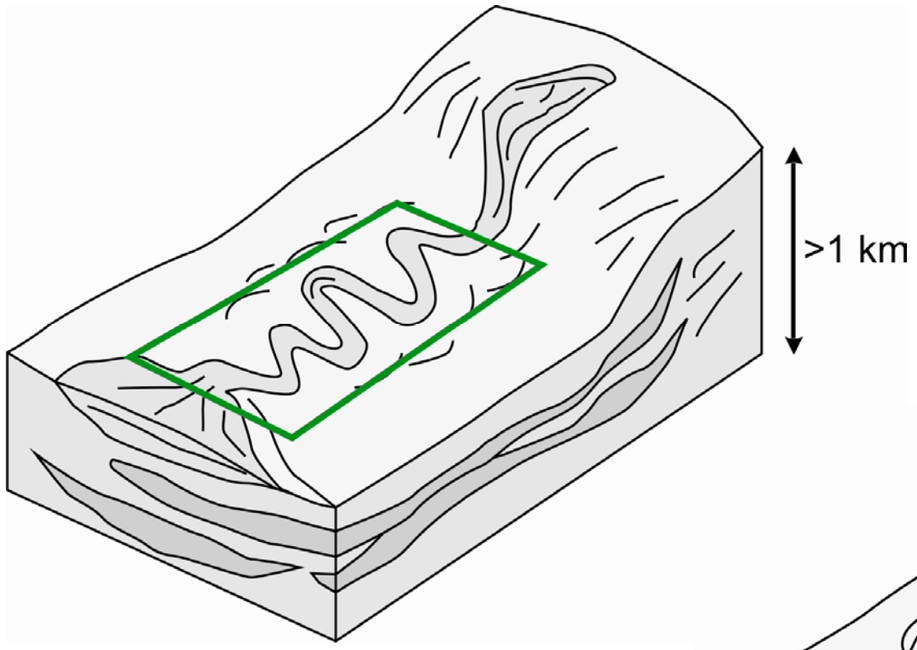
Direct Impact of Gravity Flows

Mass Movement Classification		Mass Movement Mechanism	Impact on Foundations ⊠		Impact on Pipeline/Flowline/Cable ◦		
			Profile View	Nature of Force on Foundation	Plan View	Orientation of Movement to Installation	
						Parallel	Perpendicular
Gravity Flow	Mass Flow	Debris Flow		Loading Burial Scour		Compression Burial Loading Scour	Dragging Burial Loading Scour
		Liquefied Flow		Loading Burial Scour		Compression Burial Loading Scour	Dragging Burial Loading Scour
		Fluidised Flow		Loading Burial Scour		Compression Burial Loading Scour	Dragging Burial Loading Scour
	Turbidity Current	High Density Turbidity Current		Loading? Burial? Scour		Burial Loading Scour	Burial Loading Scour
		Low Density Turbidity Current		Scour?		Scour	Scour

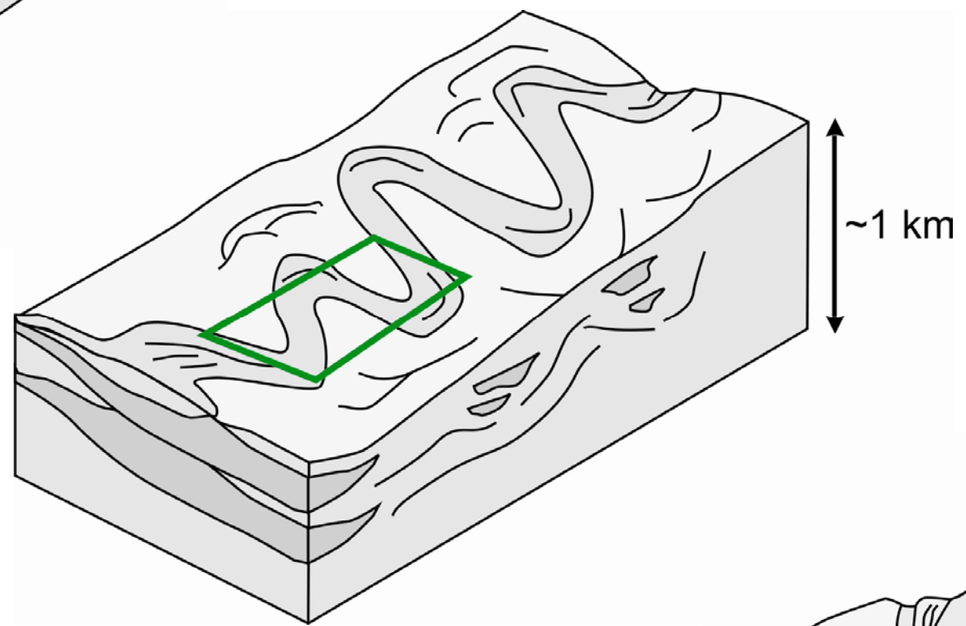
Understanding Geohazard Controls



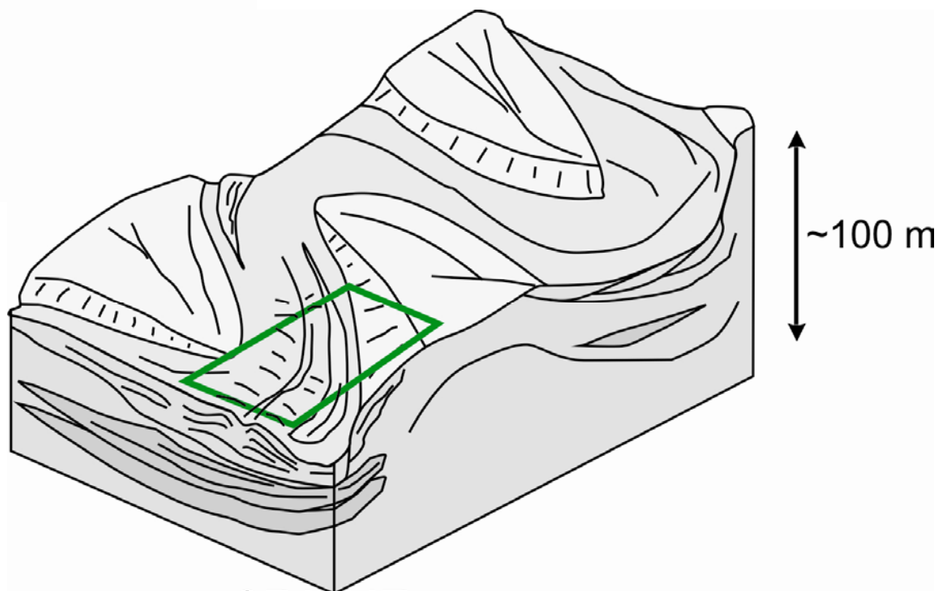
Geohazard Assessment – Multiple Scales / Tools



3DX Seismic



3DX Seismic
/ MBES



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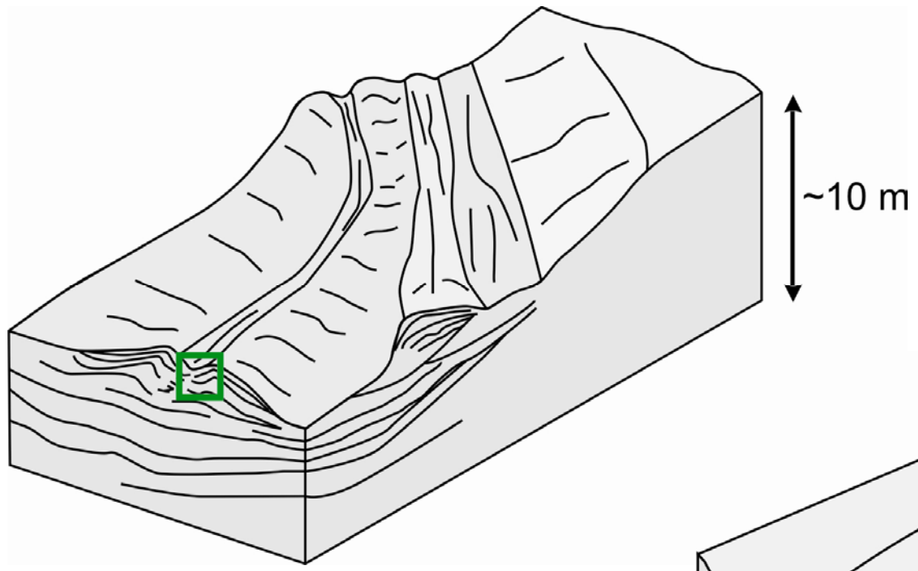
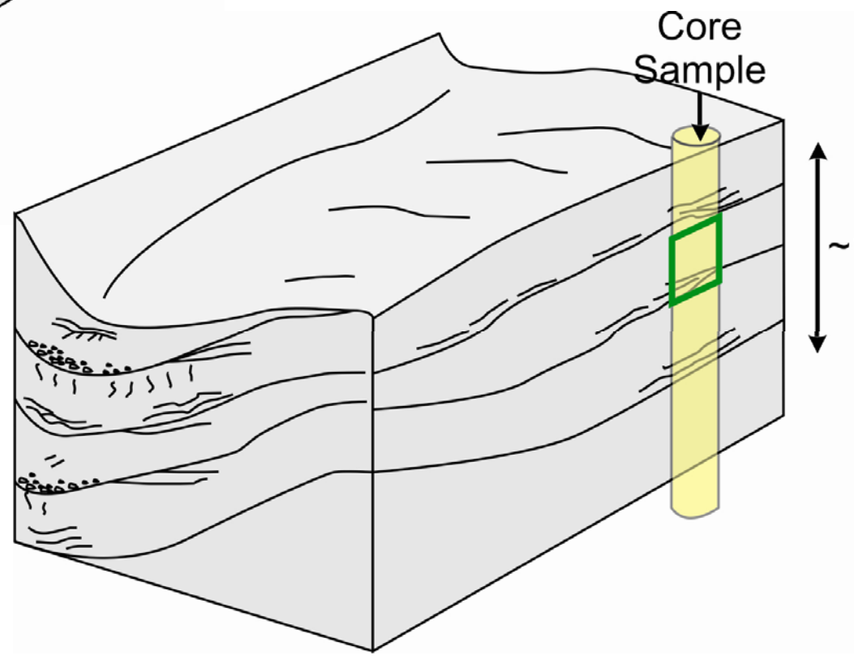
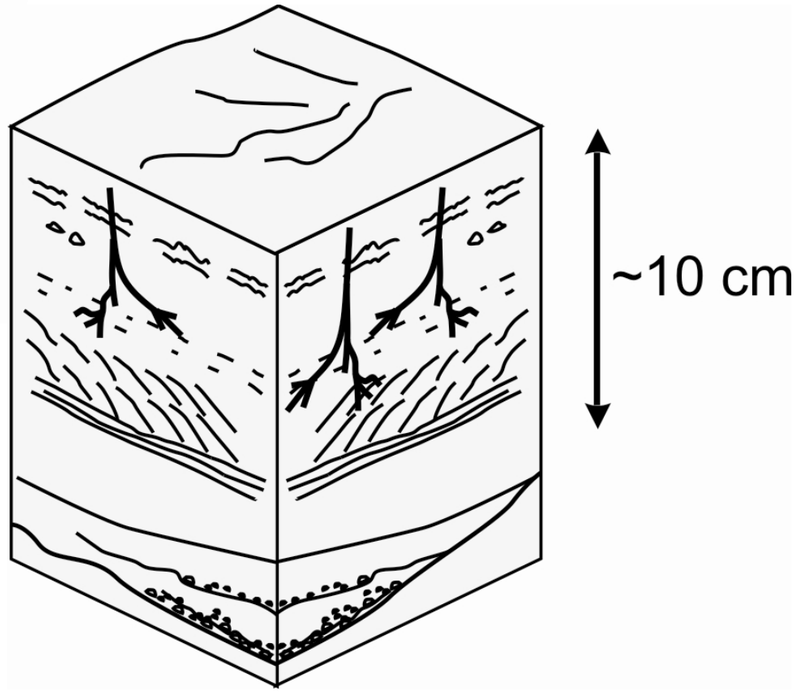


AUV Chirp

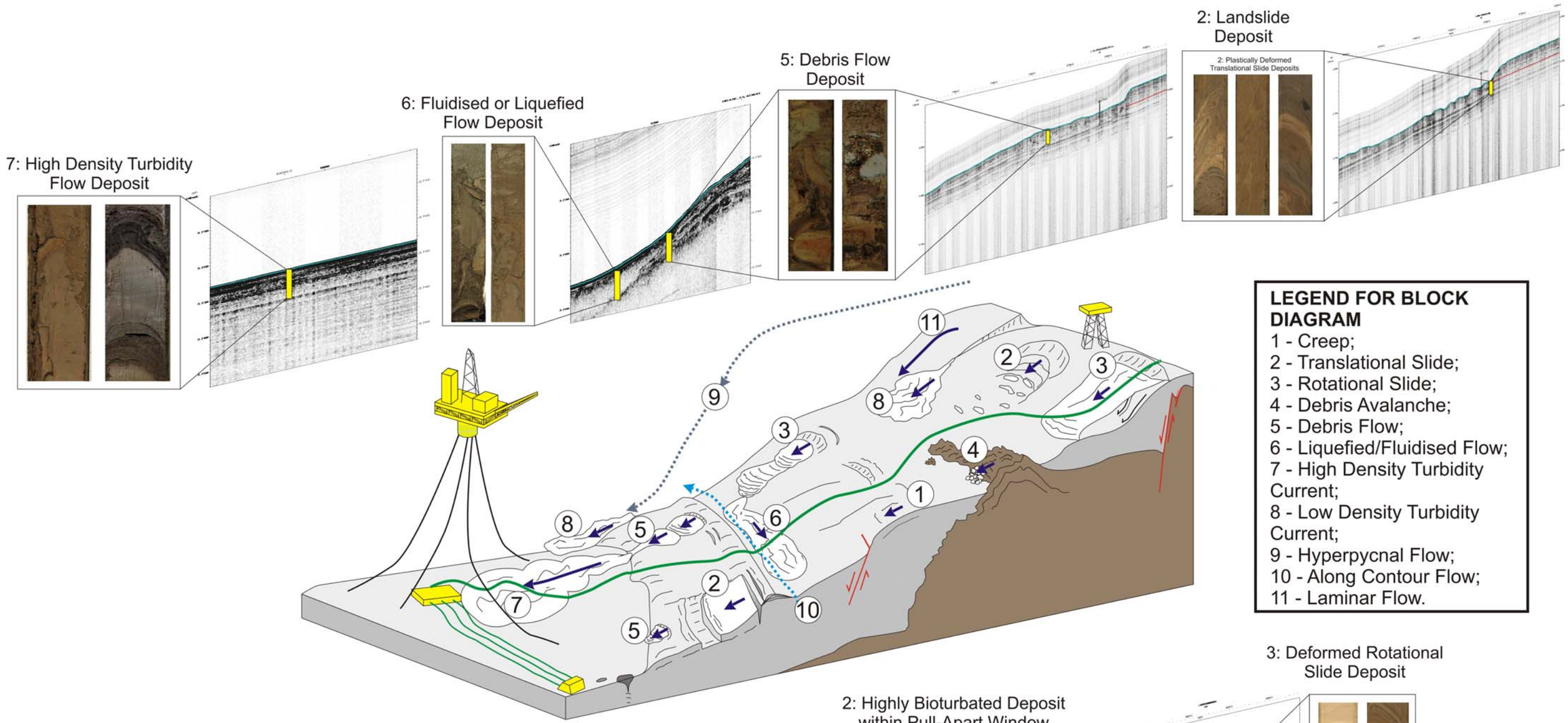


Long Piston Core

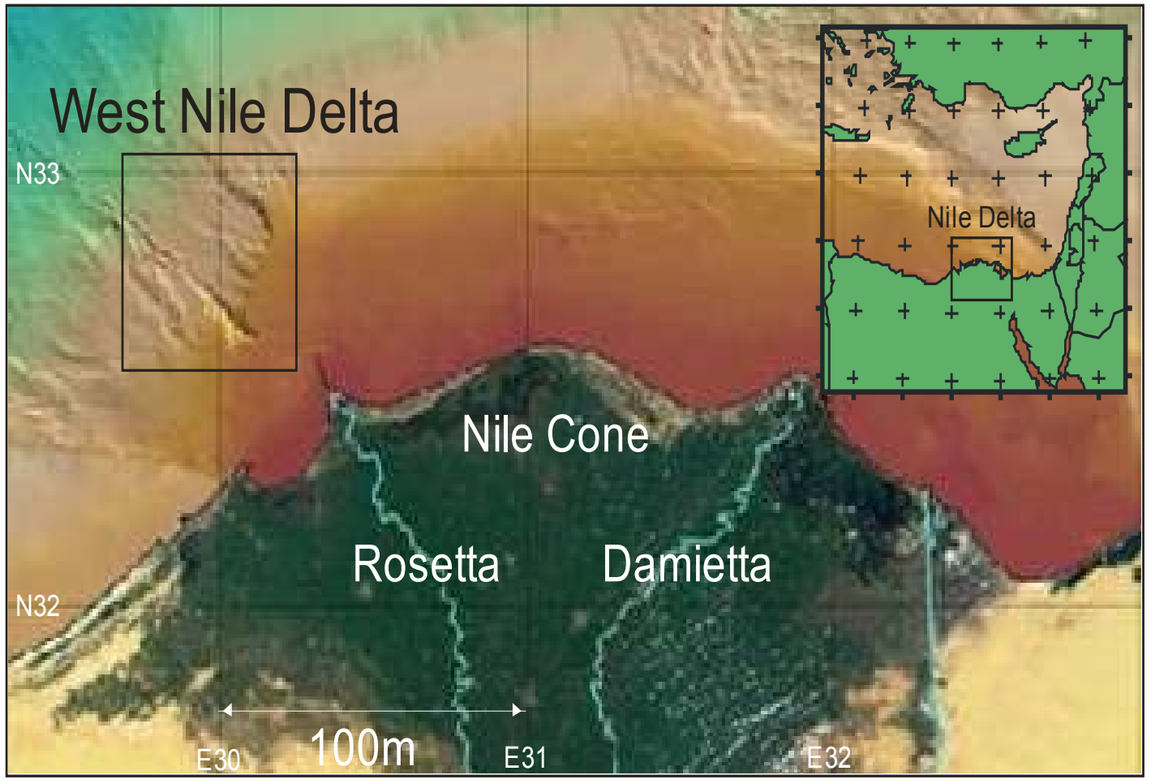


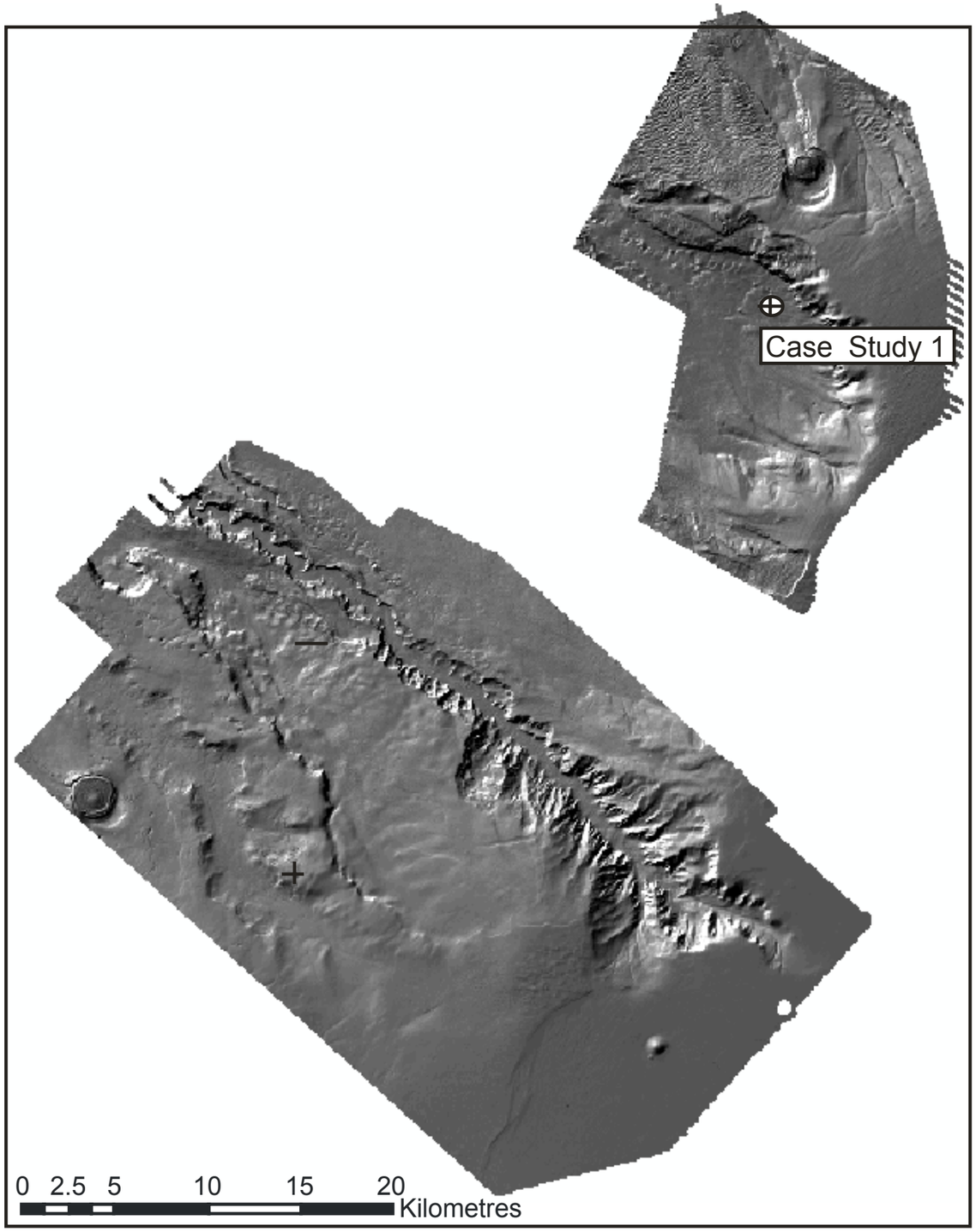
Box Core

Calibration of Slope Systems



Case Study 1 – Calibration of Geophysics for Accurate Frequency / Magnitude Determination





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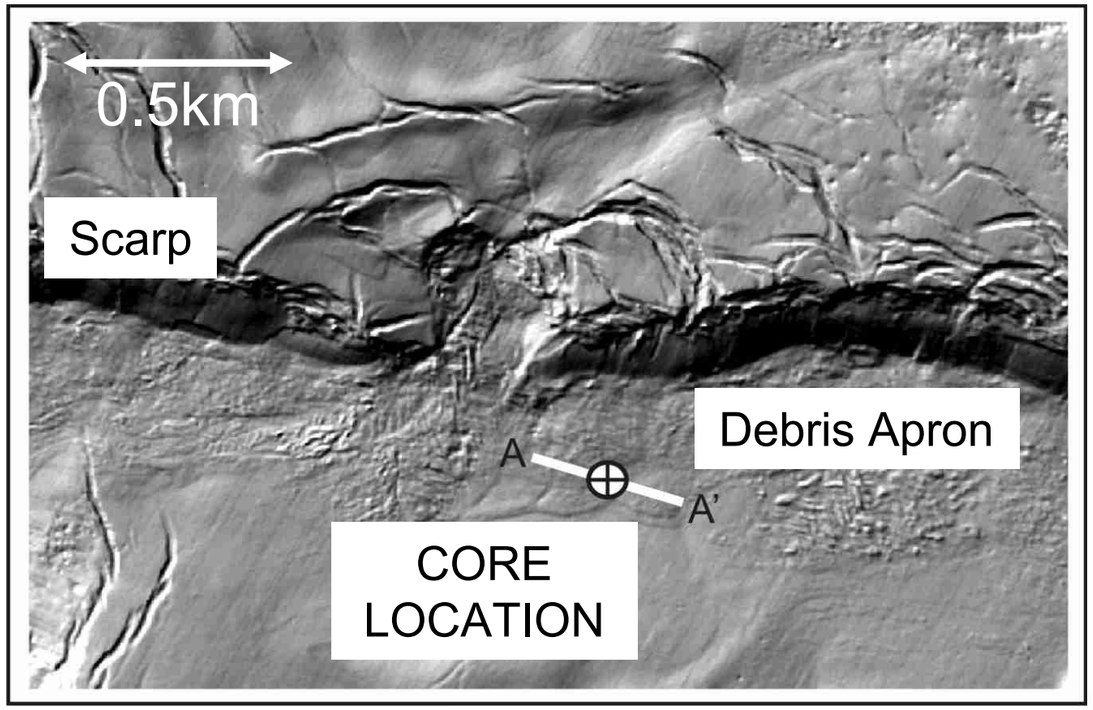

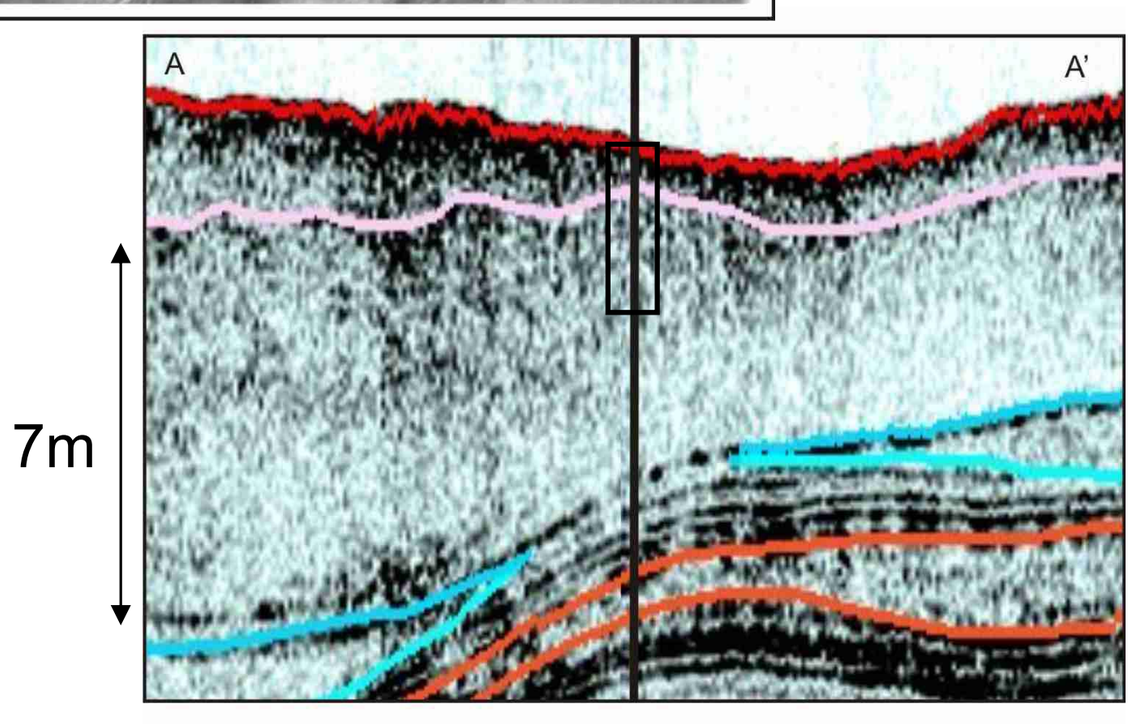

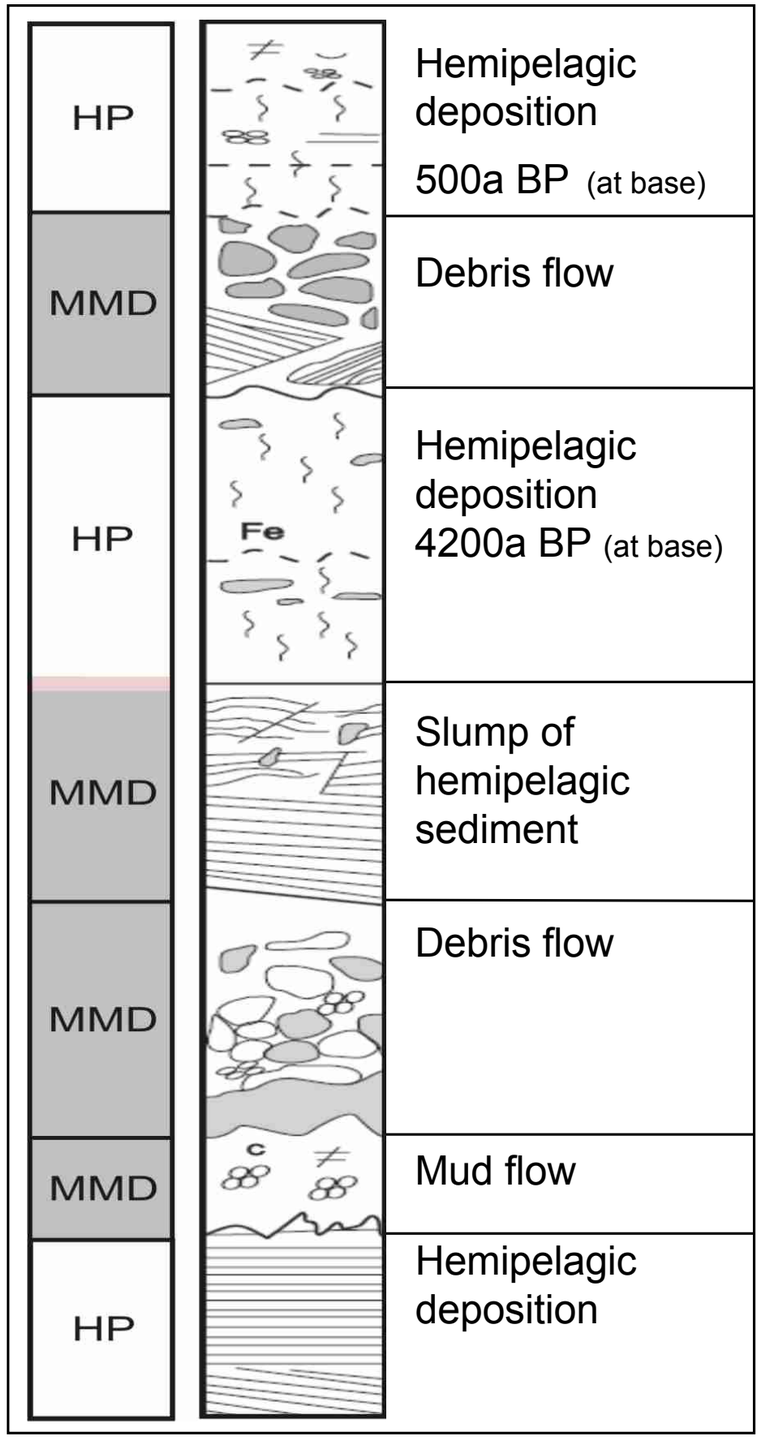

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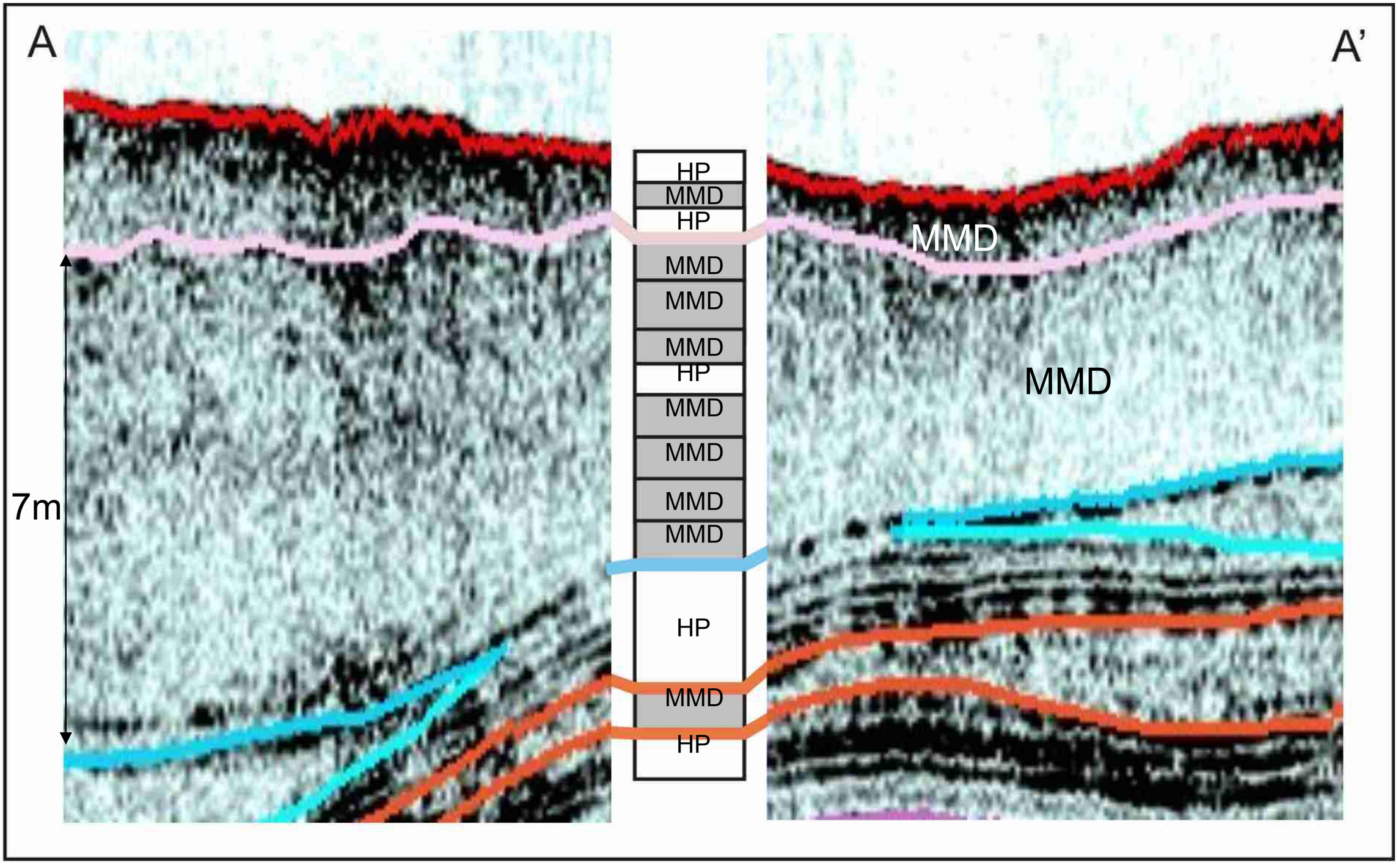
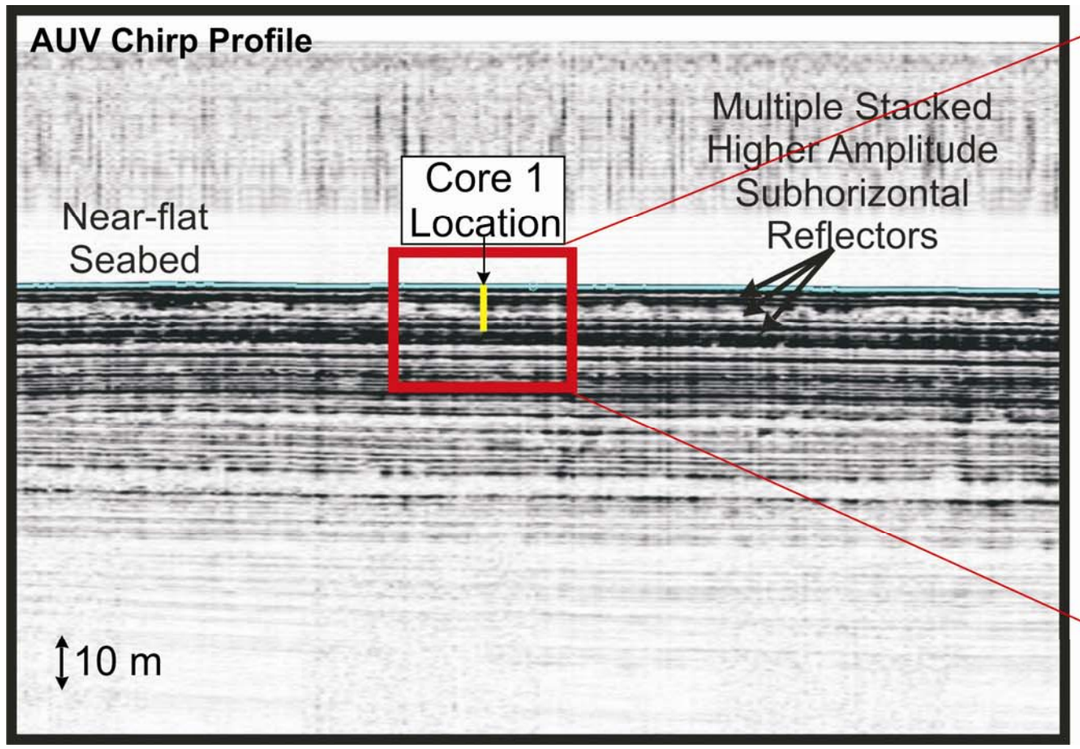
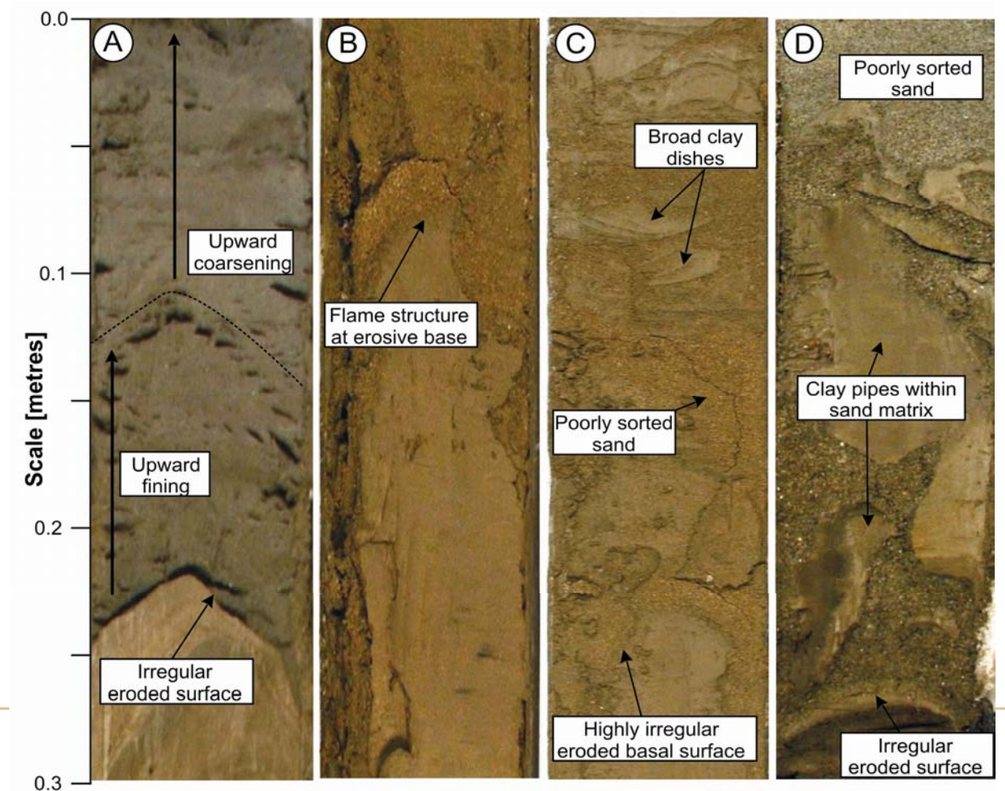
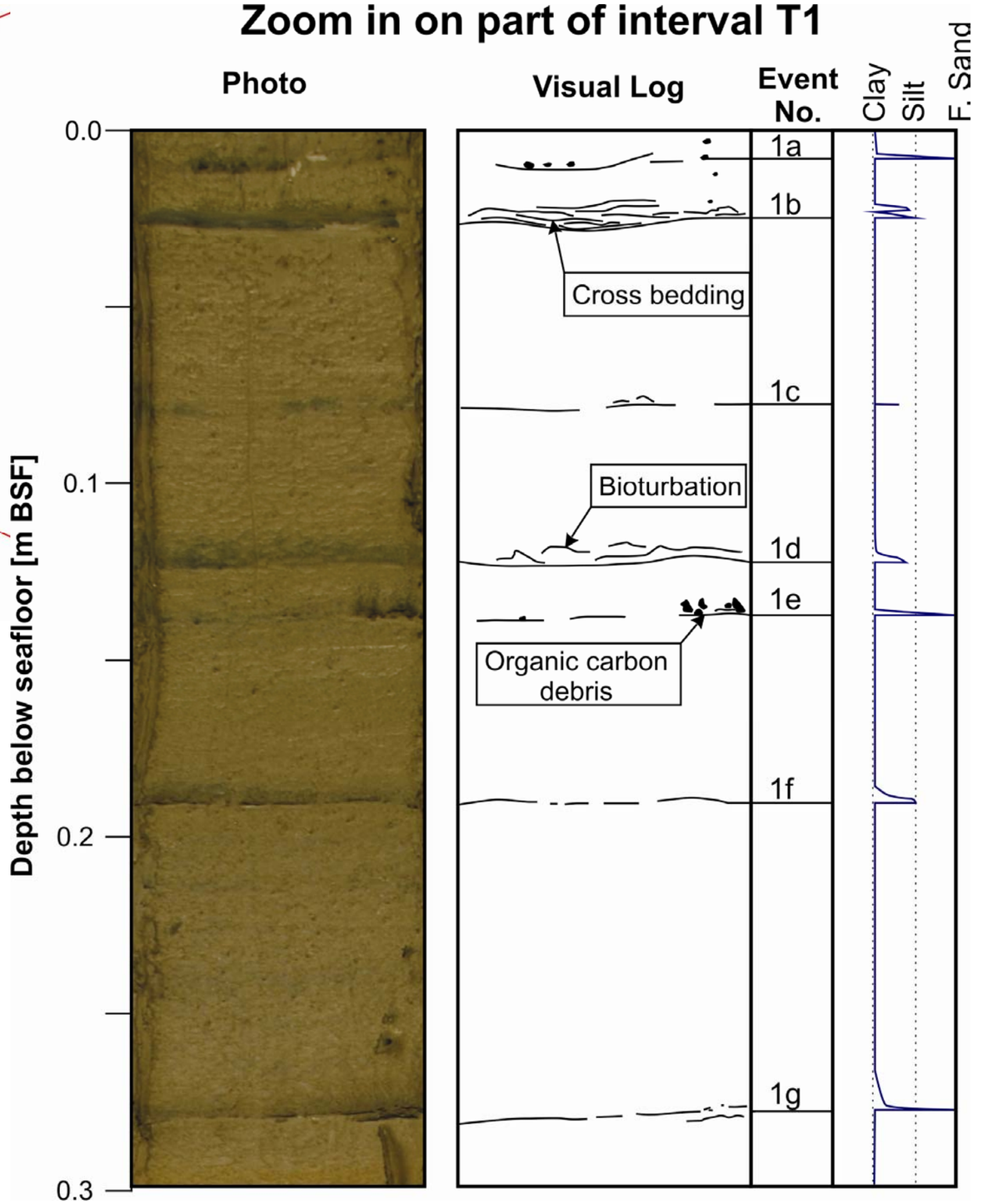


Case Study 2 – Calibration of Geophysics for Accurate Process Determination

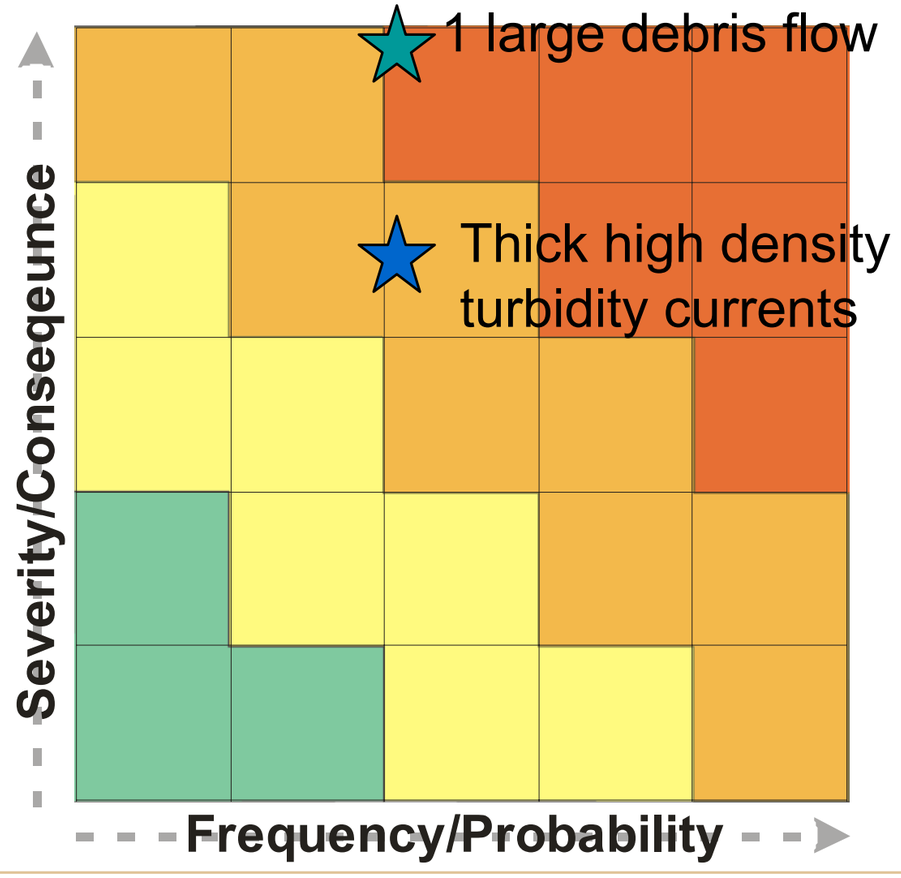


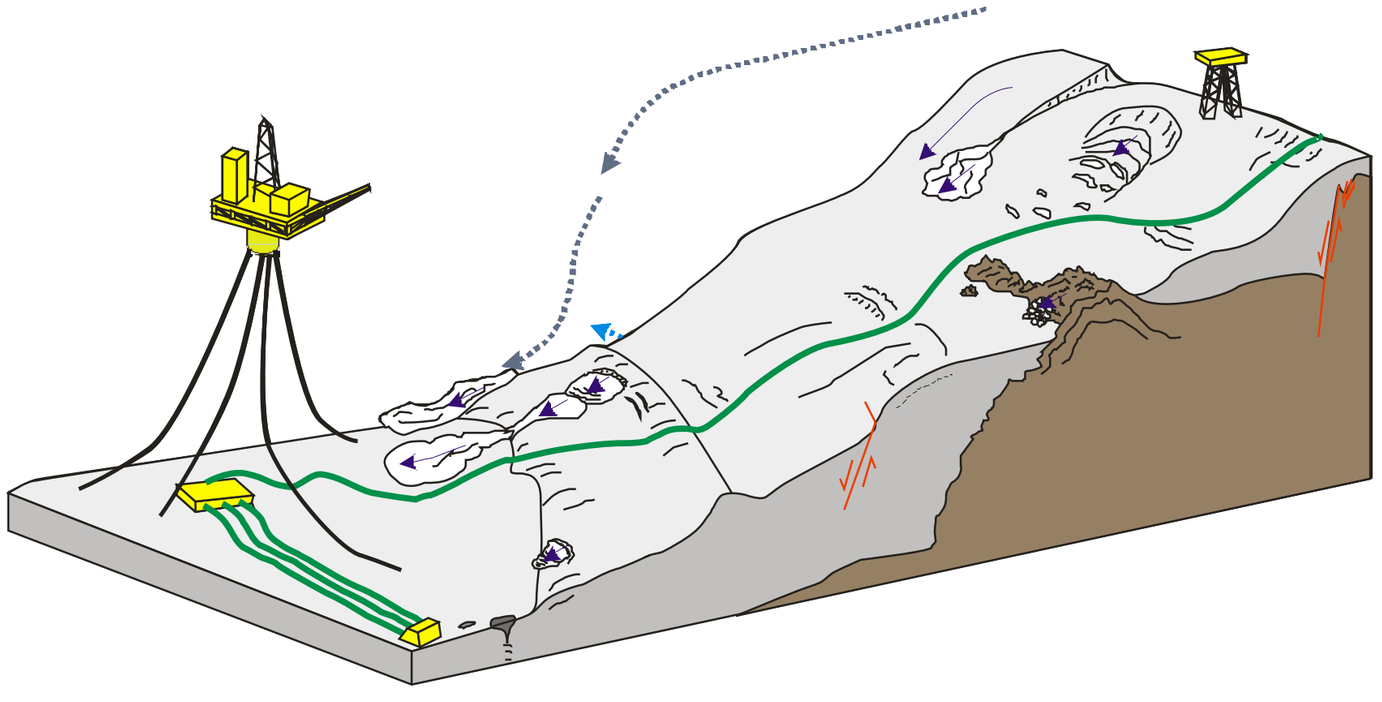




The Need for Careful Consideration

Scenario Without Calibration	Consideration
No detailed geohazard core logging	Incorrect determination of failure mechanism/process
Inaccurate frequency or geohazard process	Inaccurate QRA
Overestimation of event magnitude	Inaccurate Impact Modelling (too extreme)
Lack of understanding of geochronological framework	Incorrect assessment of triggers and/or conditioning factors





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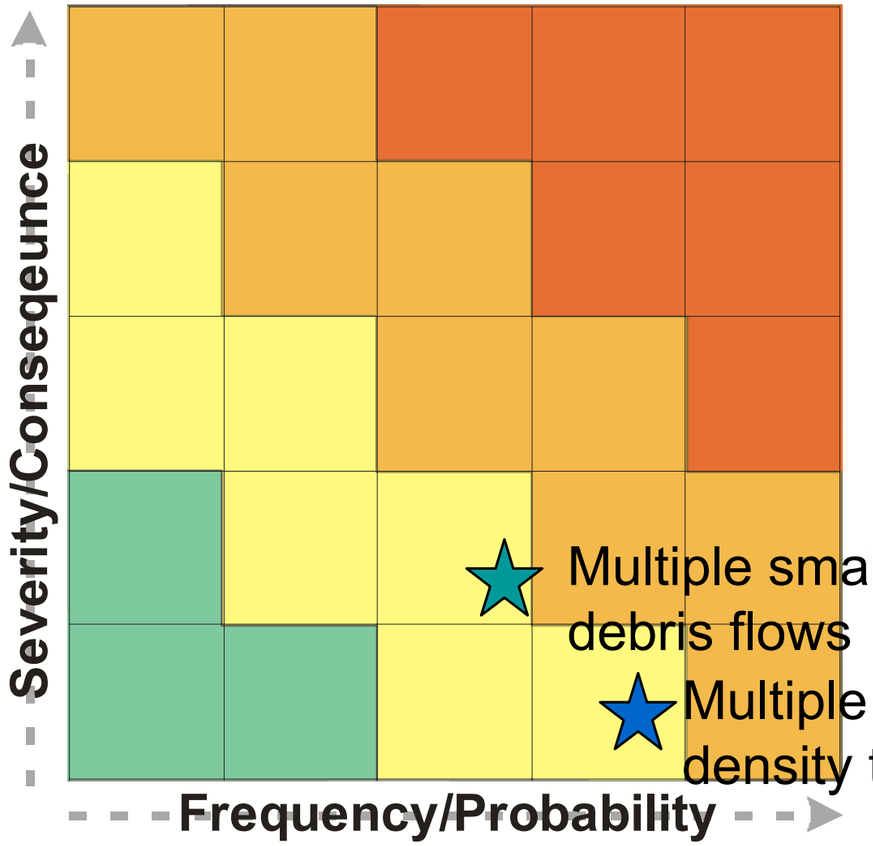

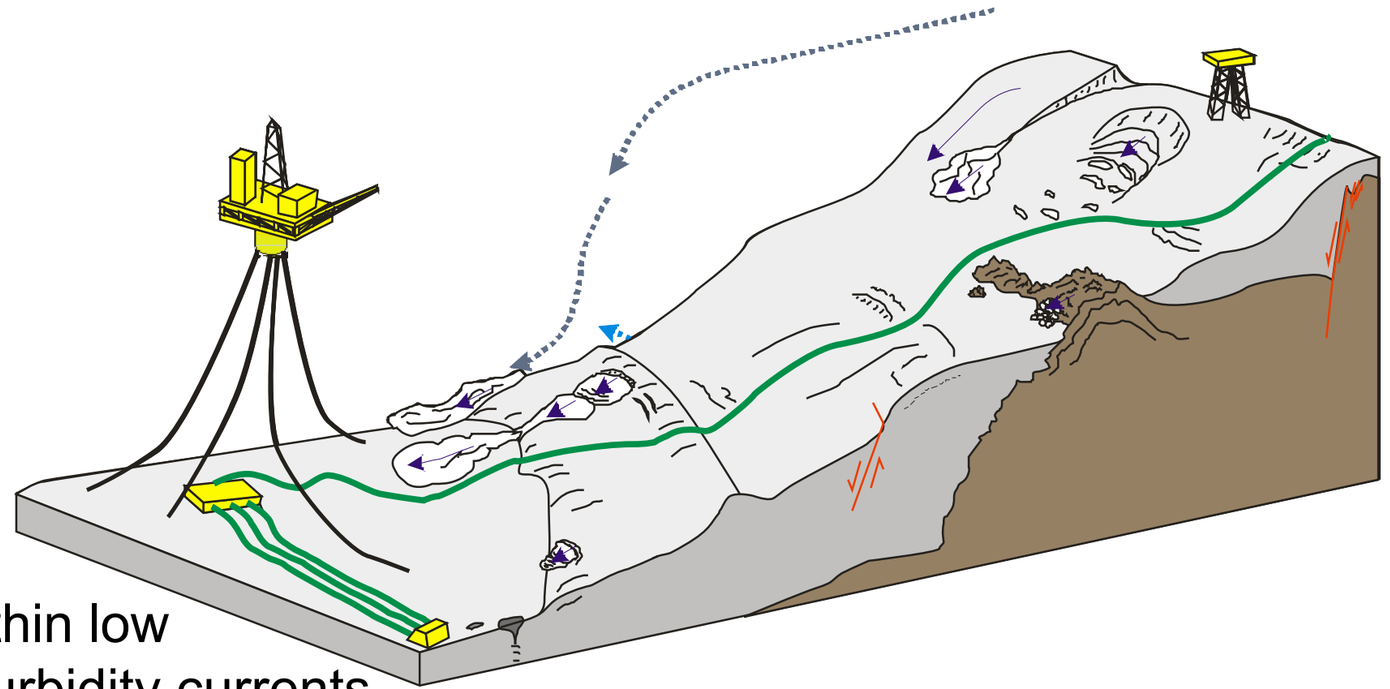

Conclusions

- For a credible geohazard assessment, it is necessary to **correlate and calibrate** geophysical data
  - **Multidisciplinary integration** should be undertaken on a variety of scales

- Geophysics should inform the **targeting of cores** for detailed geohazard logging
  - The findings should also be integrated to update the geophysical interpretation to **maximise yield of all available data**

- Without calibration, you run the risk of inaccurately calculating **frequency**, **magnitude** and **geohazard process** which may result in:
  - Poor modeling of impact
  - Unrealistic levels of perceived risk in a QRA
  - Overly conservative design

Thank You