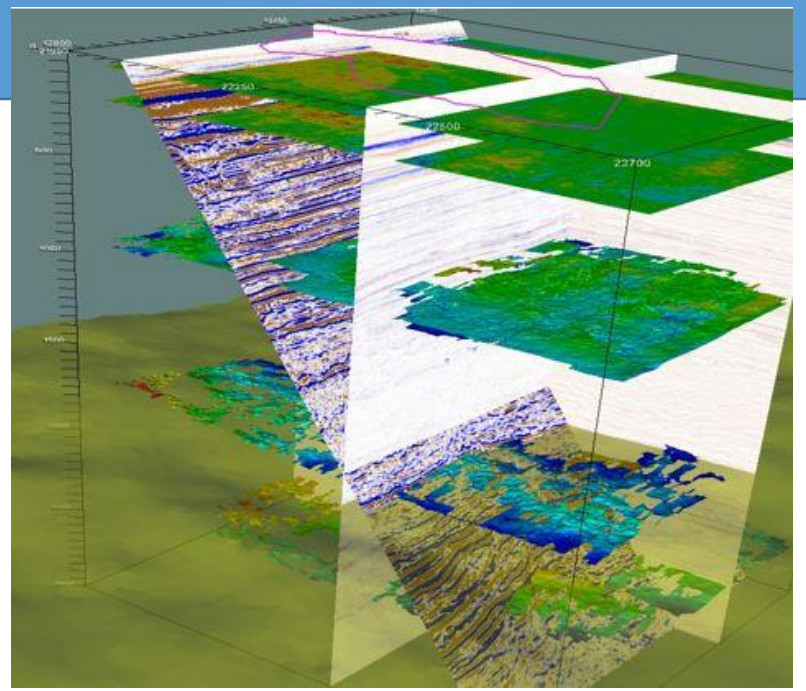
Geo-4D

Geoconsulting excellence



An overview of 3D Ground Modelling, Visualisation and Probabilistic Risk Analysis

Joe Durrant

ECOWindS

European Clusters for Offshore Wind Servicing

Geocap

Geocap

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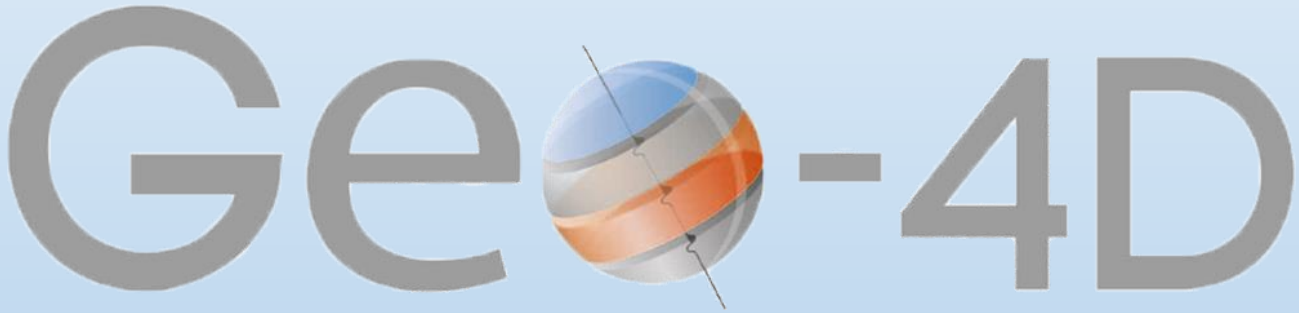
Geo-4D

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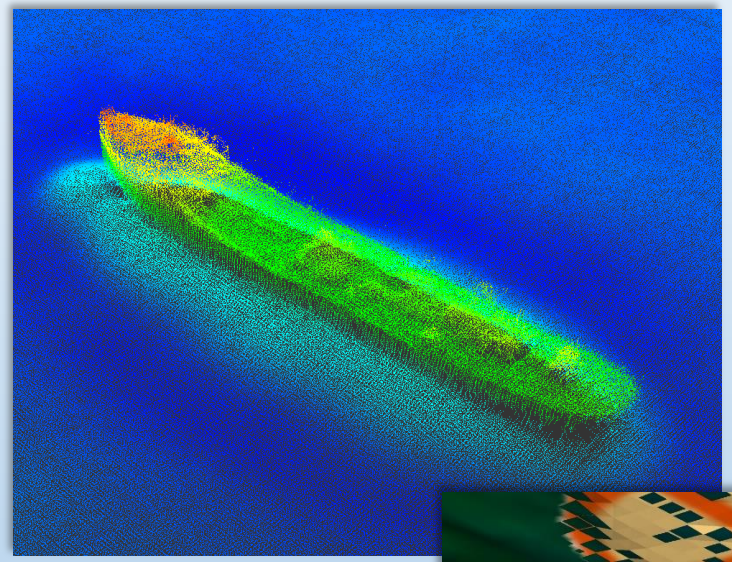
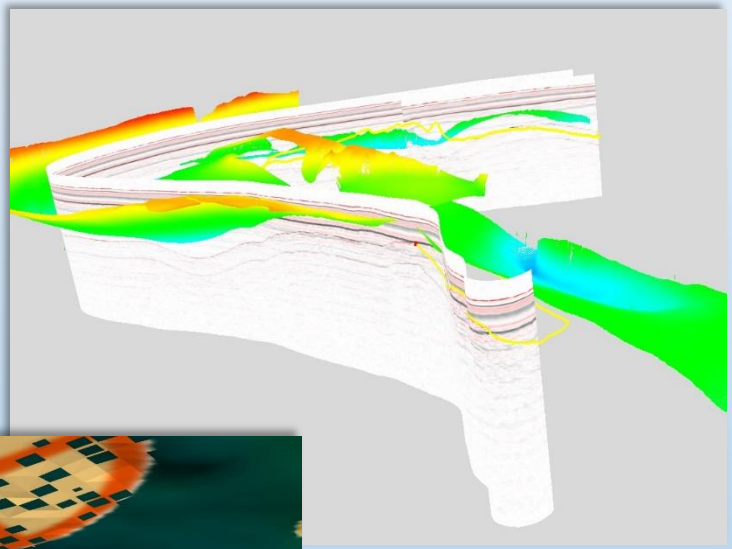
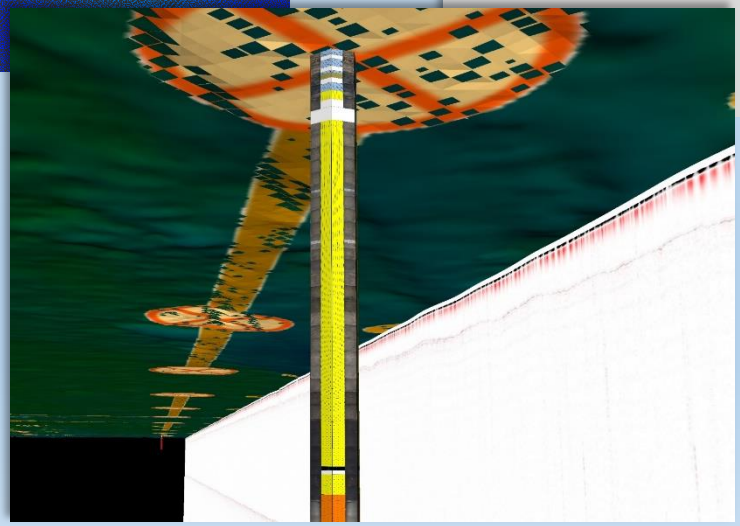
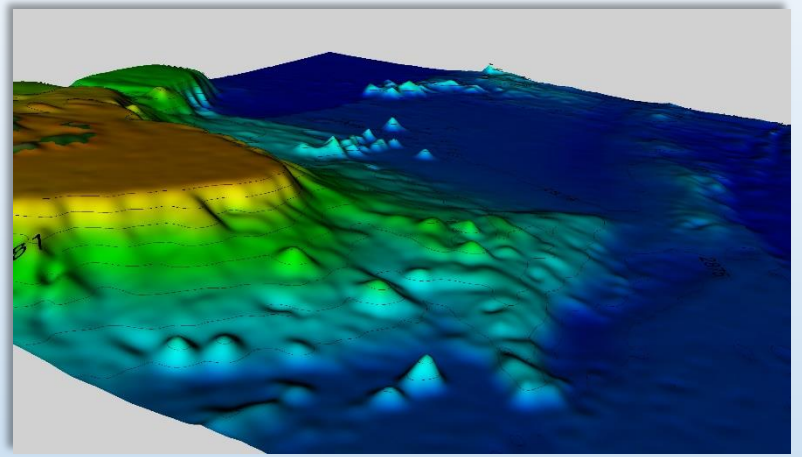
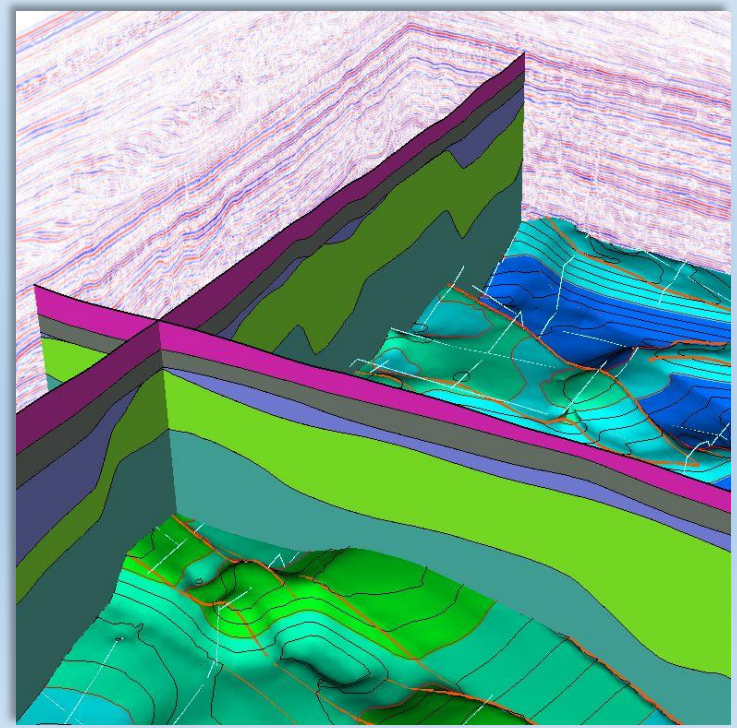
Ground Modelling in Geocap





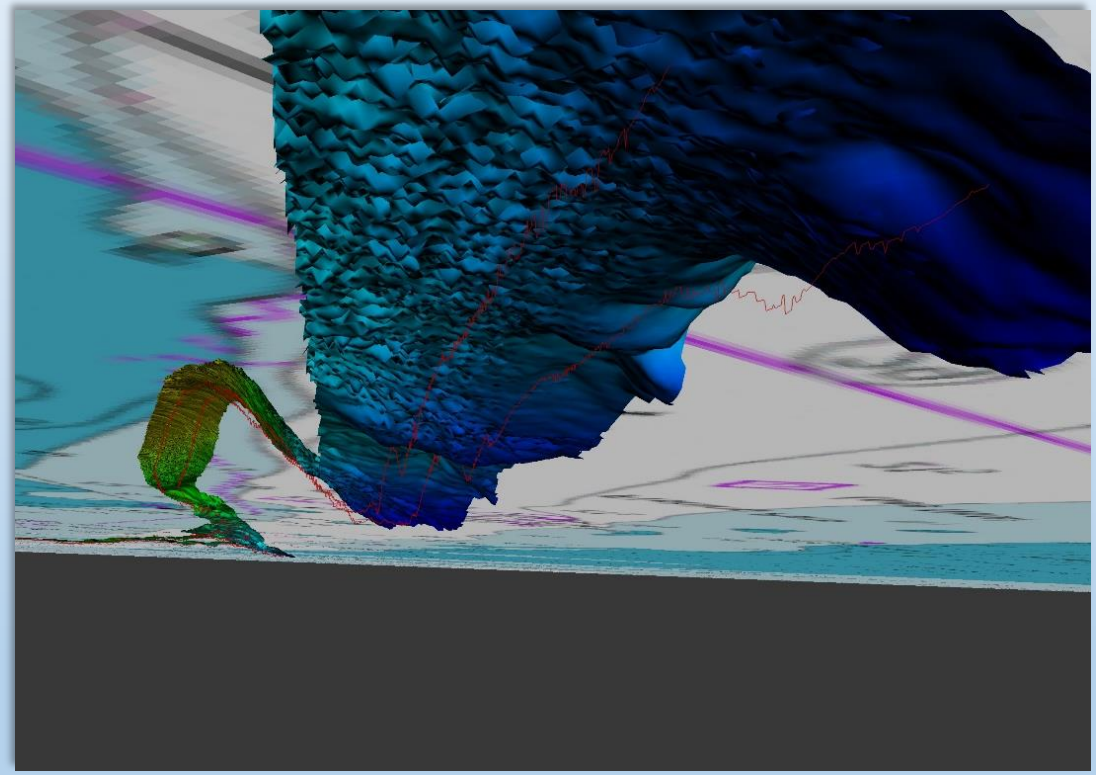






Geo-4D Applications of Geocap

- Detailed seafloor analysis
- Cable burial assessments
- Modelling bed-form migration
  From comparison of time series data
- Direct export to ArcGIS
- Probabilistic risk analysis – heat map deliverables

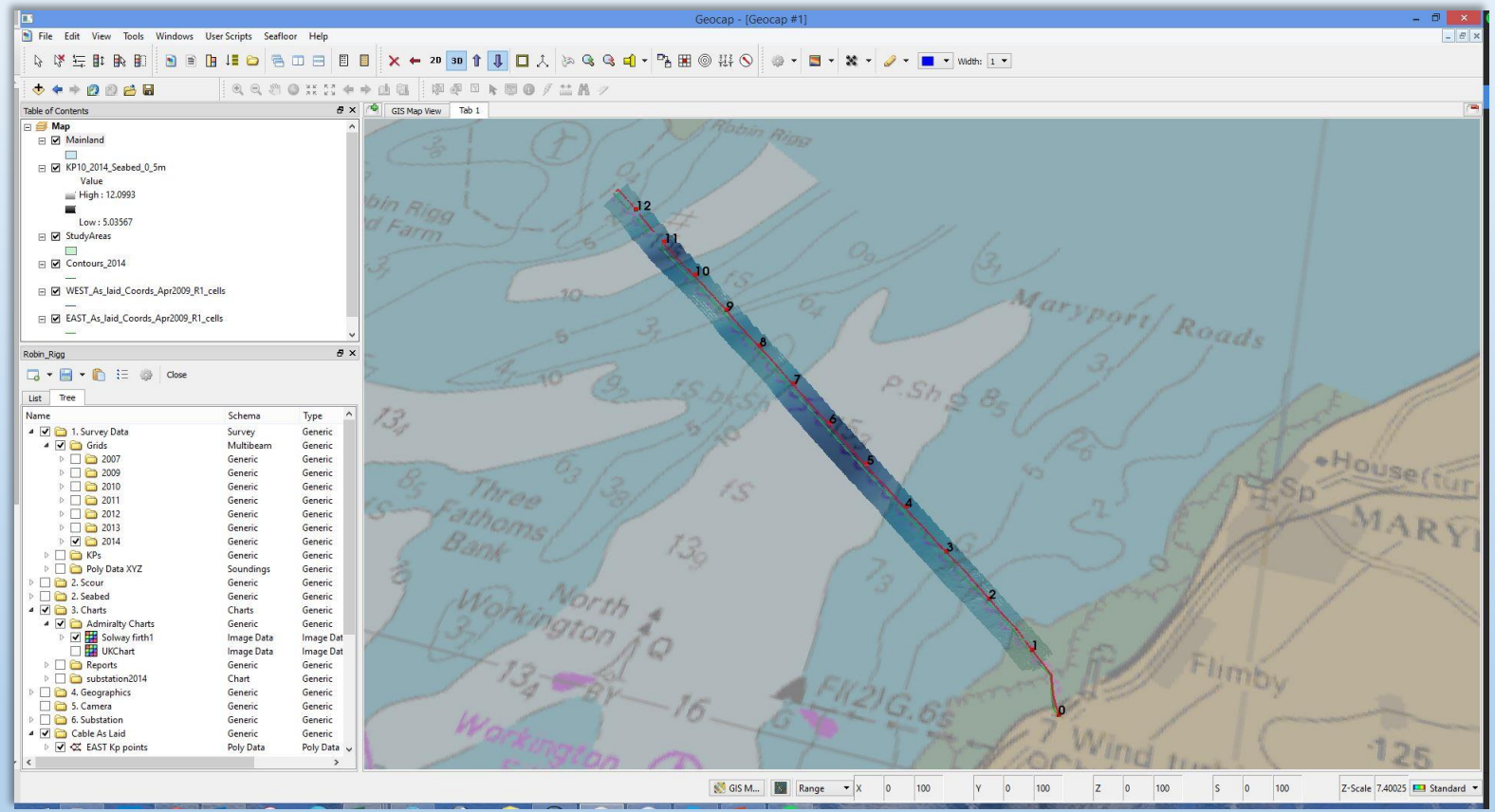


Data Assimilation and 3D Visualisation

- **Multiple features/data**
  - Bathymetry
  - Cable burial depth
  - KP markers
  - Admiralty Charts
  - Aerial photography
  - Sub bottom profiles

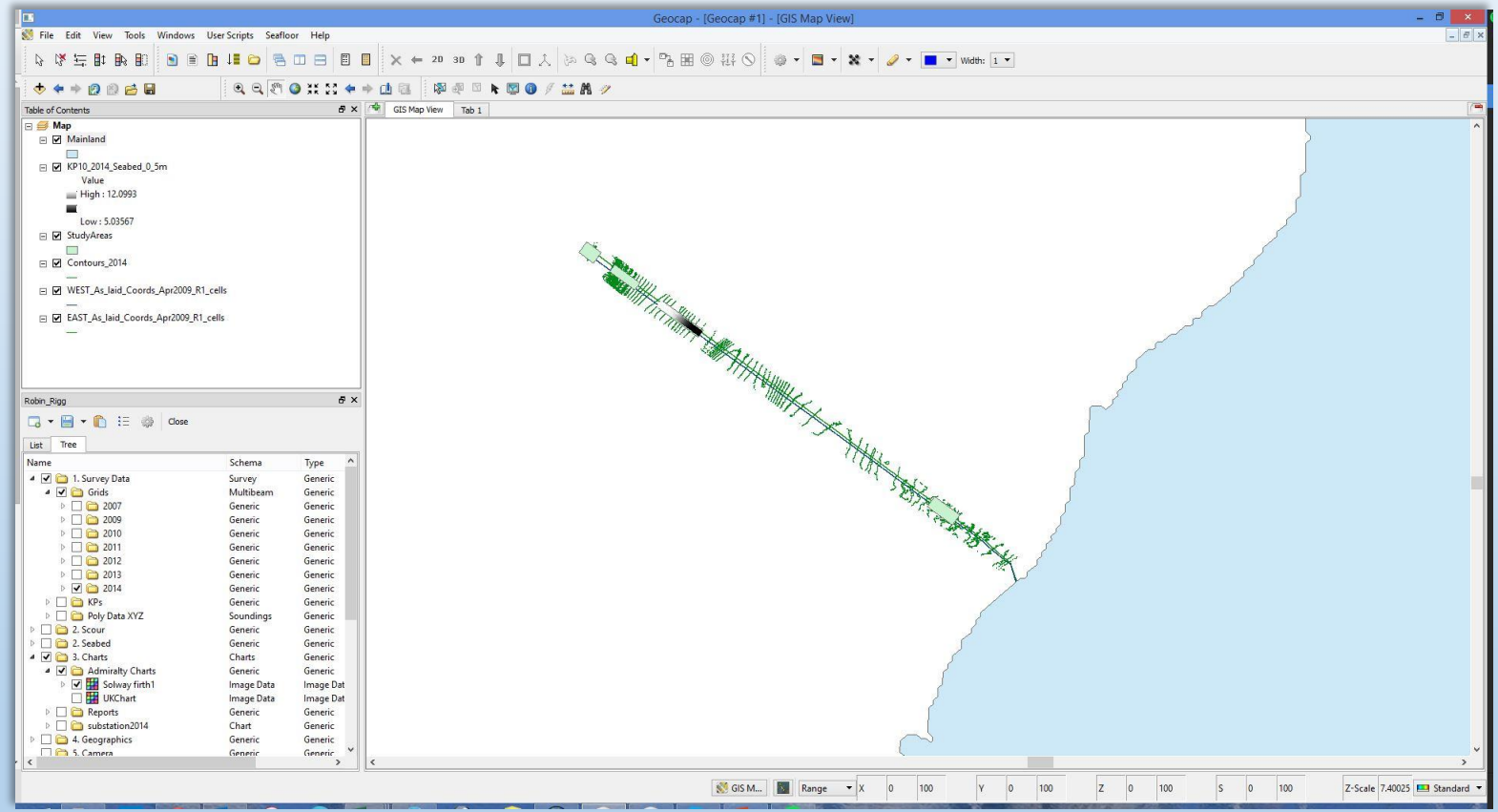
- **Time series analysis**
  - Scour/bedform migration plots

- **Slope Analysis**
  - UNCLOS



Native ArcGIS window in Geocap – Seamless data integration

- **ArcGIS Functionality**
  - Geodatabase creation
  - Feature class creation
  - Raster conversion
  - Simplified map layer organisation + visualisation
  - Dedicated Arc Toolbars
  - Export Shapefiles, tables etc..



Probabilistic Risk Assessment of Anchor drag and anchor drop.

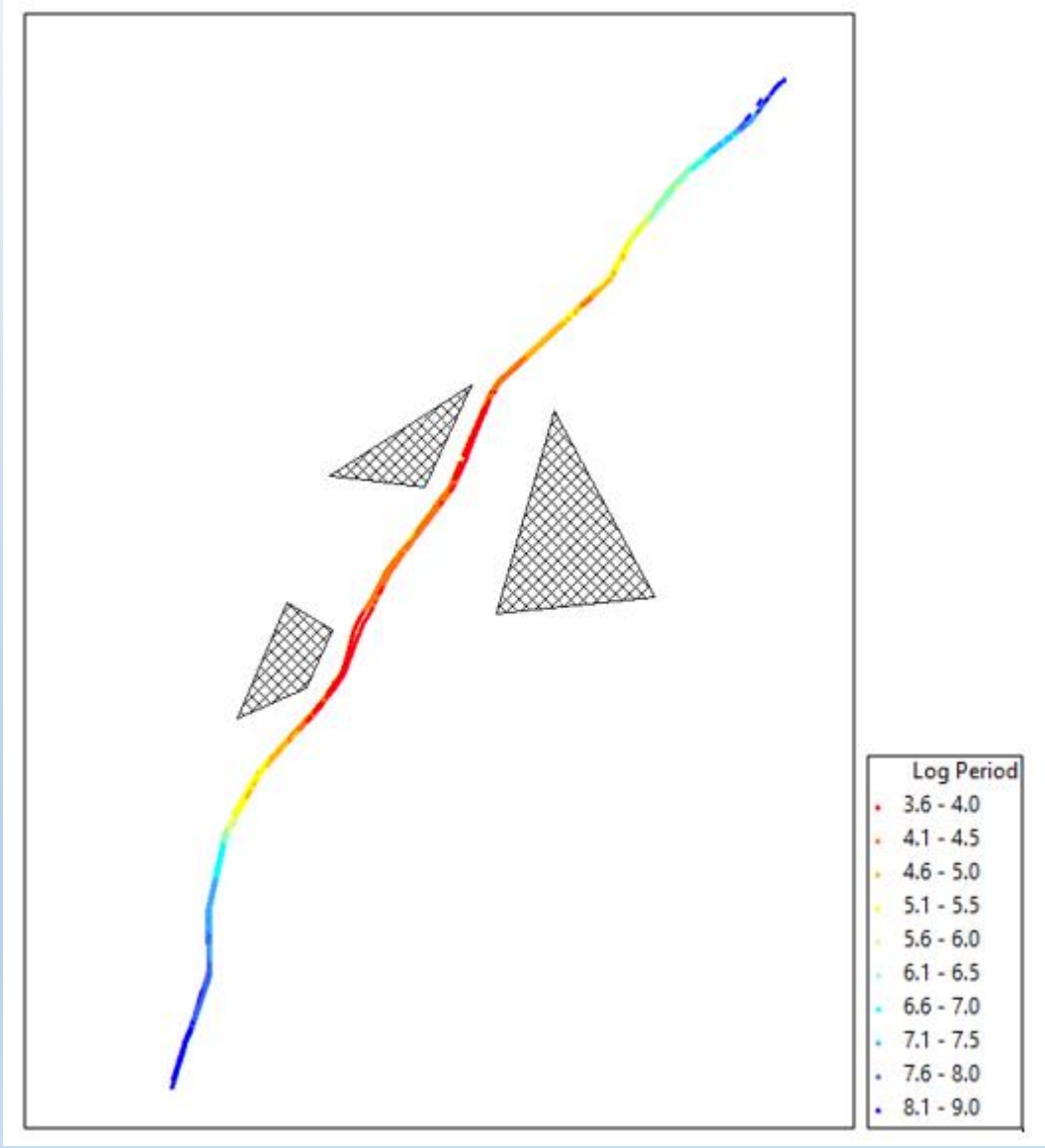
Anchor drag captures the chance that a vessel will drag it's anchor from an anchorage, across the cable. The risk is primarily dependent on the vessel traffic density combined with wind strength and direction, the burial depth, and the anchor penetration.

Anchor drop captures the chance that a passing vessel will drop it's anchor onto the cable. This is a much smaller risk than anchor drag.

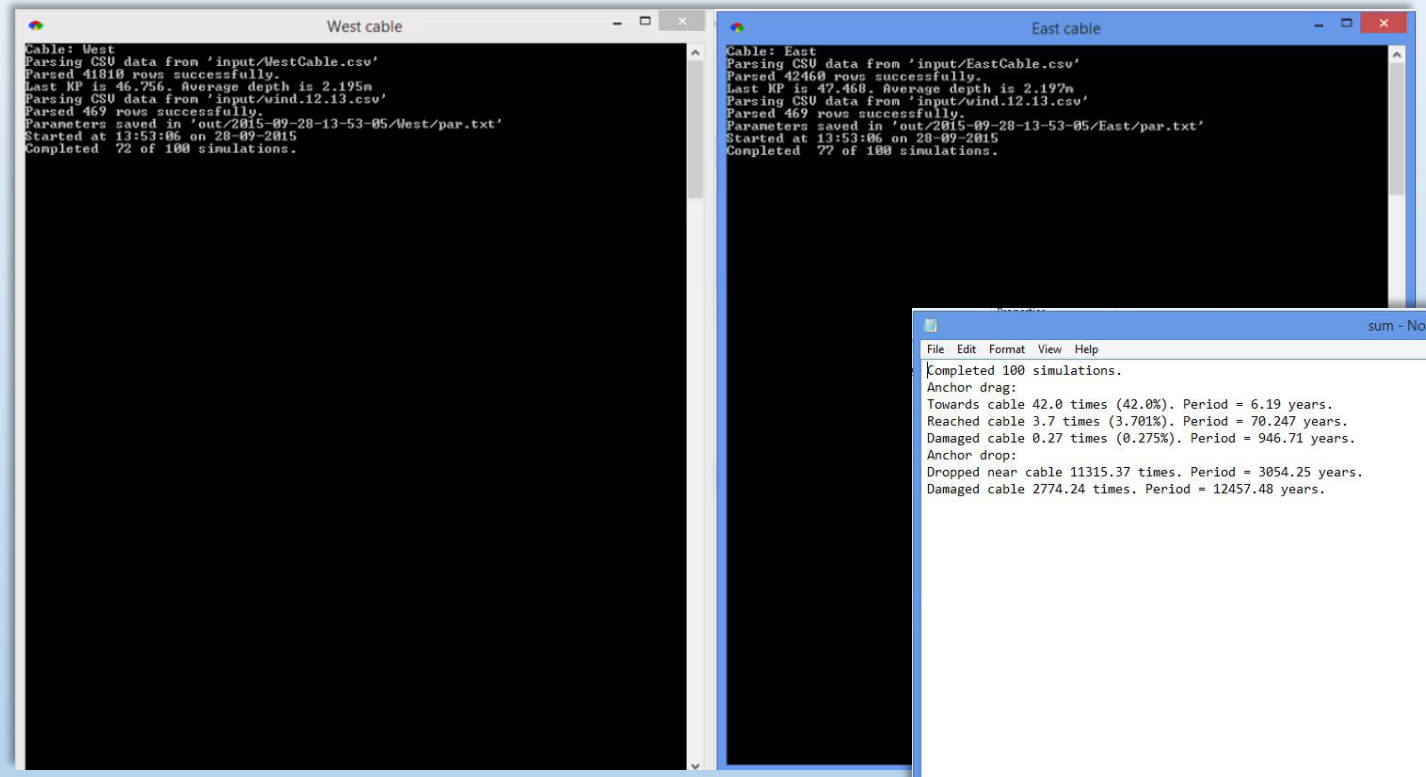
Sediment mobility is also taken into account which modifies the burial depth in that area, which changes the risk profile.

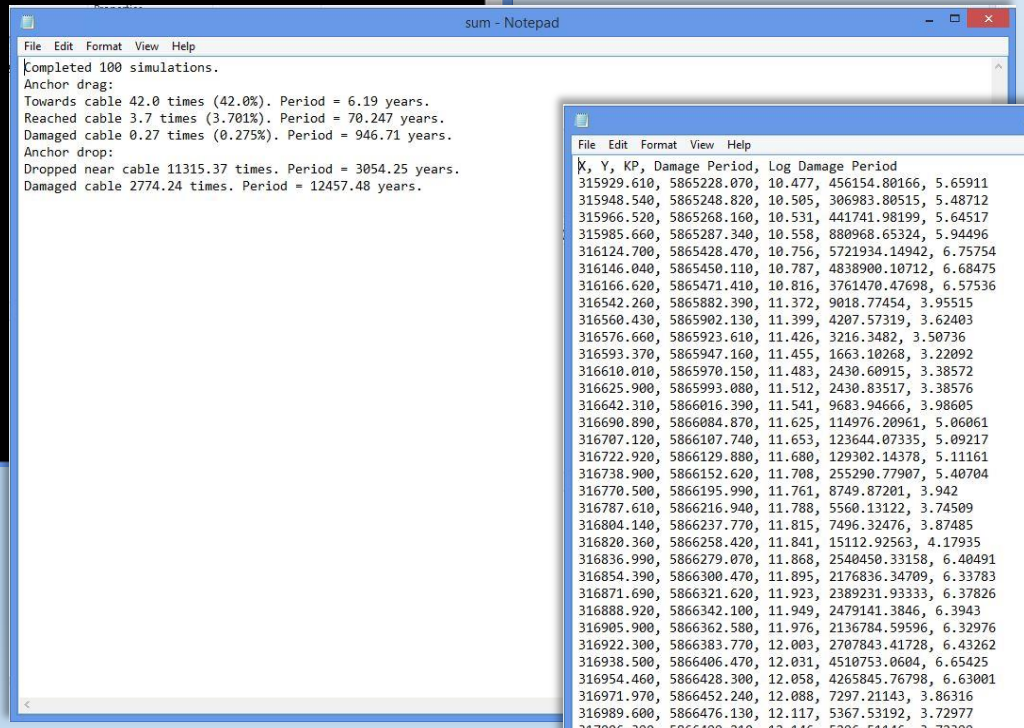
It is possible to extend the model to take into account activities such as dredging and fishing.

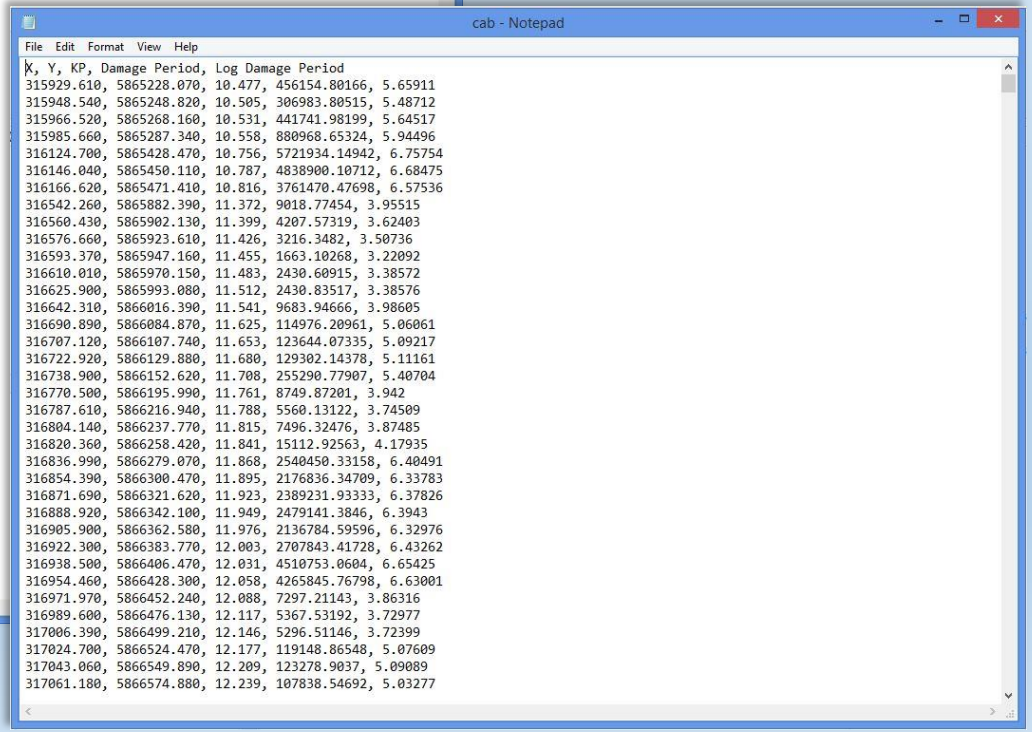
Here is an example of a risk map from three anchorages. The period corresponds to the expected period, in years, between cable damage events. It uses burial depth information corrected for sediment mobility.



Probabilistic Analysis – Sneak peek







python

- Multiple Monte Carlo Simulations
- Typically 10,000 Simulations
- meter scale gridded results

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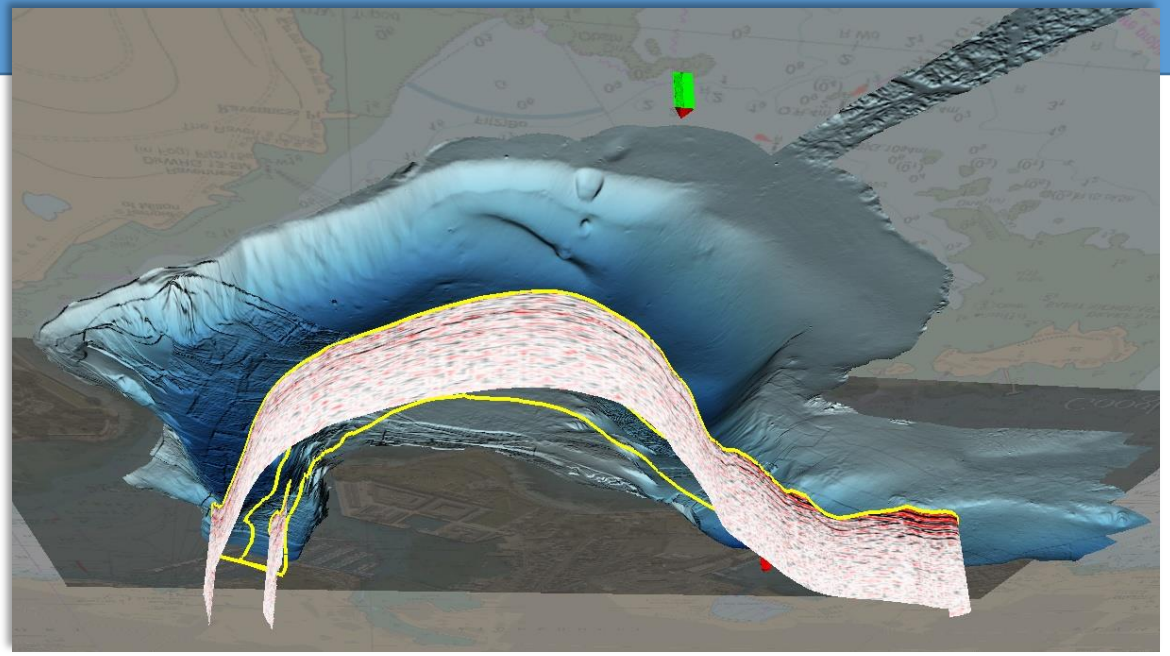

Thank you

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