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CHARLESTON
DEPARTMENT OF GEOLOGY
AND ENVIRONMENTAL
GEOSCIENCES



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Geomorphological Analysis of Complex Sand Waves off the Southeastern Coast of Ireland

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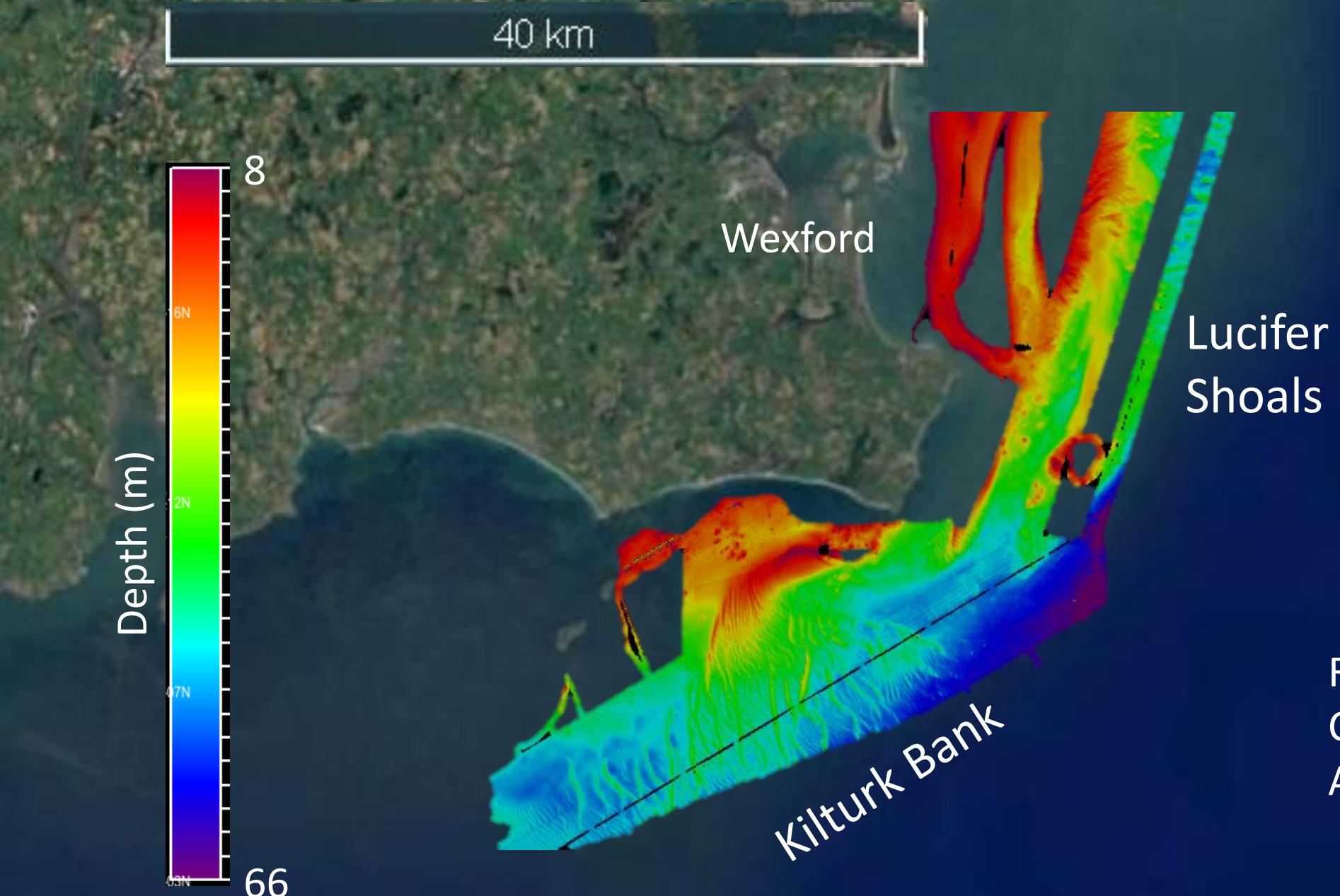
BEAMS Program – May 2016

caris



R/V Celtic Voyager

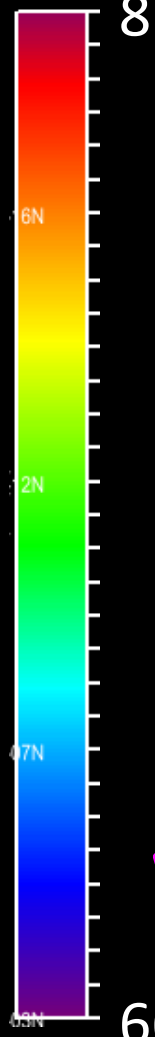
40 km



R/V *Celtic Voyager*
CV09_03
August 2009



Depth (m)



8

6N

2N

07N

66

KB-D4

KB-D3

KB-D2

KB- I2

KB-S

KB-I1

KB-D1

52-08N

52-06N

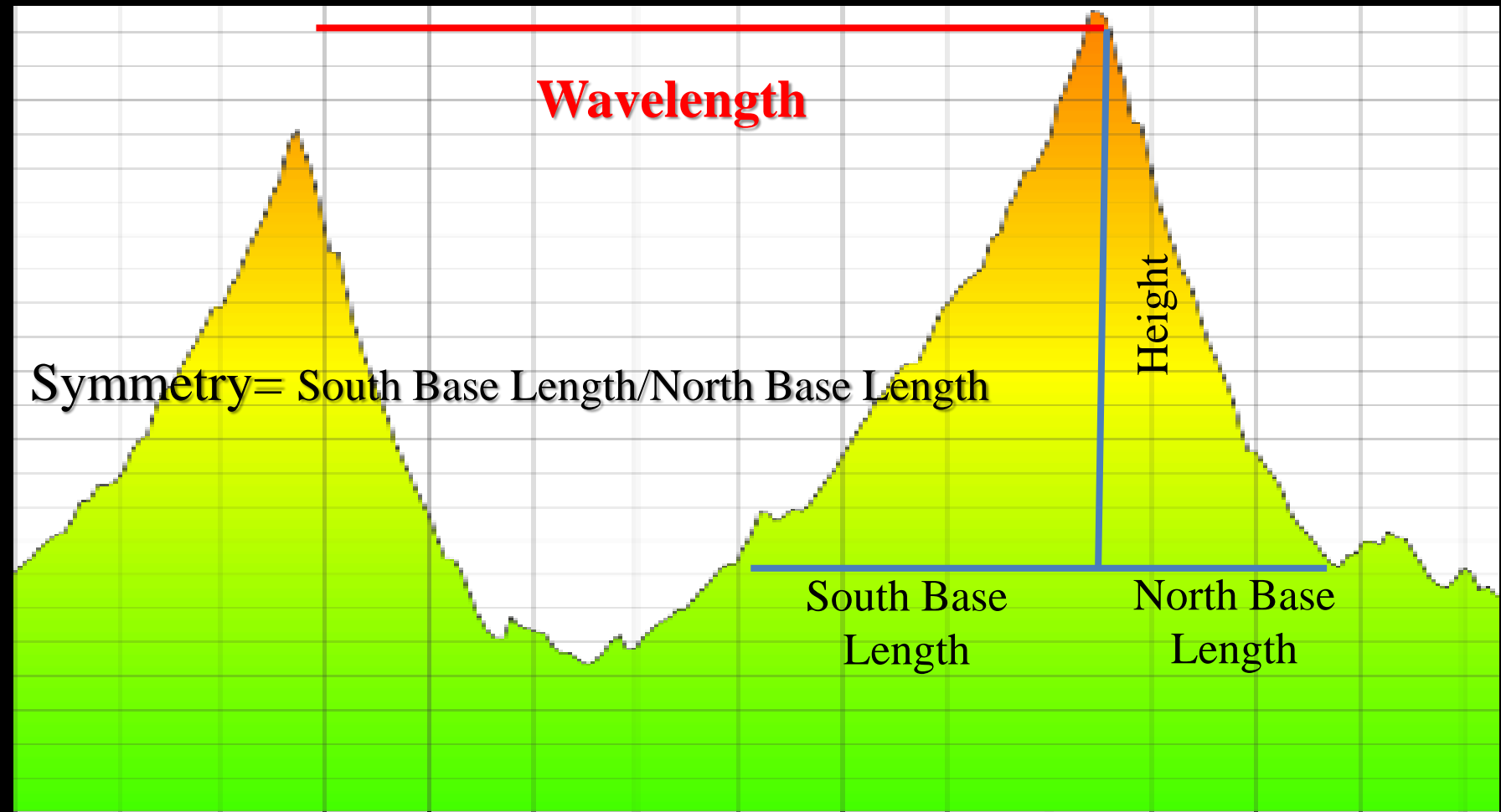
52-04N

52-02N

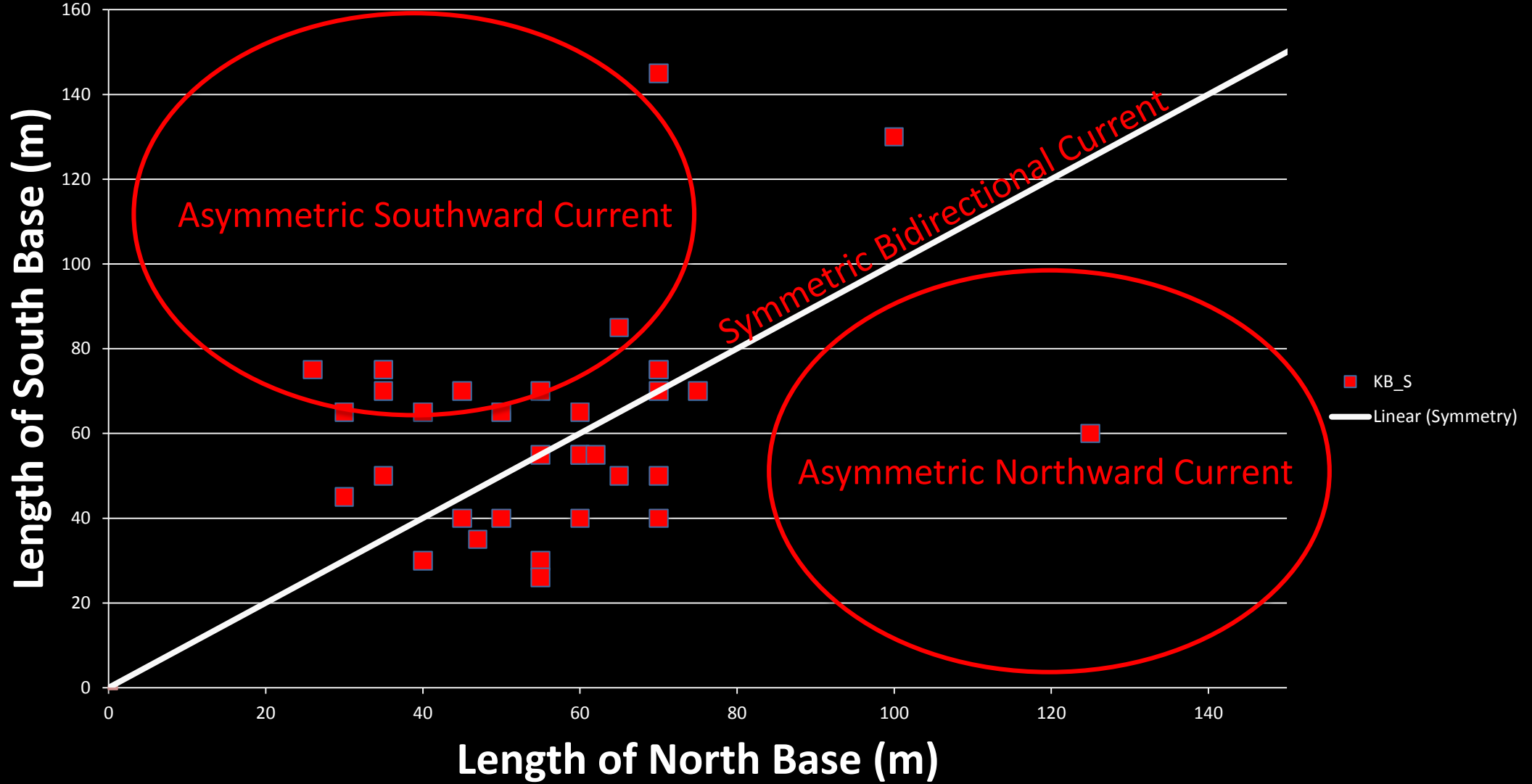


Methods- Quantifying Sand Wave Geomorphology

- Measure sand wave symmetry
 - Purpose: Direction of current flow



Sand Wave Symmetry



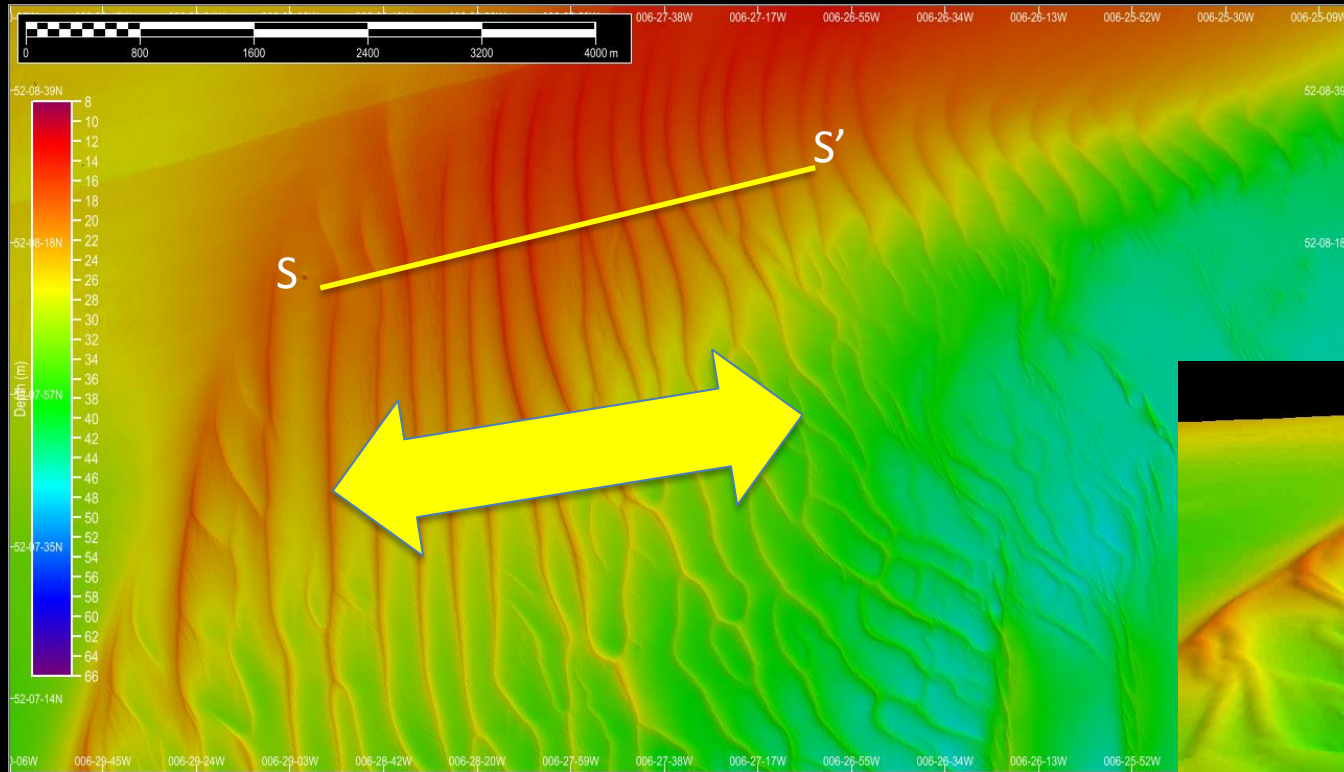
Methods- Quantifying Sand Wave Geomorphology

- Measuring **average wavelength**
 - Purpose: Estimate current velocity

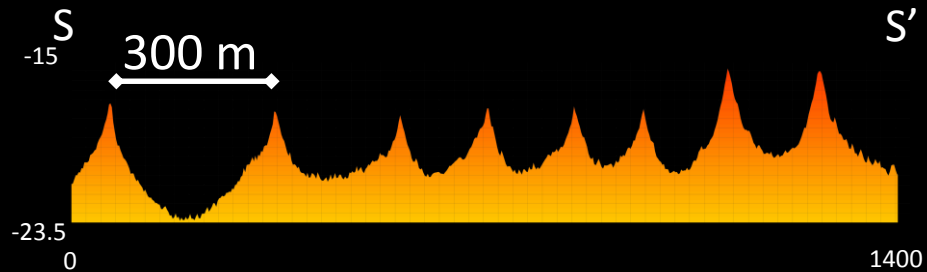
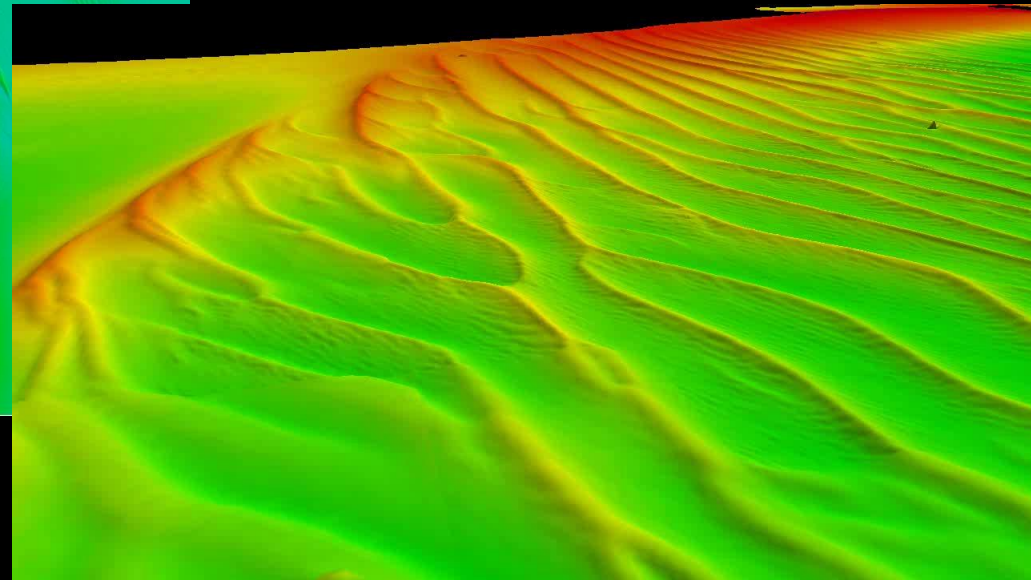
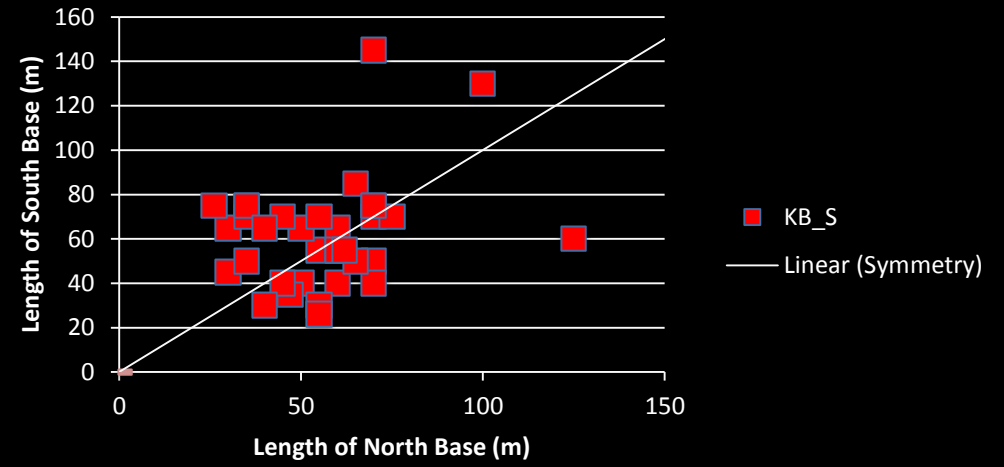
Avg. Wavelength (m)	Predicted Velocity (m/s)
125	0.30
150	0.56
175	0.78
200	1.00

*Wavelengths at Kilturk Bank exceed 200 m

Kilturk Bank- Shallow



Southeastern Ireland Symmetry

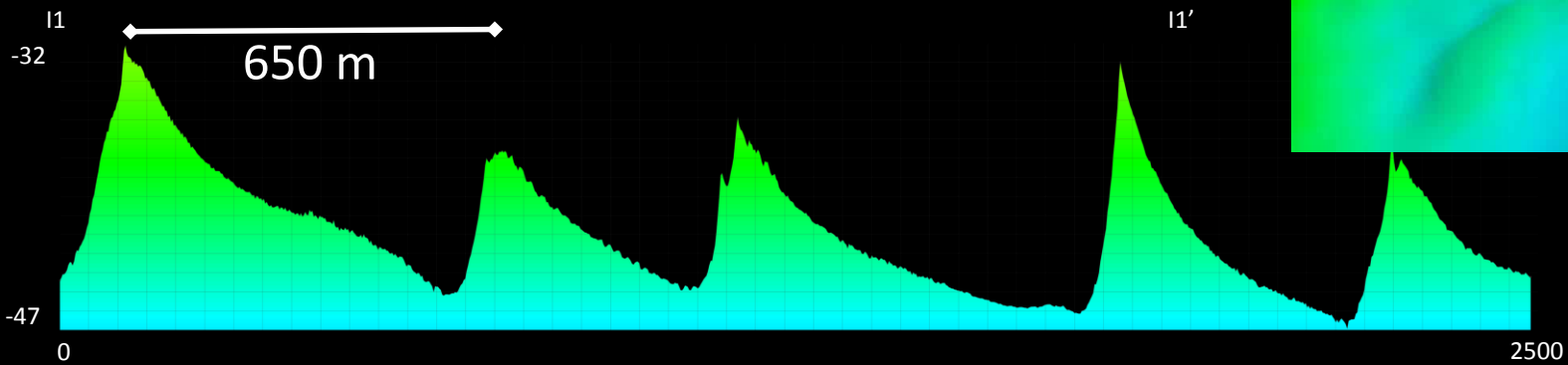
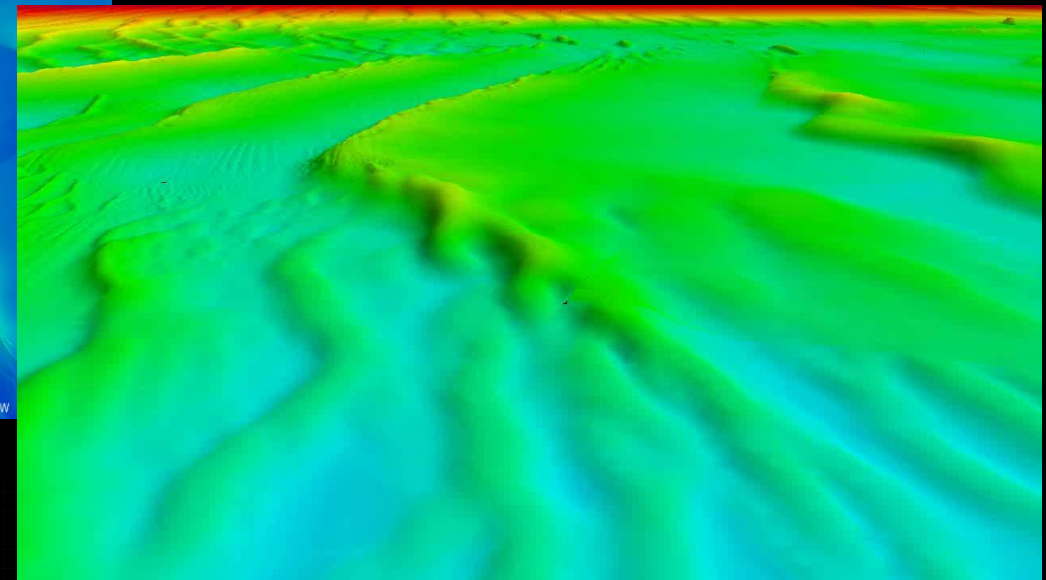
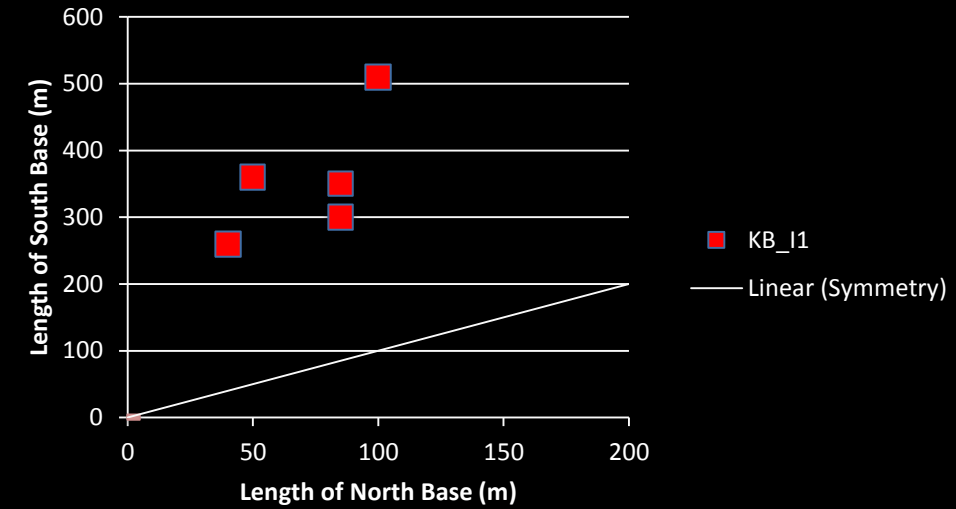
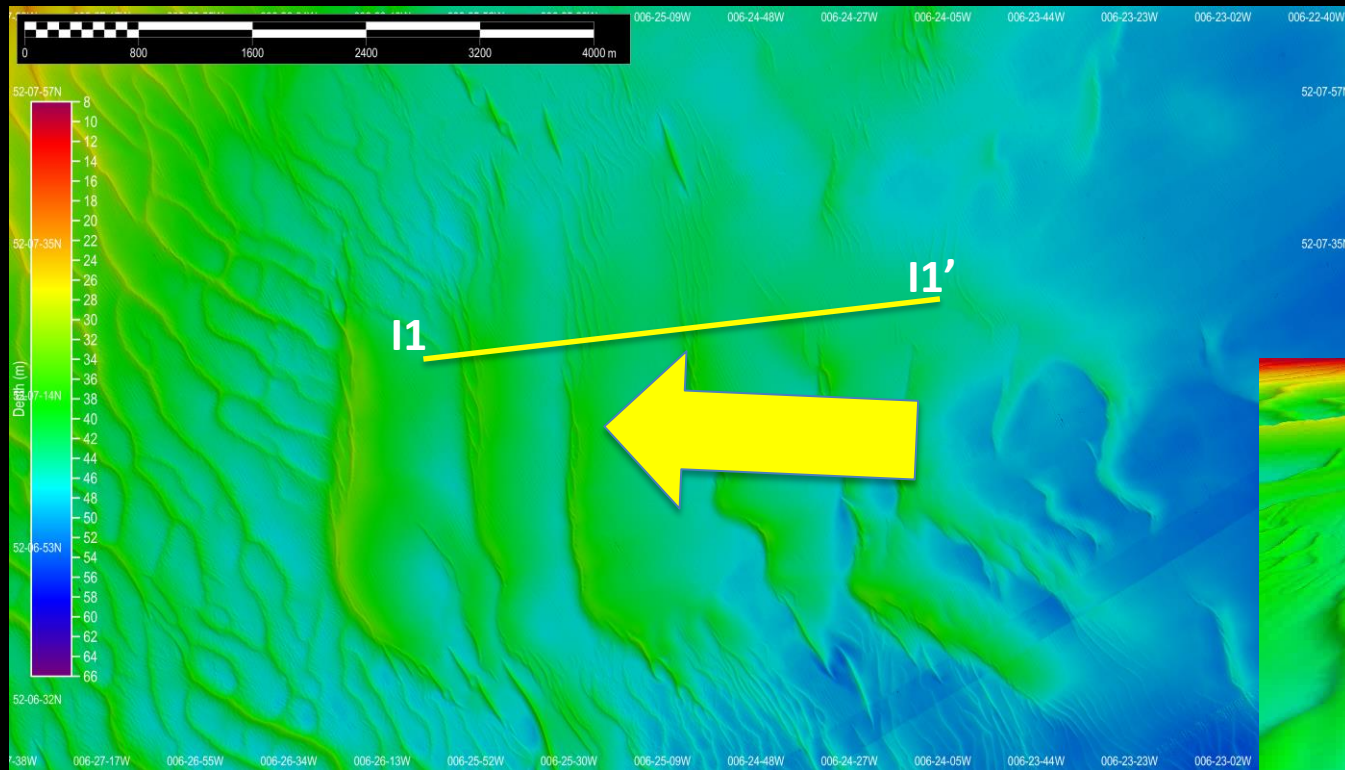


VE = 50x



Kilturk Bank- Intermediate 1

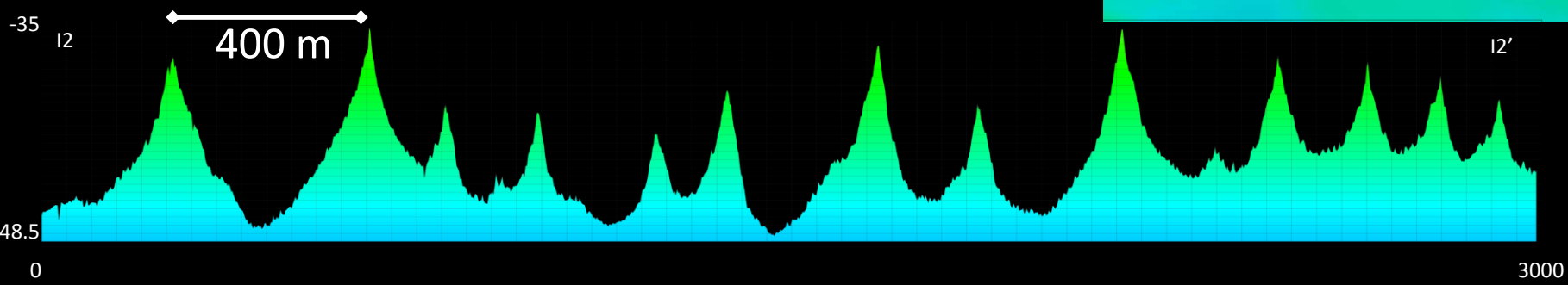
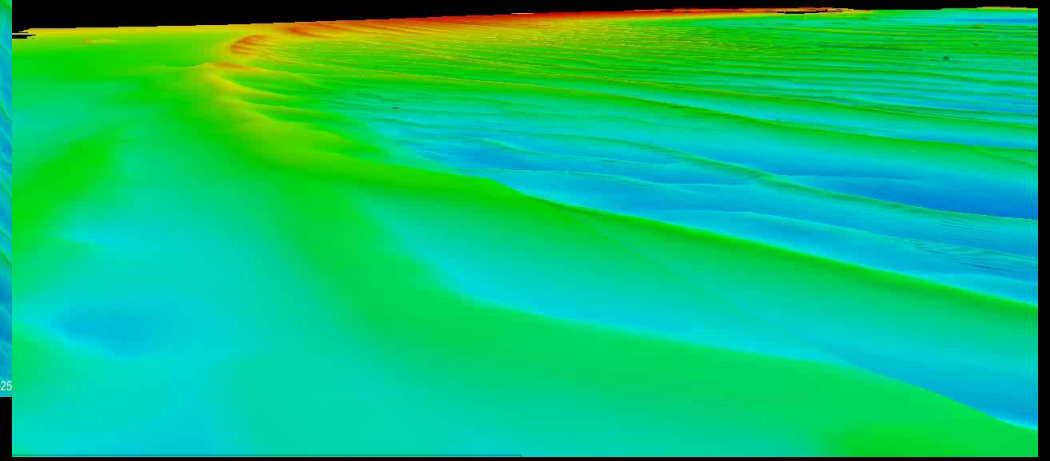
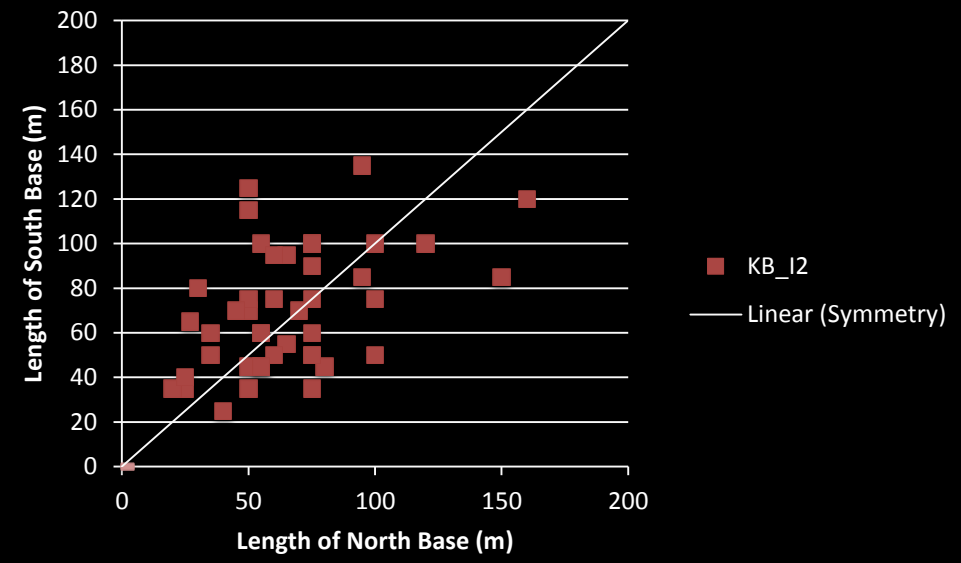
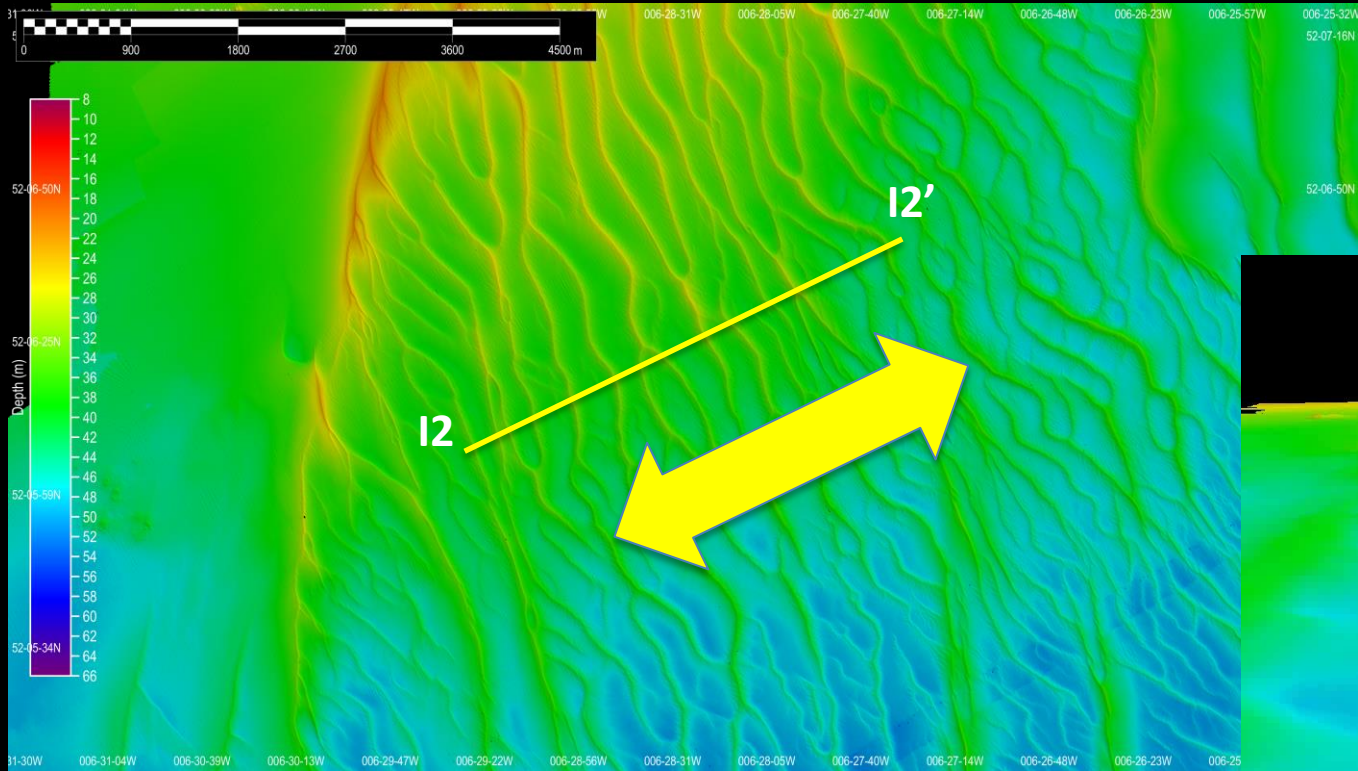
Southeastern Ireland Symmetry



VE = 50x



Kilturk Bank- Intermediate 2

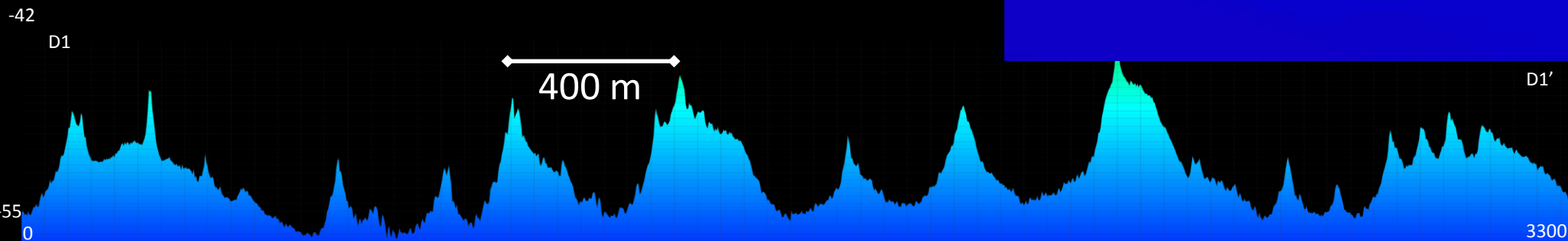
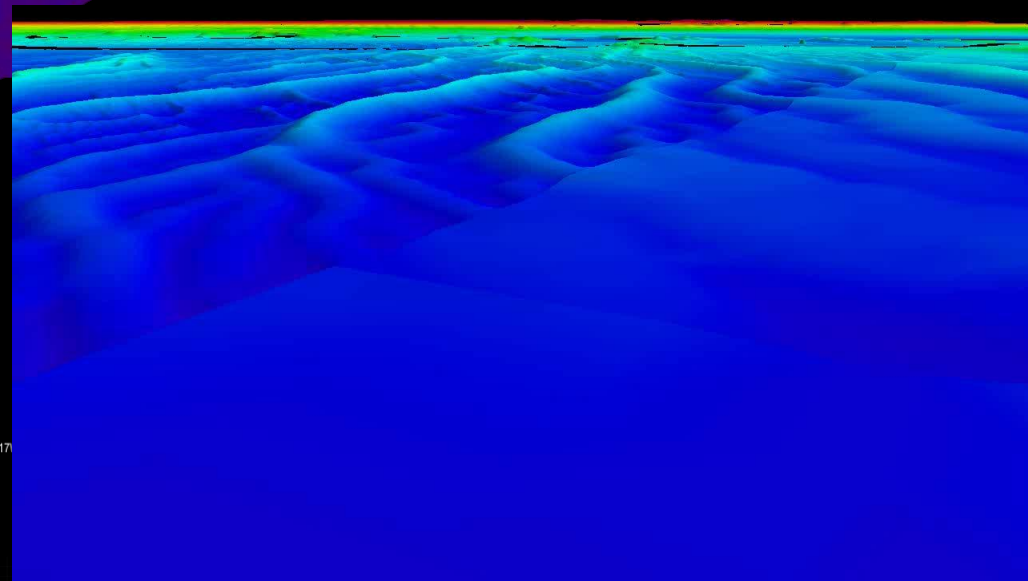
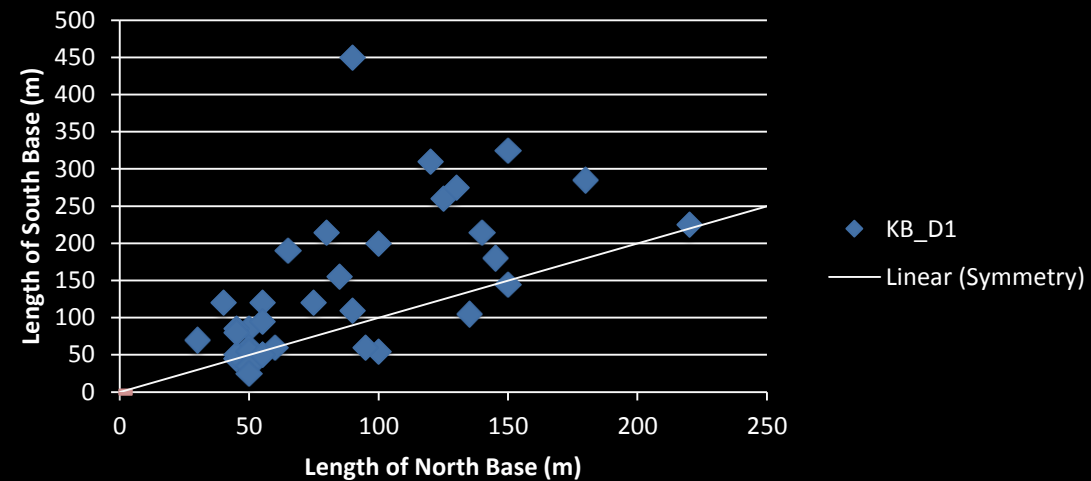
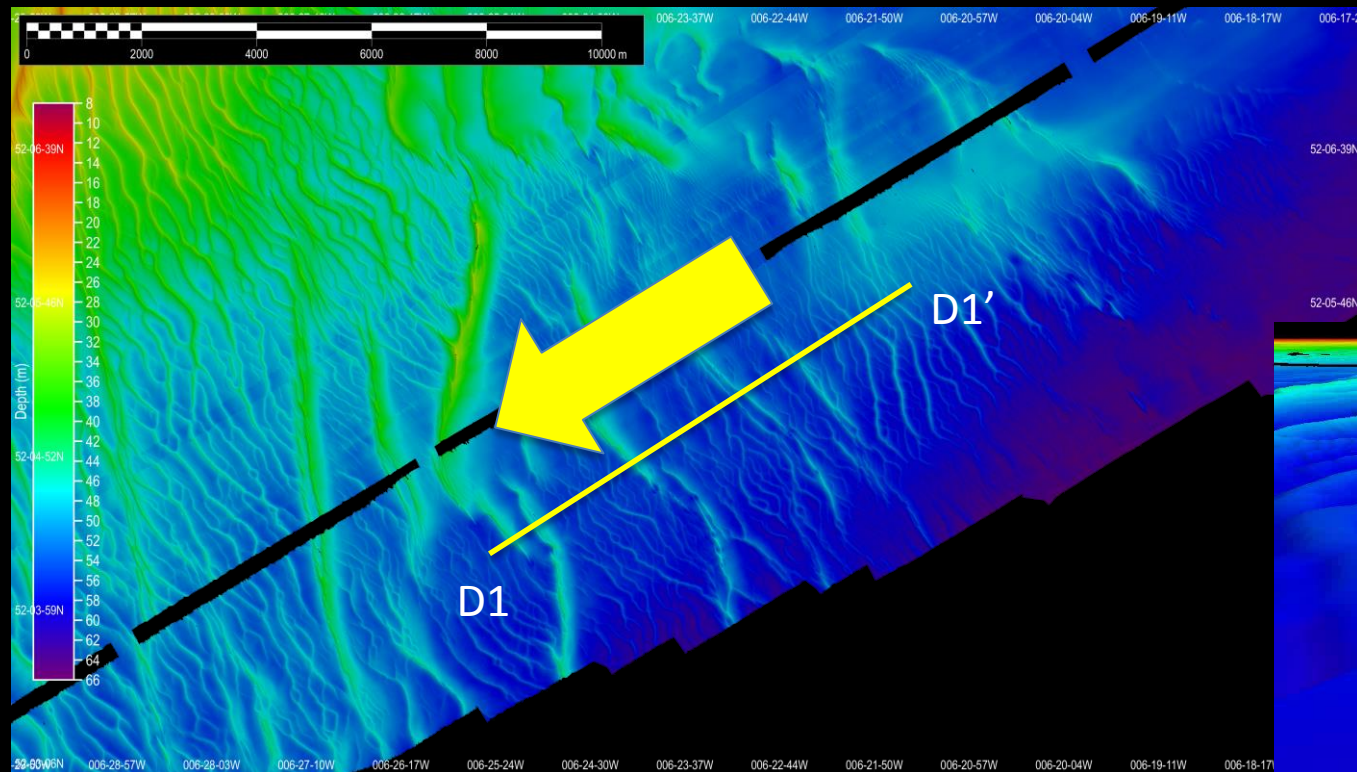


VE = 50x



Kilturk Bank- Deep 1

Southeastern Ireland Symmetry

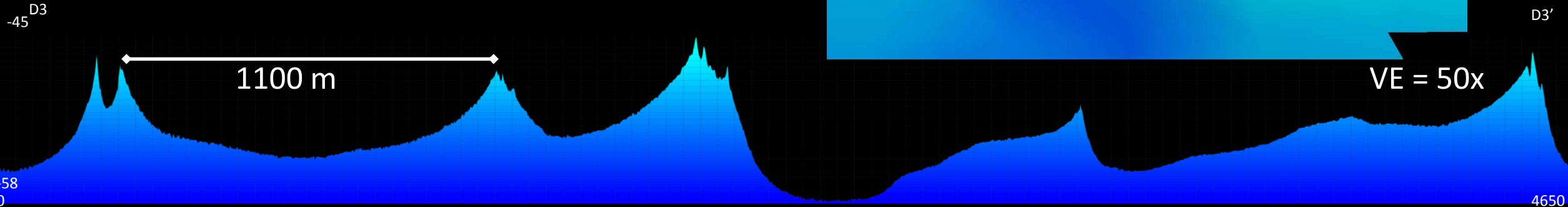
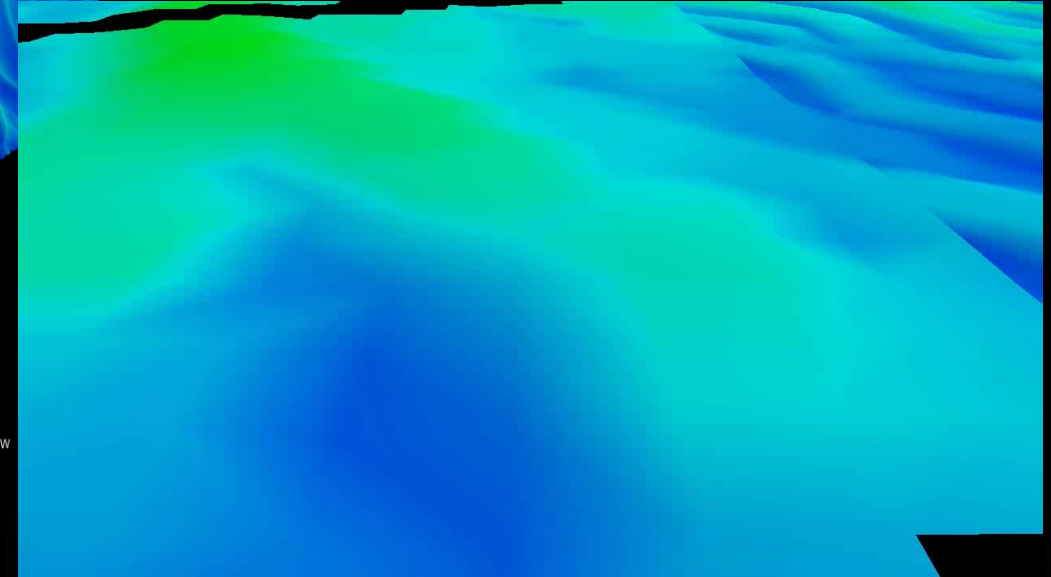
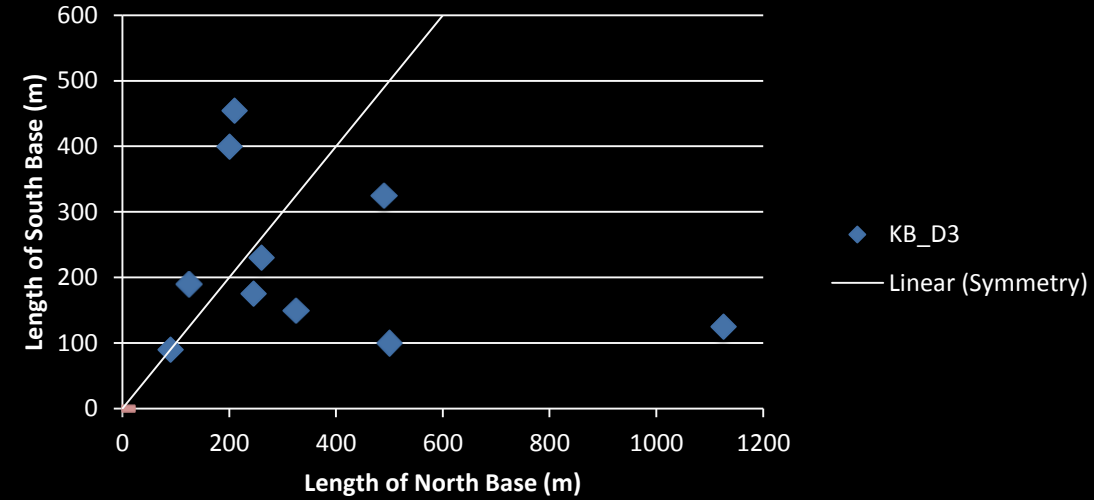
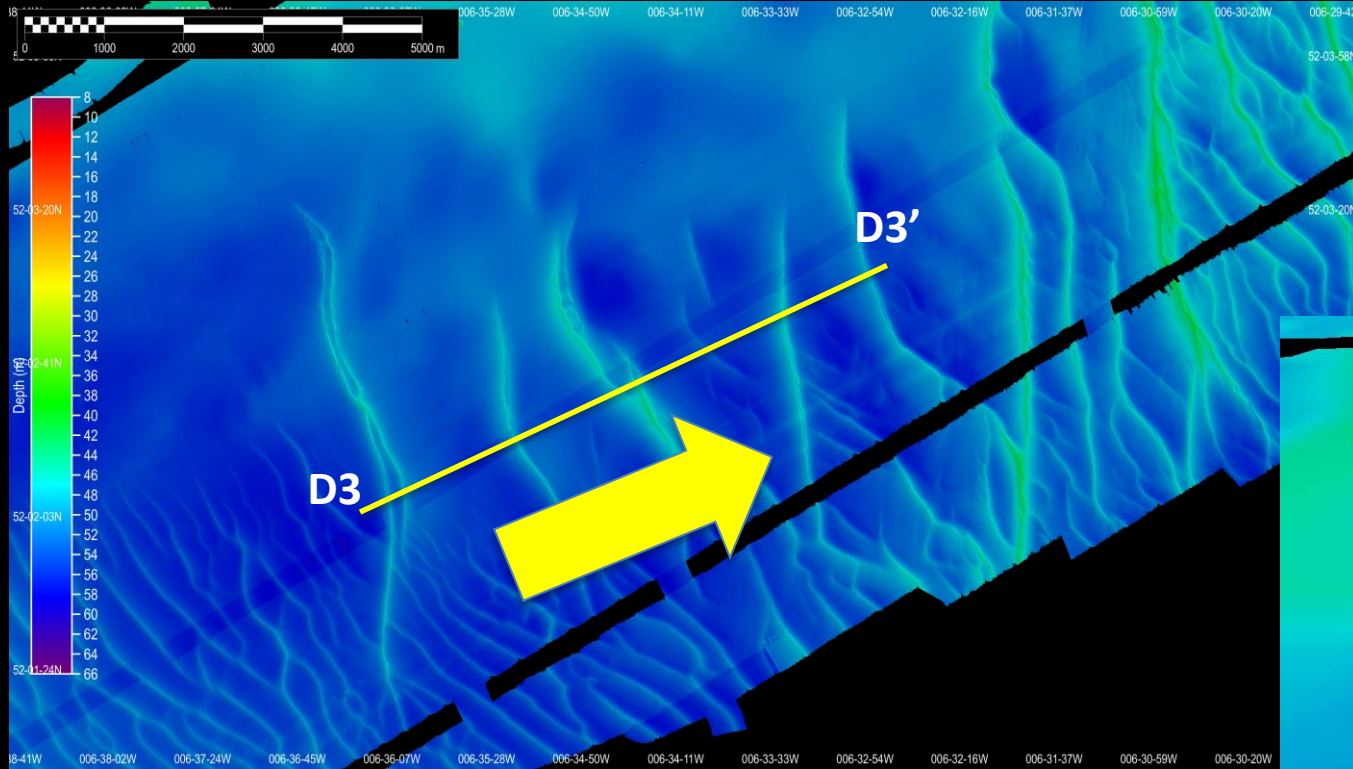


VE = 50x



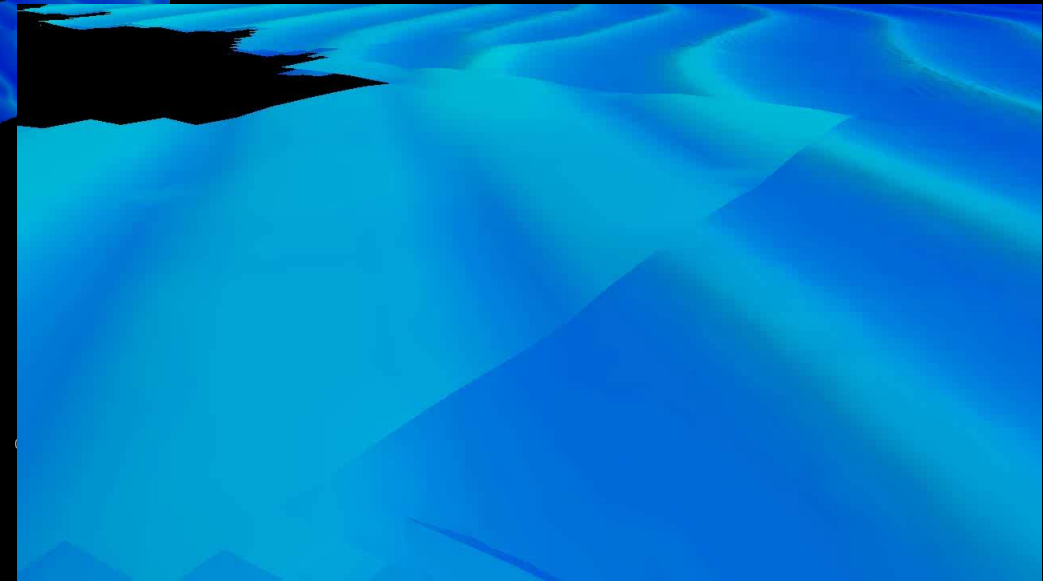
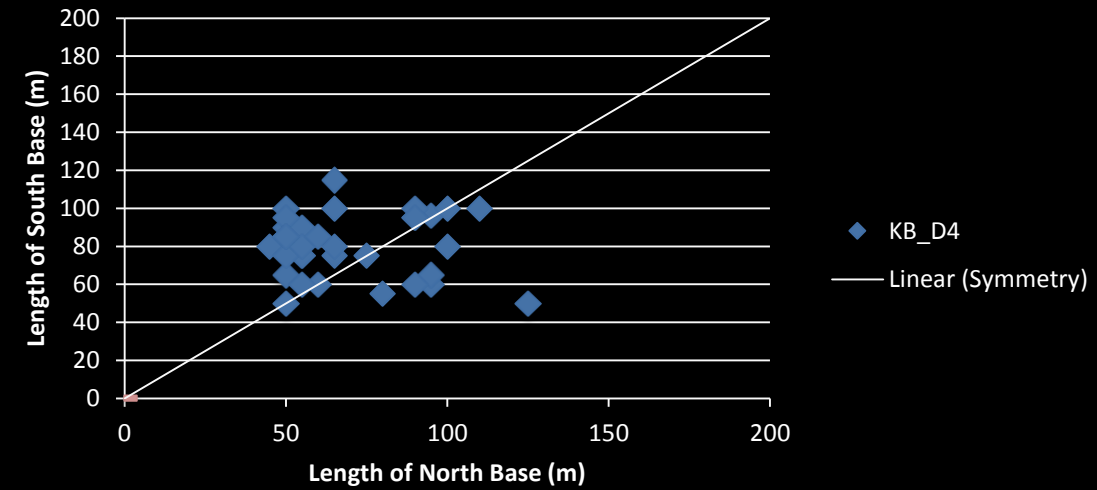
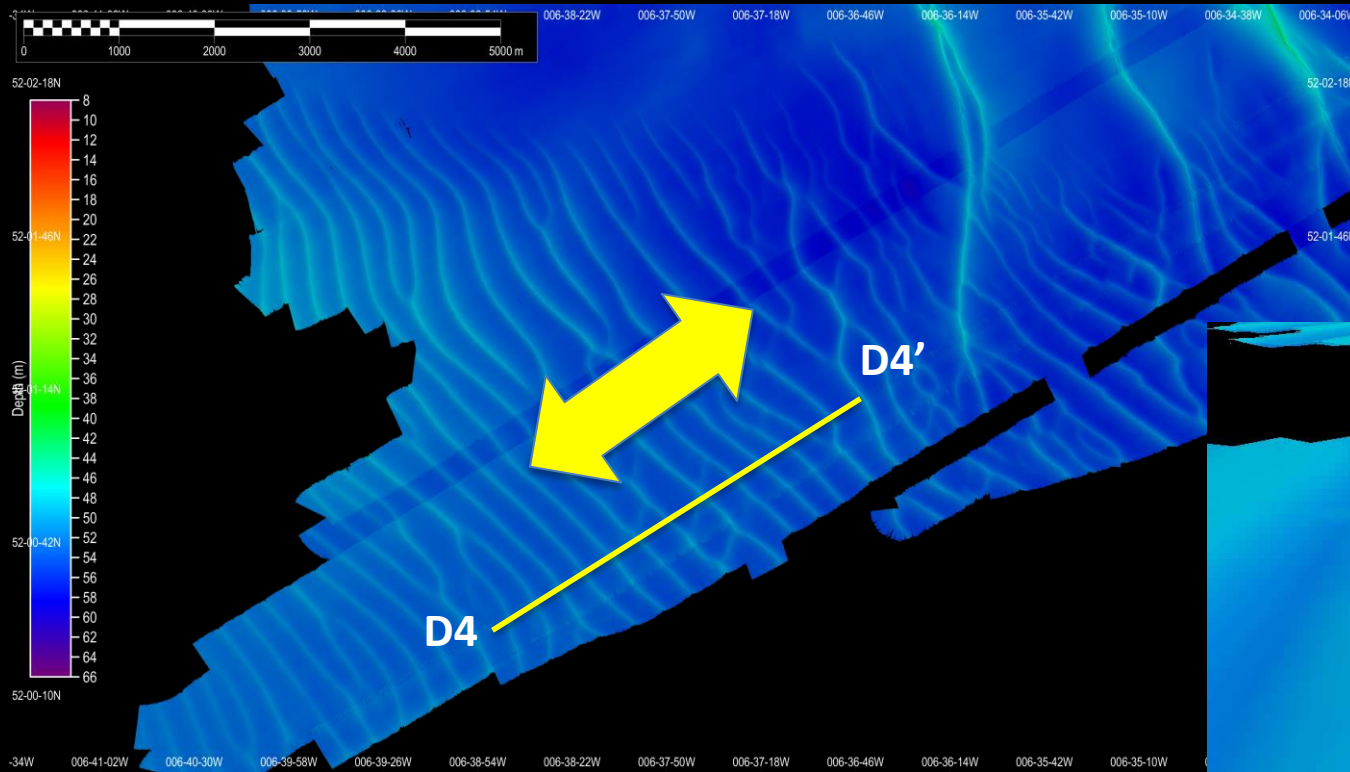
Kilturk Bank- Deep 3

Southeastern Ireland Symmetry



Kilturk Bank- Deep 4

Southeastern Ireland Symmetry



D4

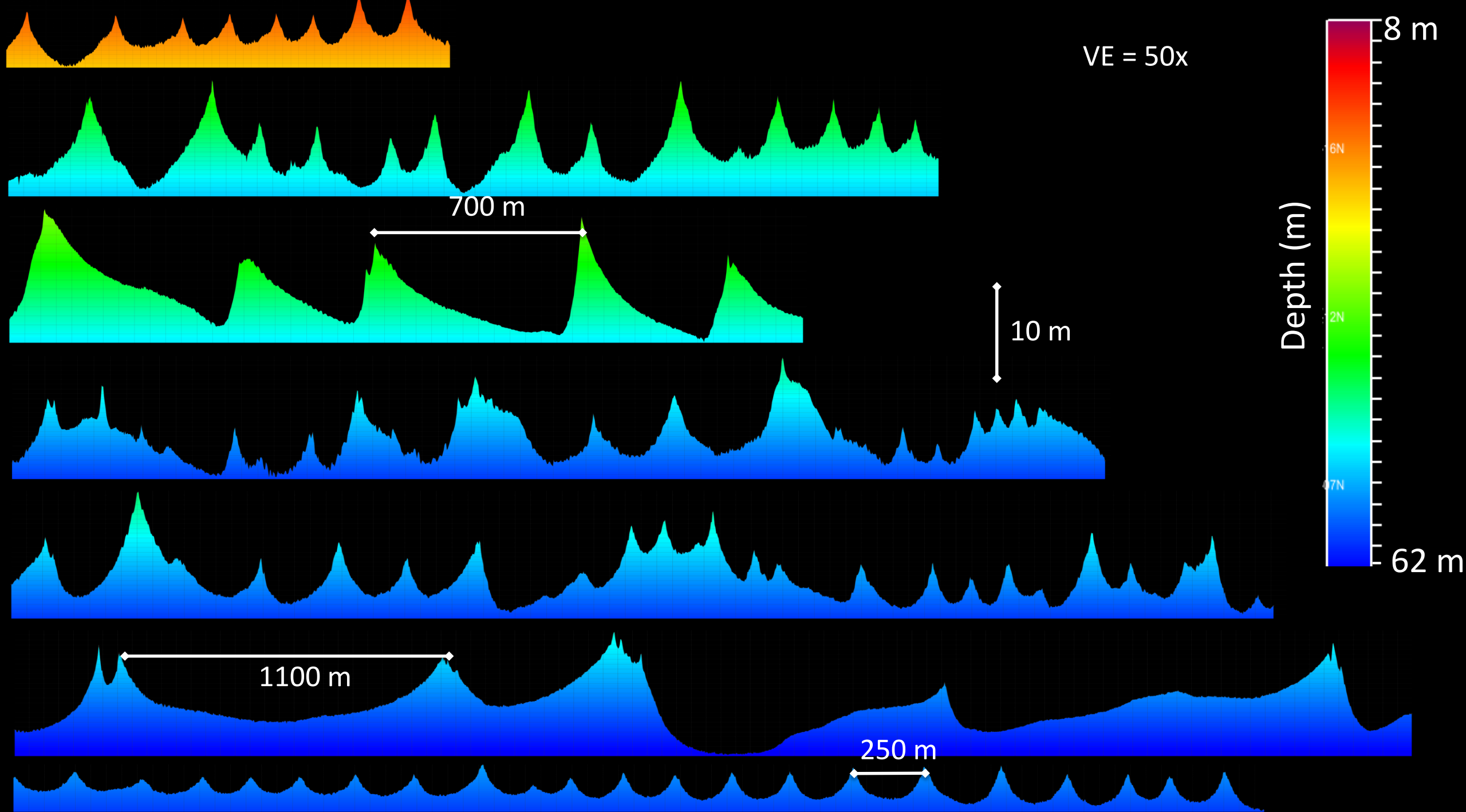
D4'

250 m

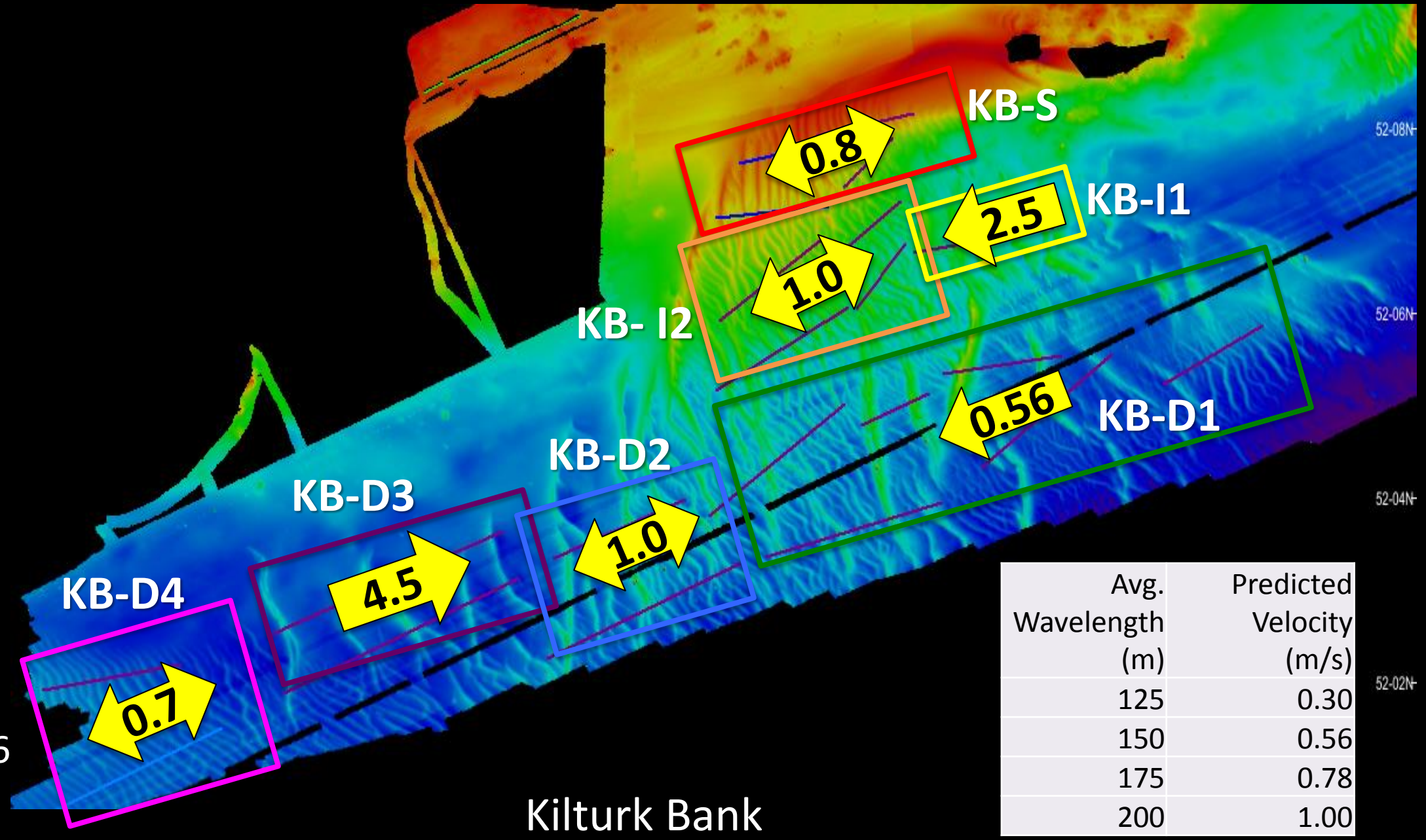
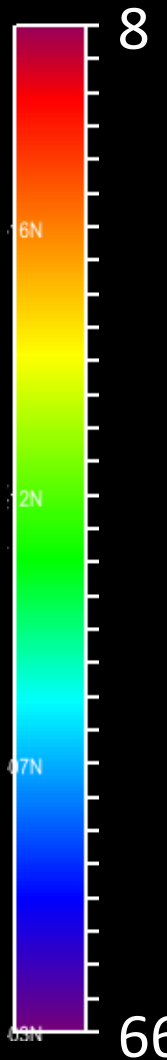
VE = 50x

4000





Depth (m)

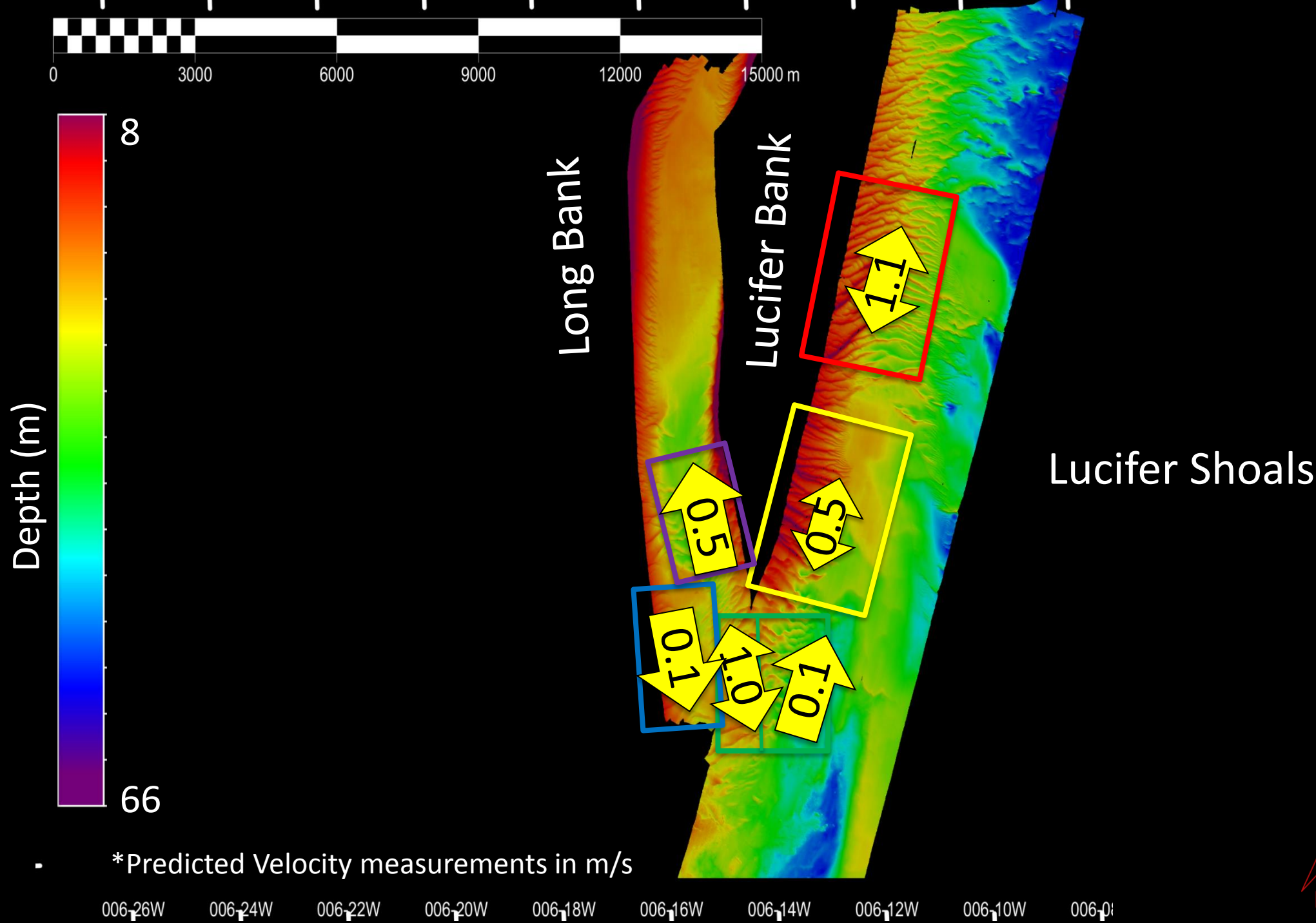


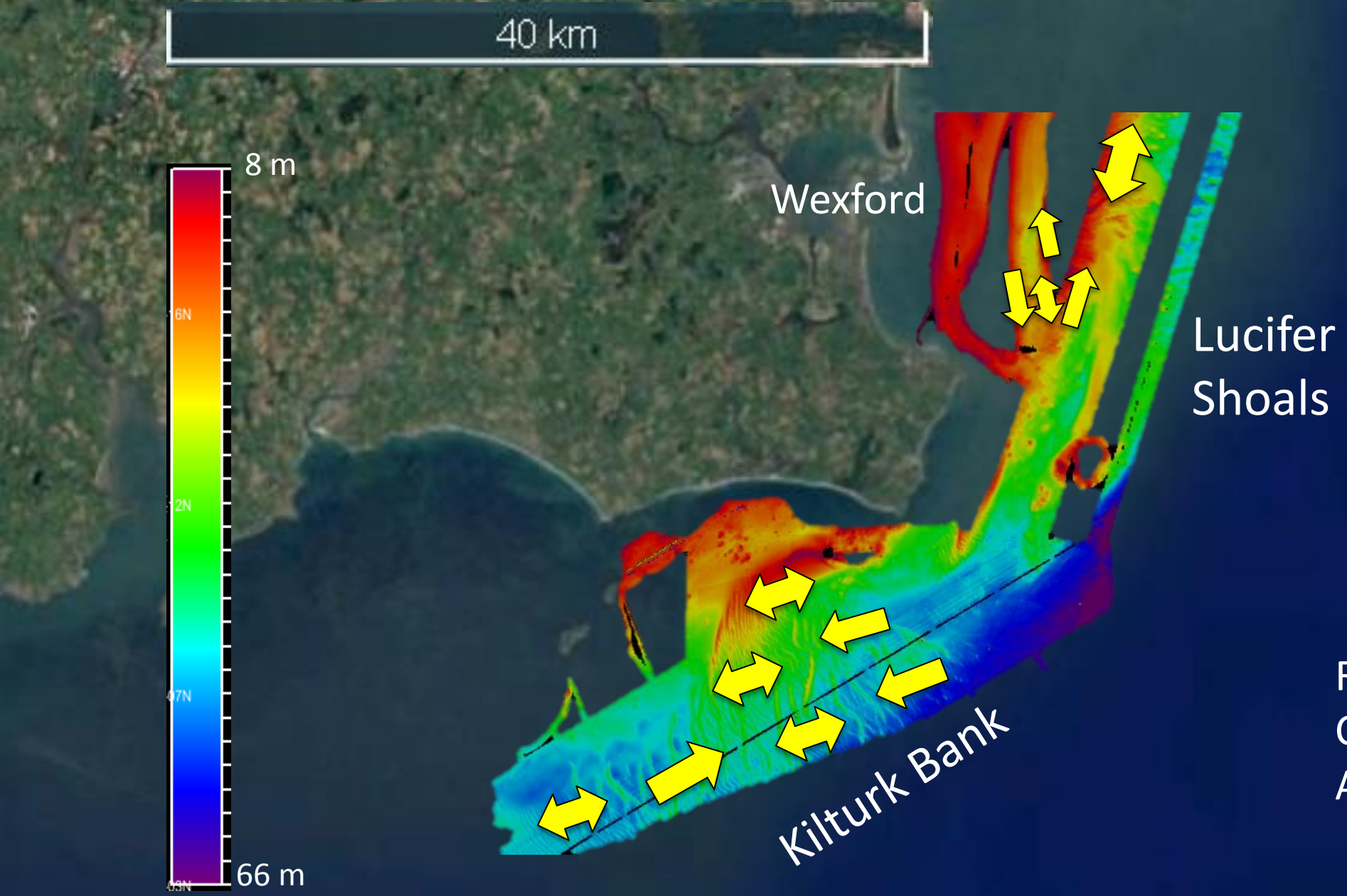
Kilturk Bank

Avg. Wavelength (m)	Predicted Velocity (m/s)
125	0.30
150	0.56
175	0.78
200	1.00

*Predicted velocity measurements in m/s







R/V *Celtic Voyager*
CV09_03
August 2009



References

- Kinahan, G.H., 1885, The Drifting Power of Tidal Currents versus That of Windwaves: Proceedings of the Royal Irish Academy. Science, v. 2, p. 443–458.
- Levin, D. R. and Lillycrop, W. J., 1992, Sand Waves: Sand Wave Shoaling in Navigation Channels: Improvement of Operations and Maintenance Techniques Research Program. Technical Report HL-90-17, Report 1 p. 1-52.
- Wexford Harbour Tide Times, 2017, Tide Times, <https://www.tidetimes.org.uk/wexford-harbour-tide-times-20170322>