

On-ice vibroseis: Sediment features below Ekström Ice Shelf, East Antarctica

Emma C. SMITH¹

Reinhard DREWS², Todd EHLERS², Dieter FRANKE³, Christoph GAEDICKE³, Coen HOFSTEDE¹, Gerhard KUHN¹, Astrid LAMBRECHT⁴, Christoph MAYER⁴, Ralf TIEDEMANN^{1,5}, Olaf EISEN^{1,5}

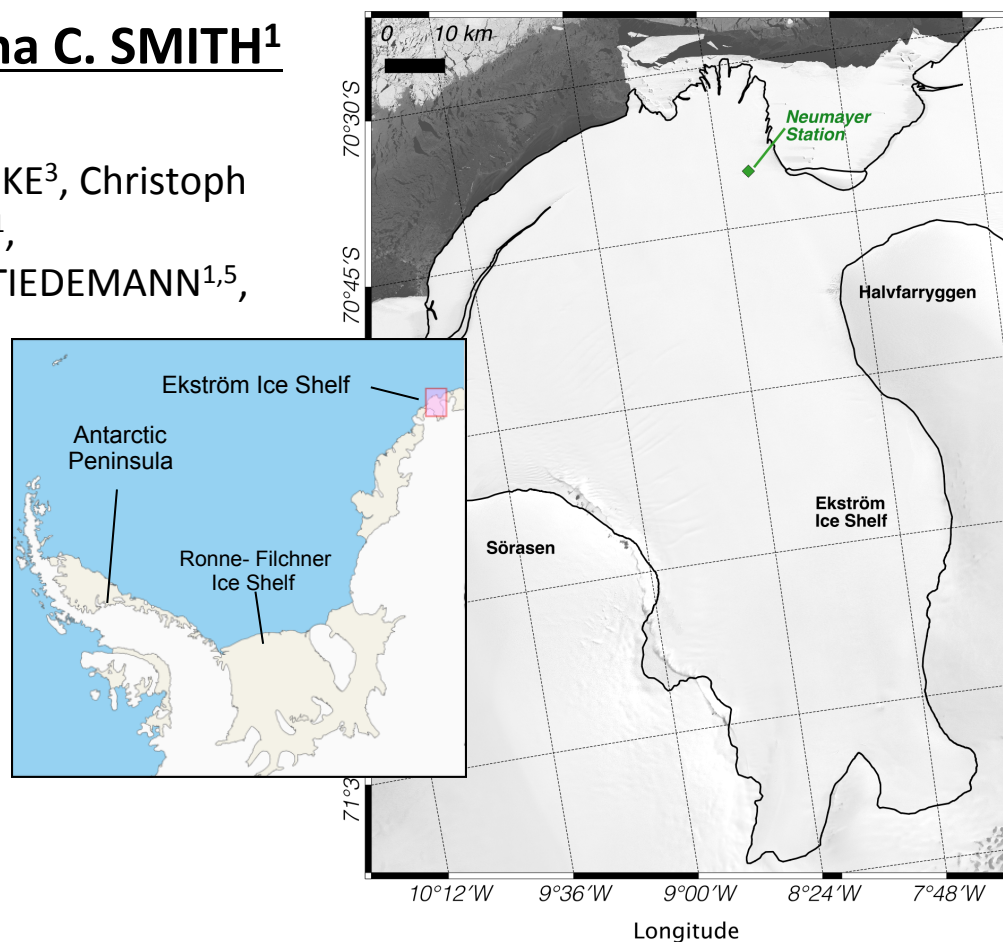
¹Alfred Wegener Institute, Bremerhaven, Germany

²Dept. Of Geosciences, University of Tübingen, Germany

³BGR, Hannover, Germany

⁴Geodesy and Glaciology, Bavarian Academy of Sciences and Humanities, Munich, Germany

⁵Department of Geosciences, University of Bremen, Germany



and other On-ice vibroseis: Sediment features below Ekström Ice Shelf, East Antarctica

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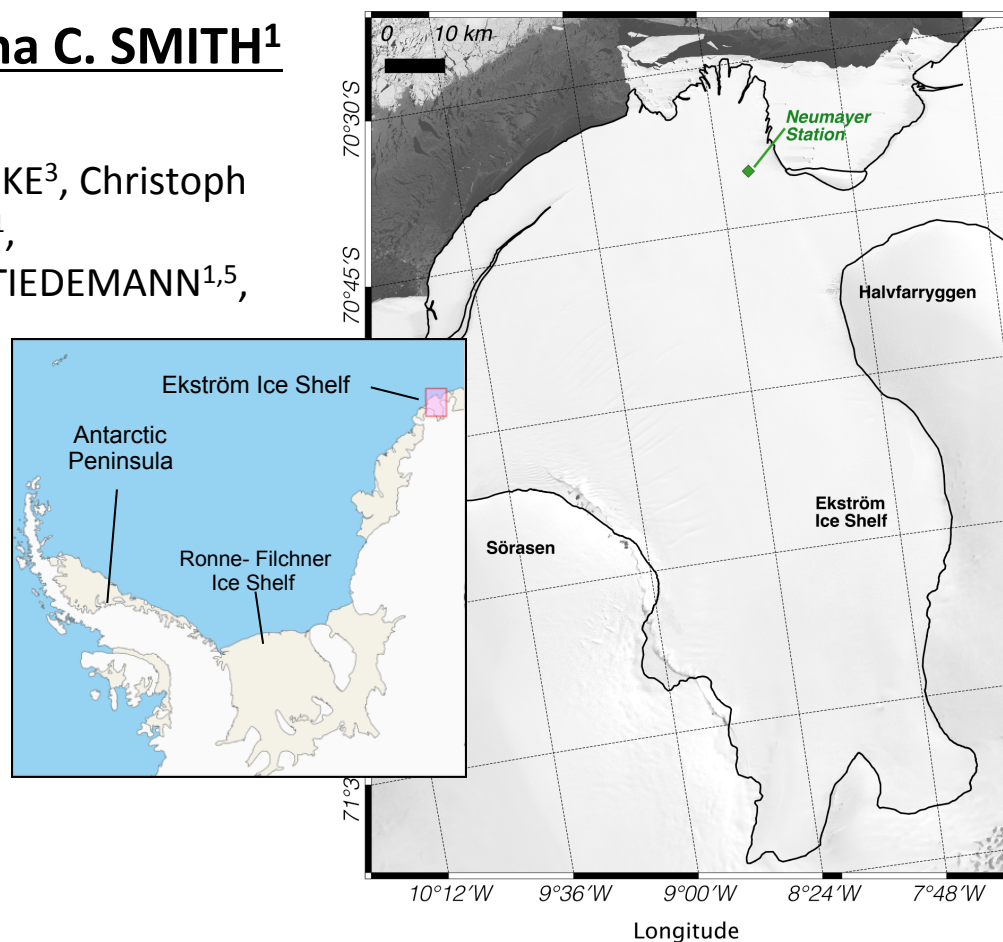
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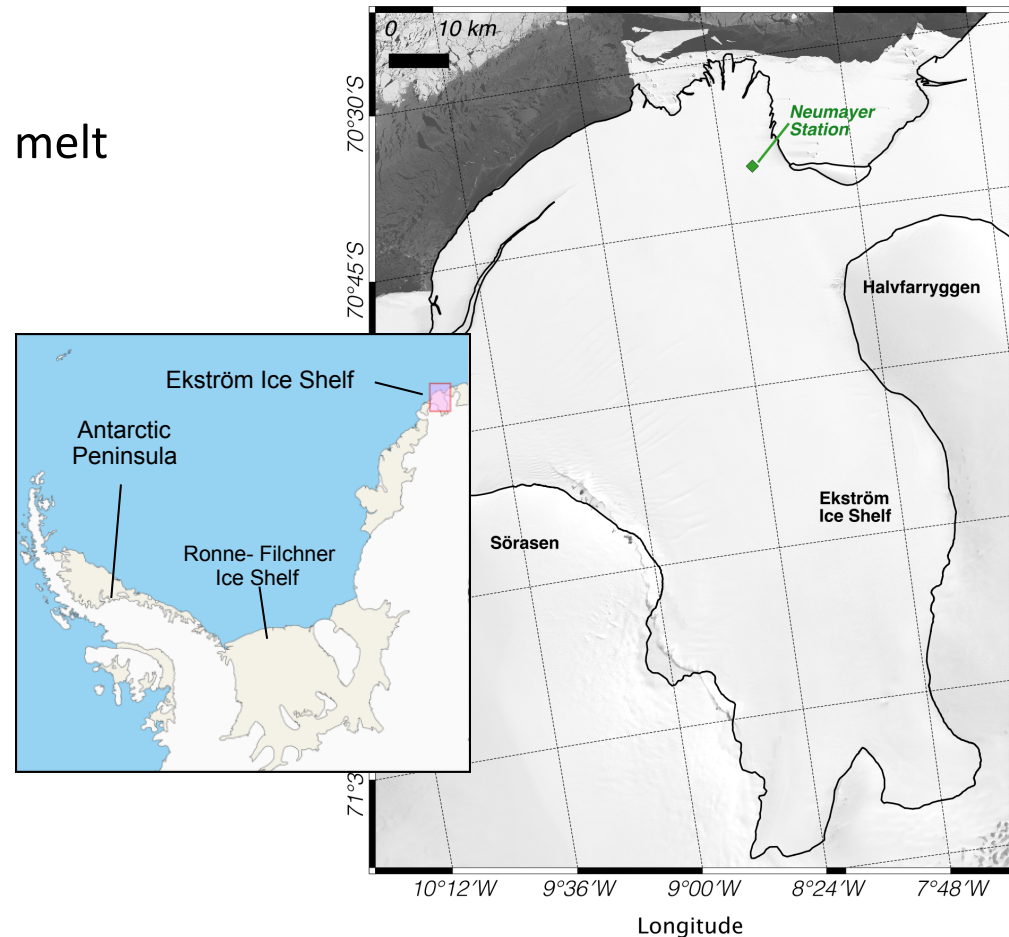
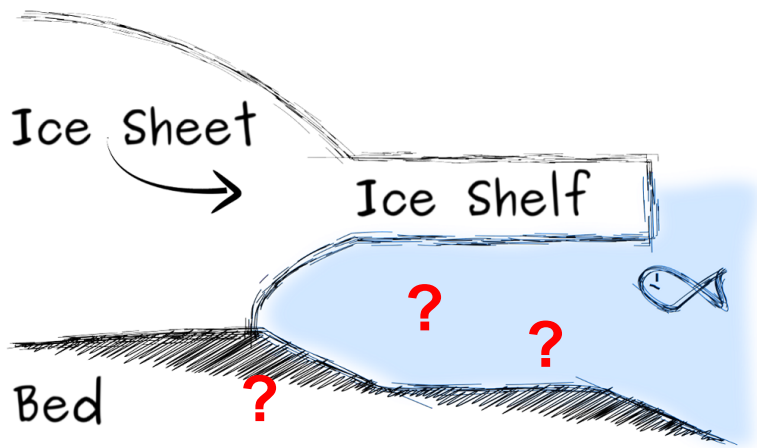
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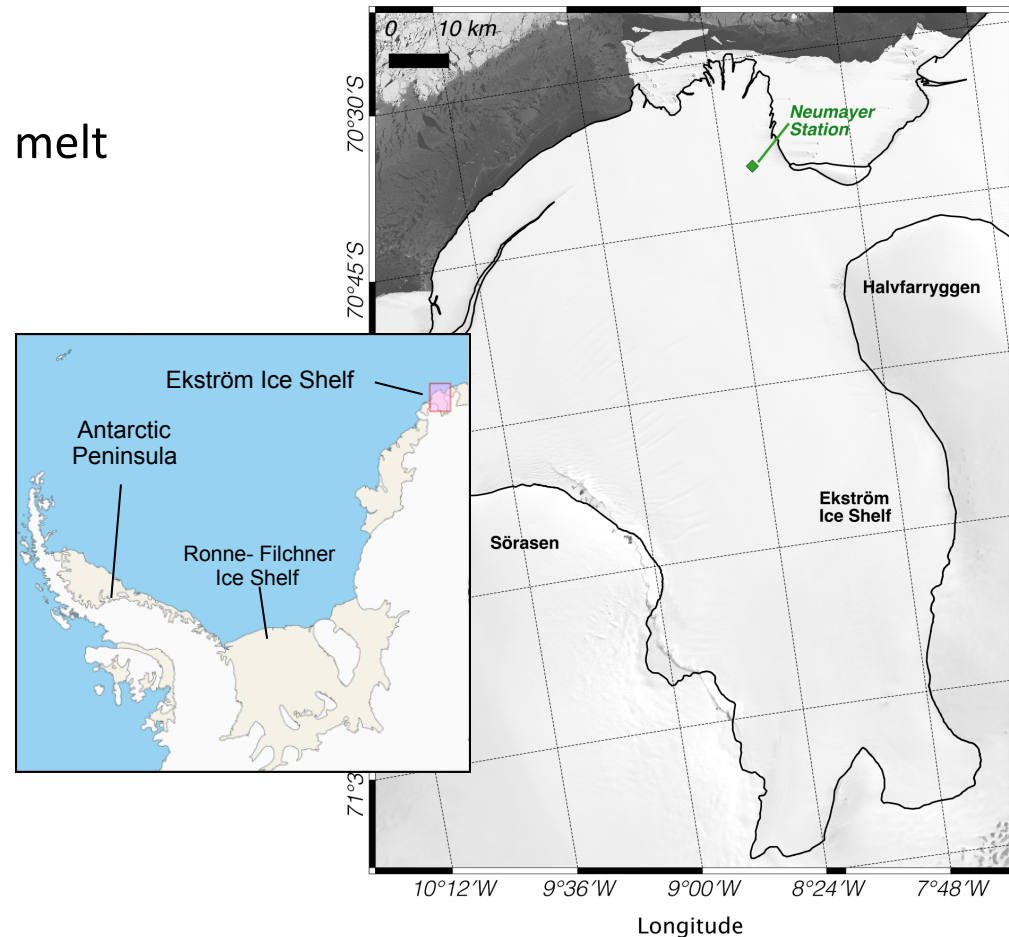
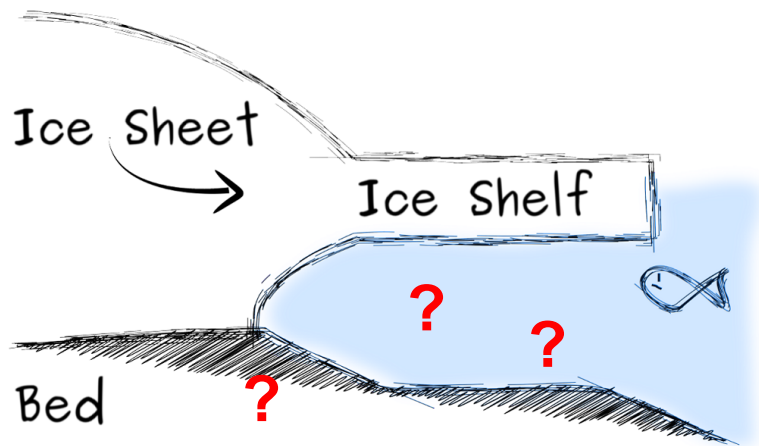
Under Ice Shelves – Why?

- Sea floor topography → past ice dynamics
- Sub-sea floor → geological history
- Cavity → ocean circulation and ice melt



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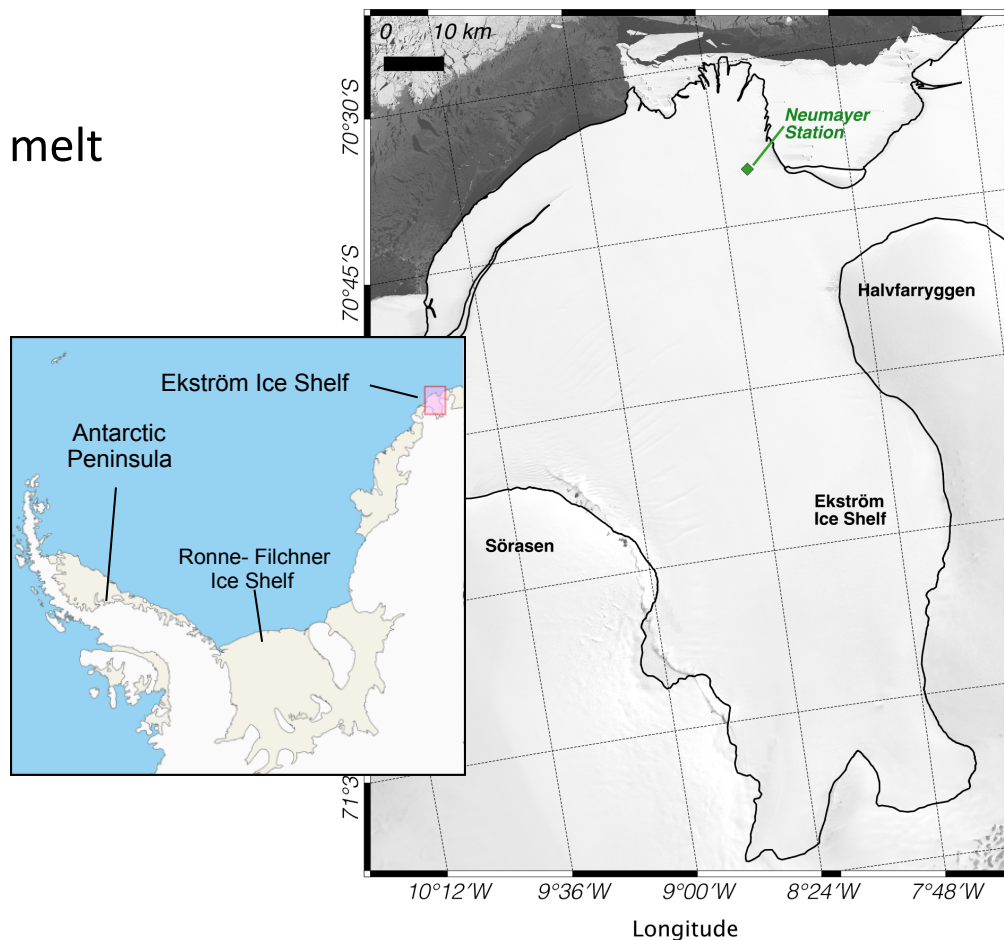
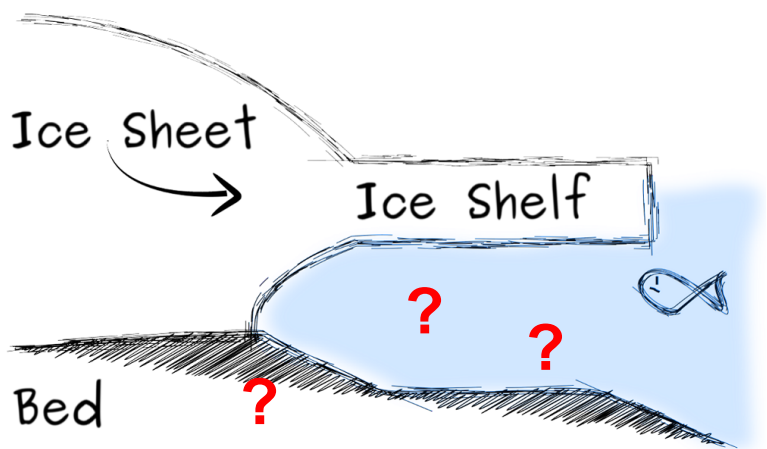
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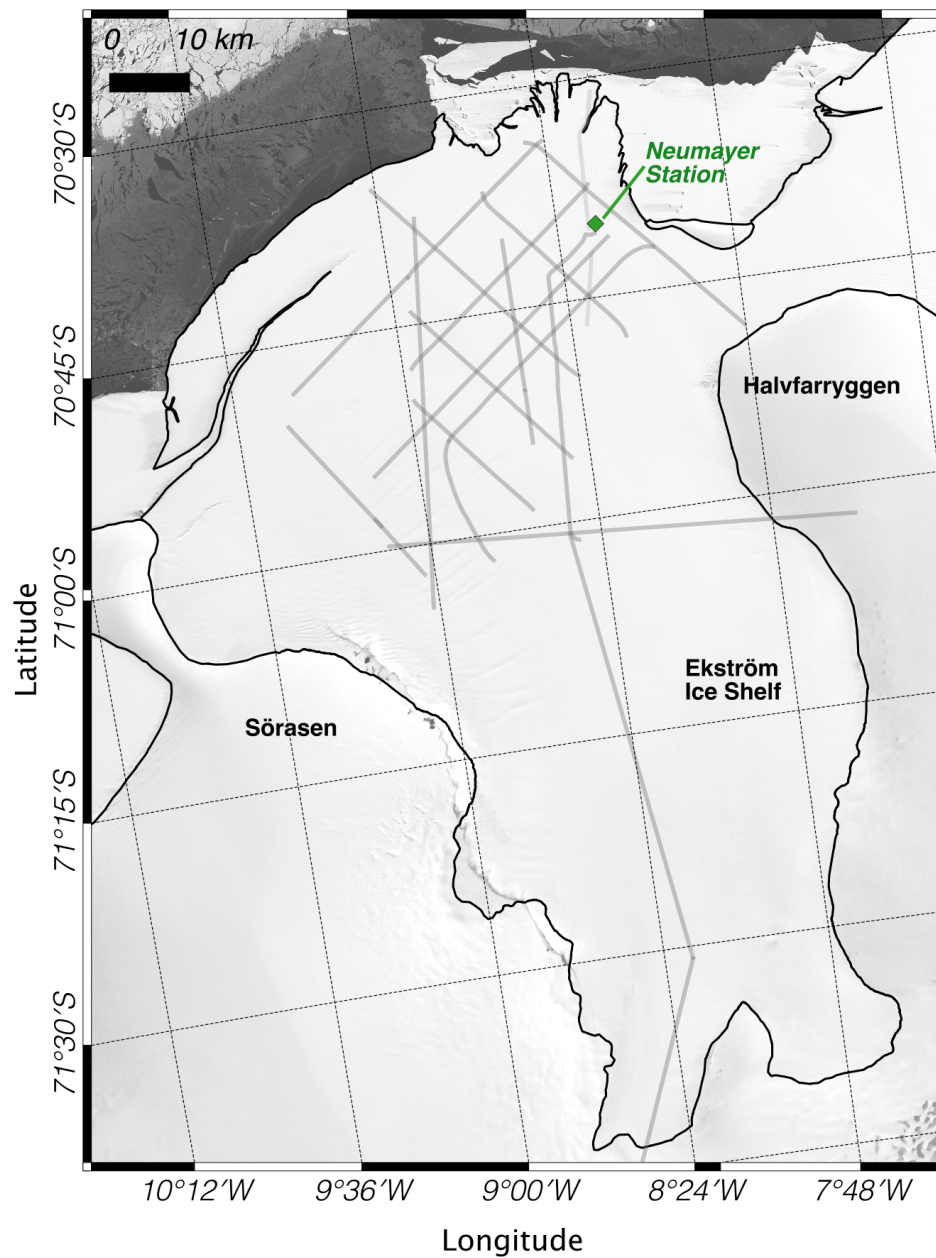
- Sub-sea floor → geological history

- Cavity → circulation and ice melt

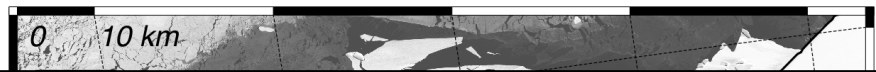
Watch this space!



Ekström Ice Shelf – Seismic Data



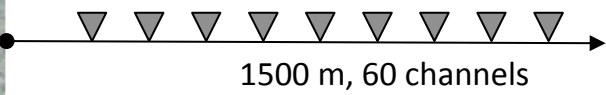
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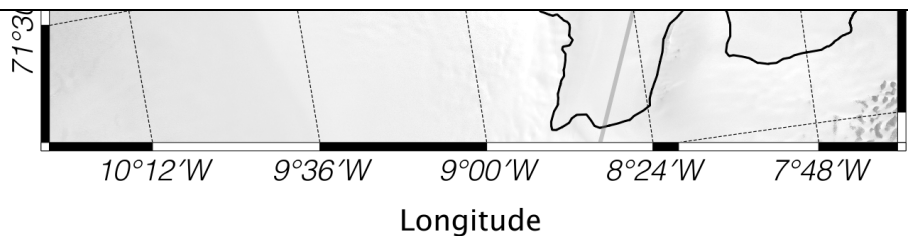
Eisen et al., *Polar Sci.*, 2015



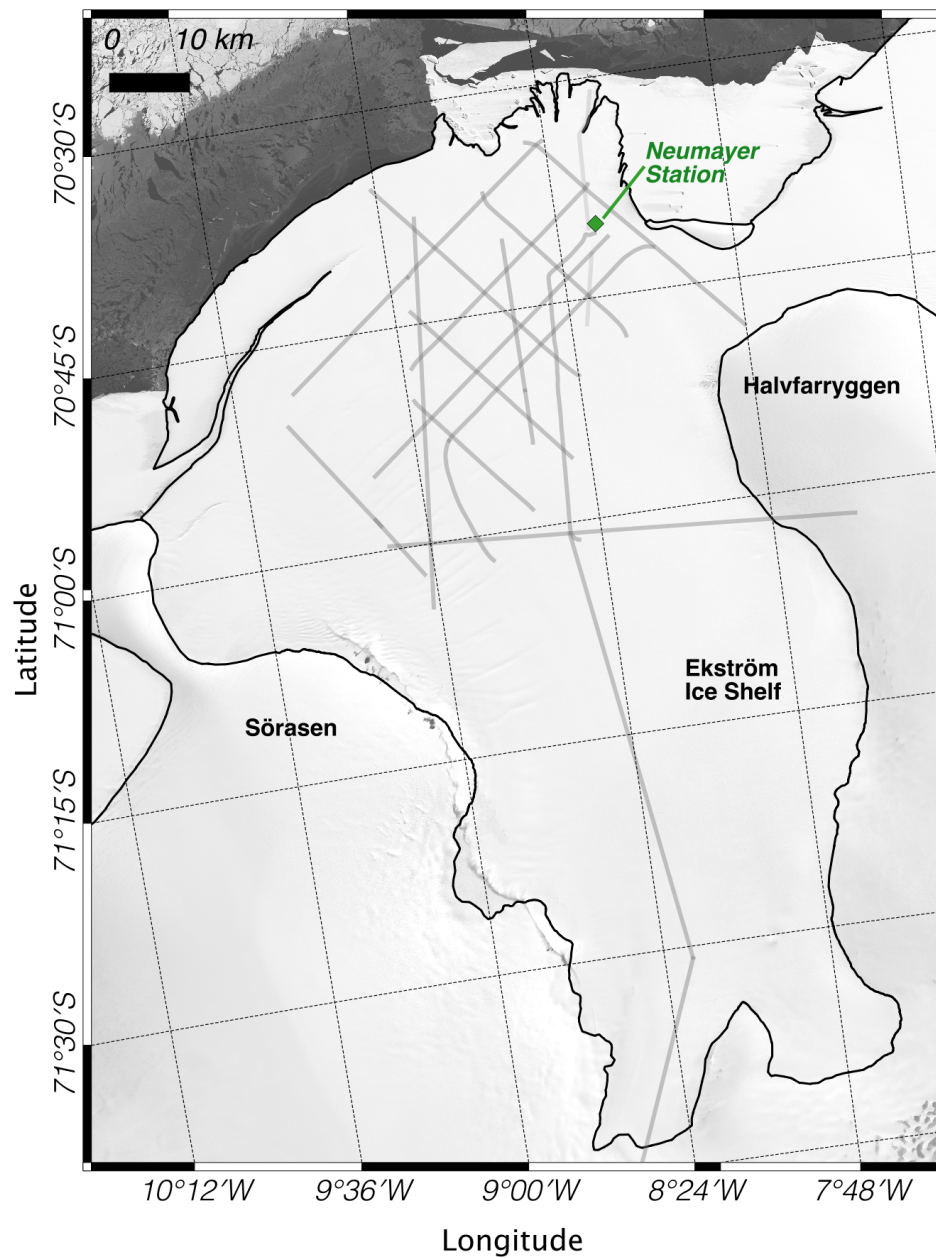
←→
SPs 75 – 750 m



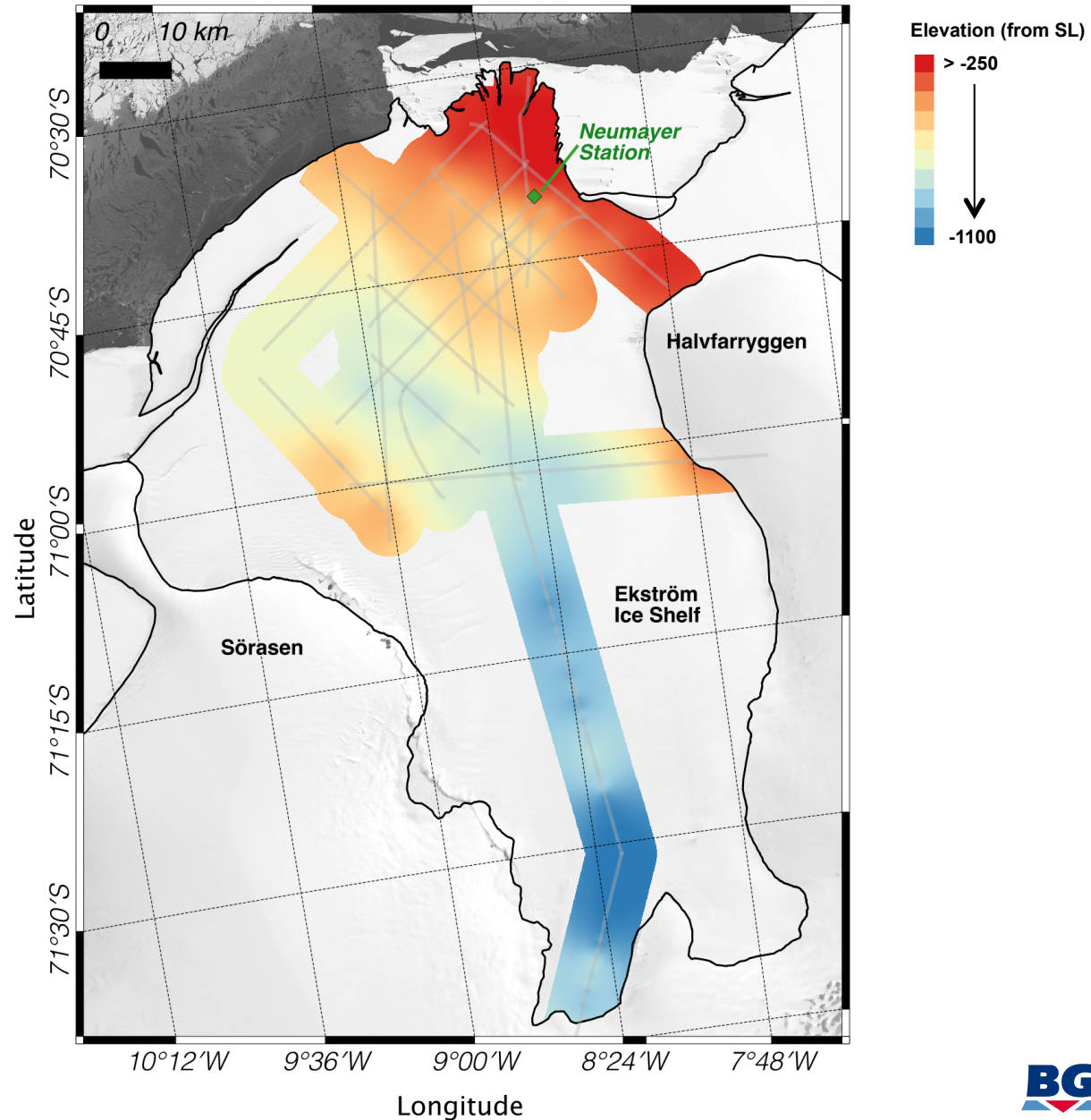
Sweep: 10 – 220 Hz
Time: 10 seconds



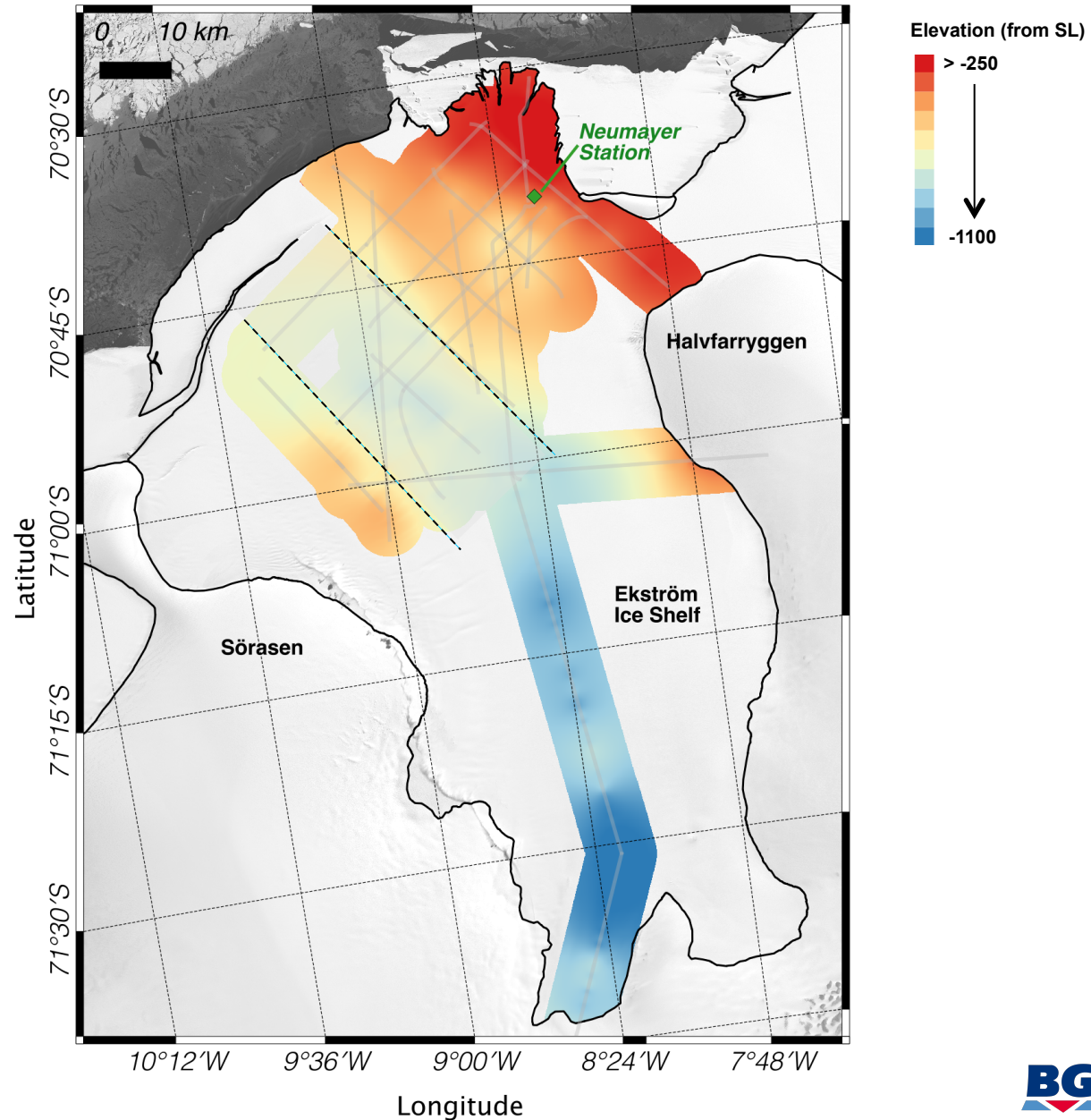
Ekström Ice Shelf – Seismic Data



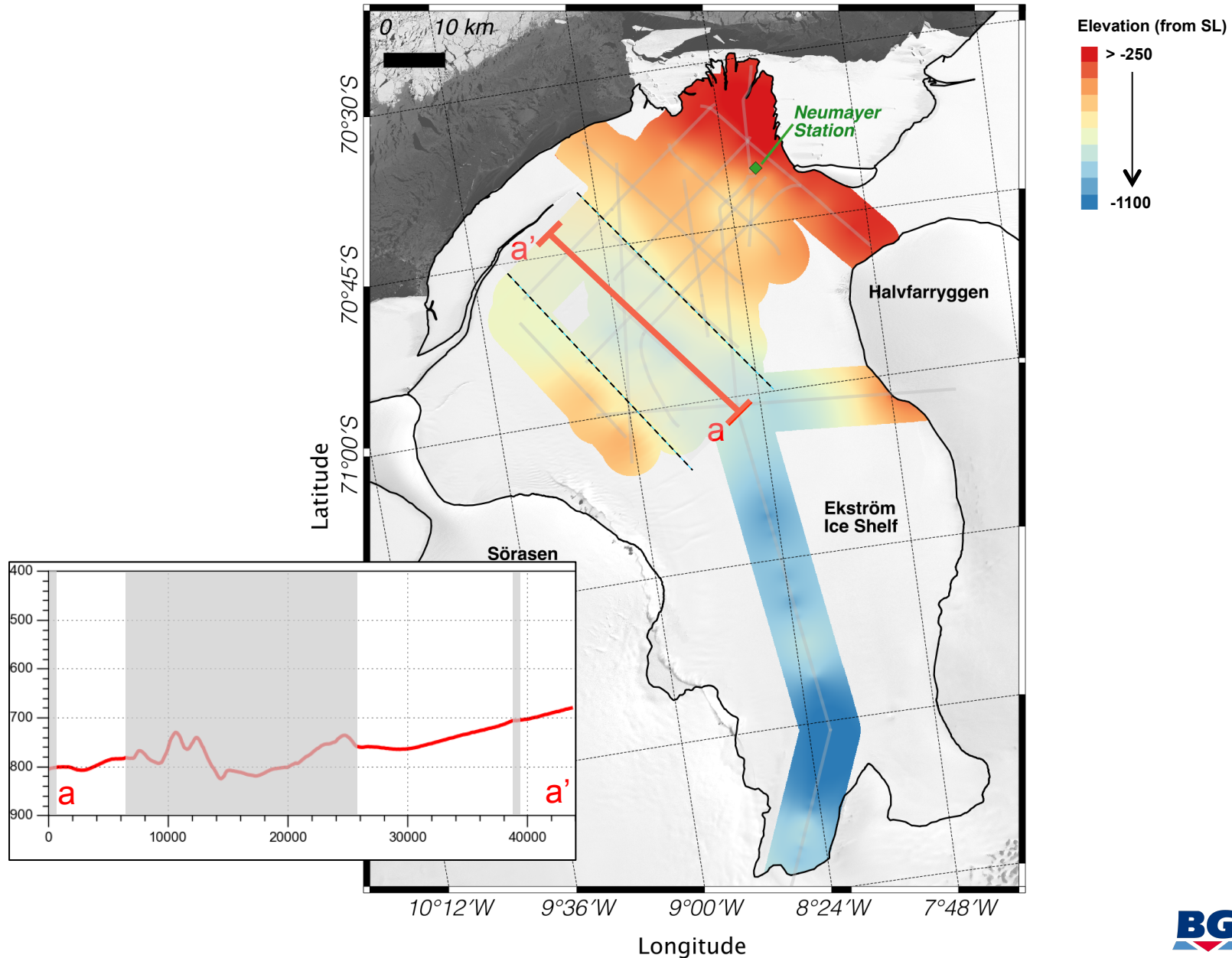
Ekström Ice Shelf – Sea-floor Bathymetry



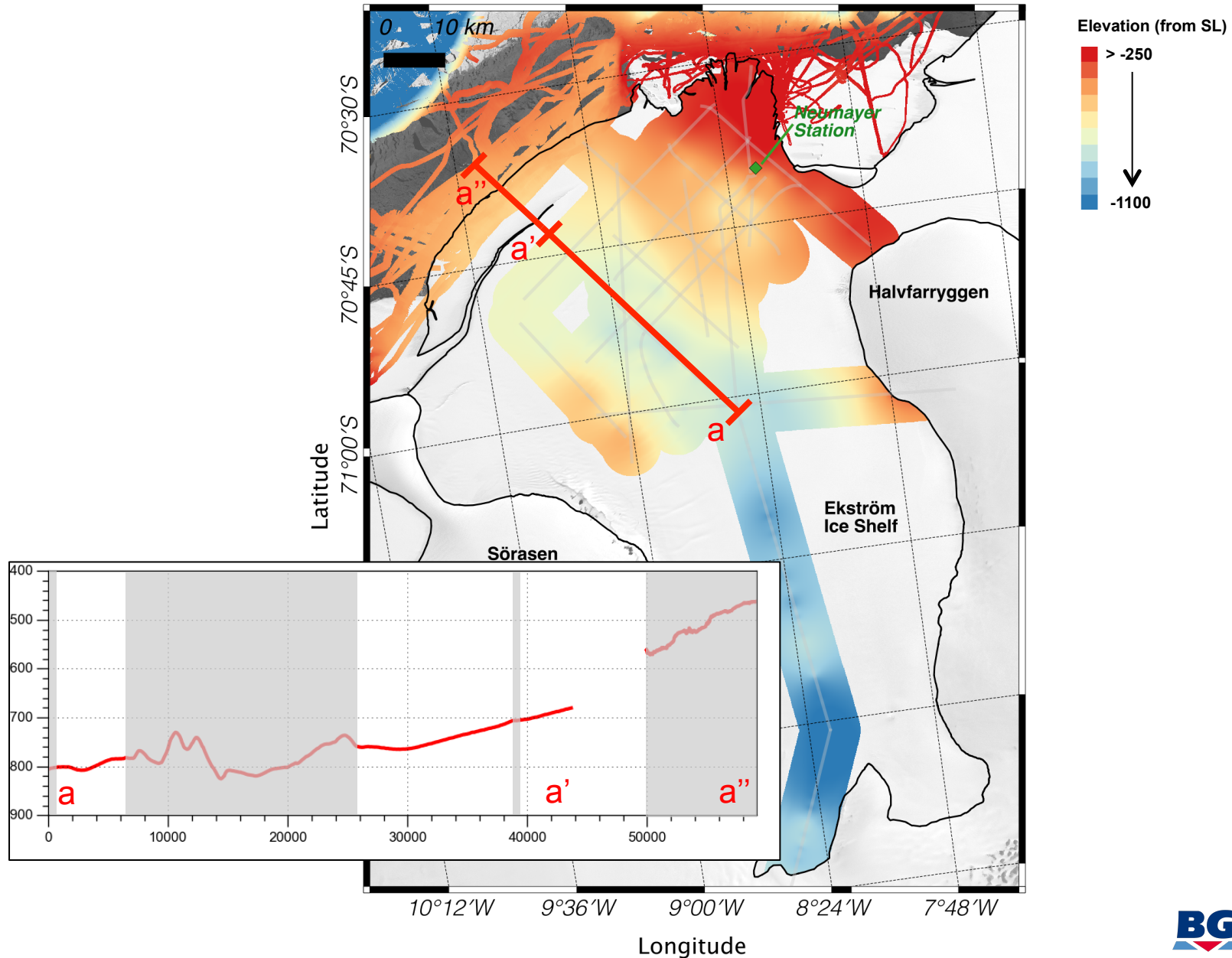
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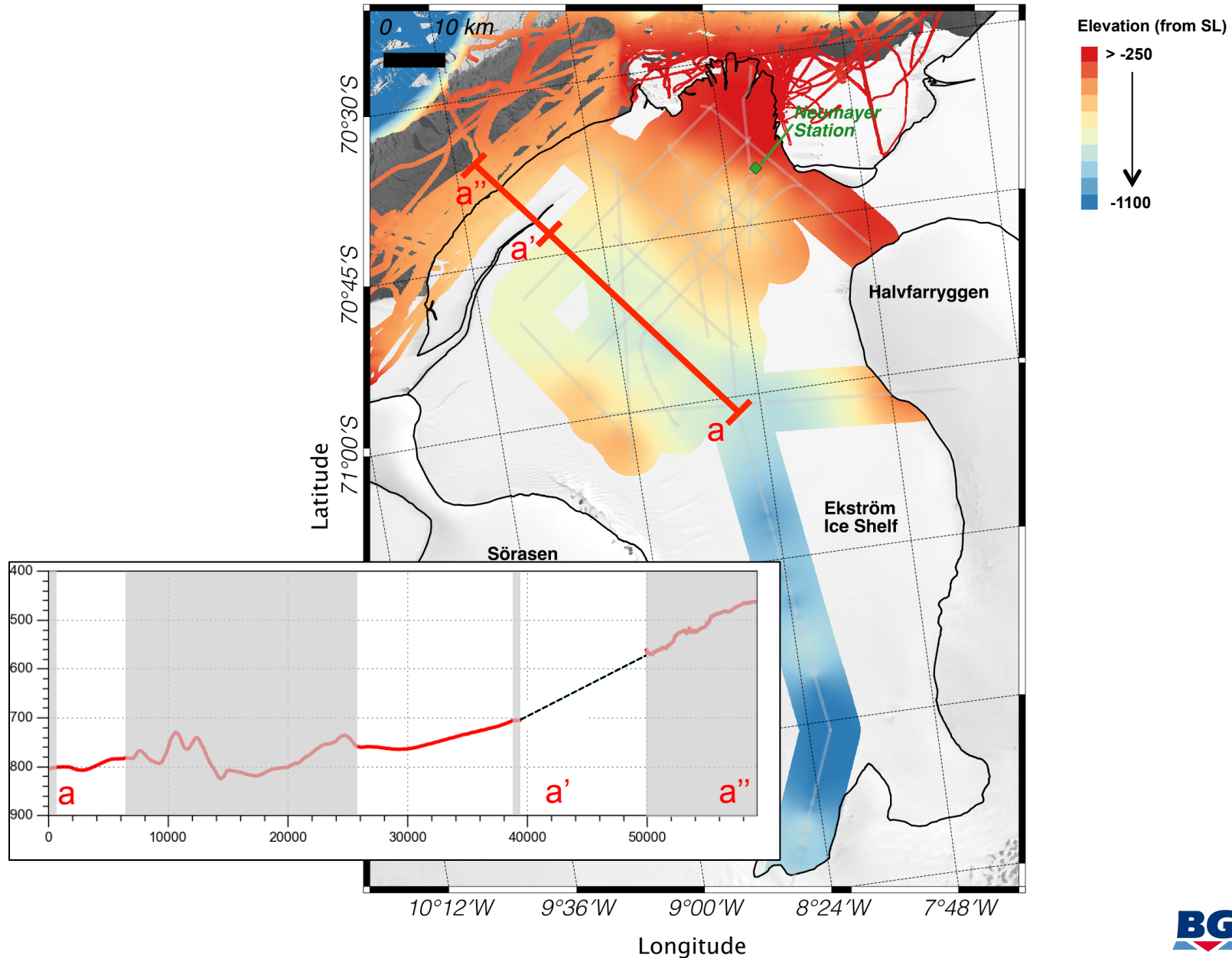
Palaeo-trough



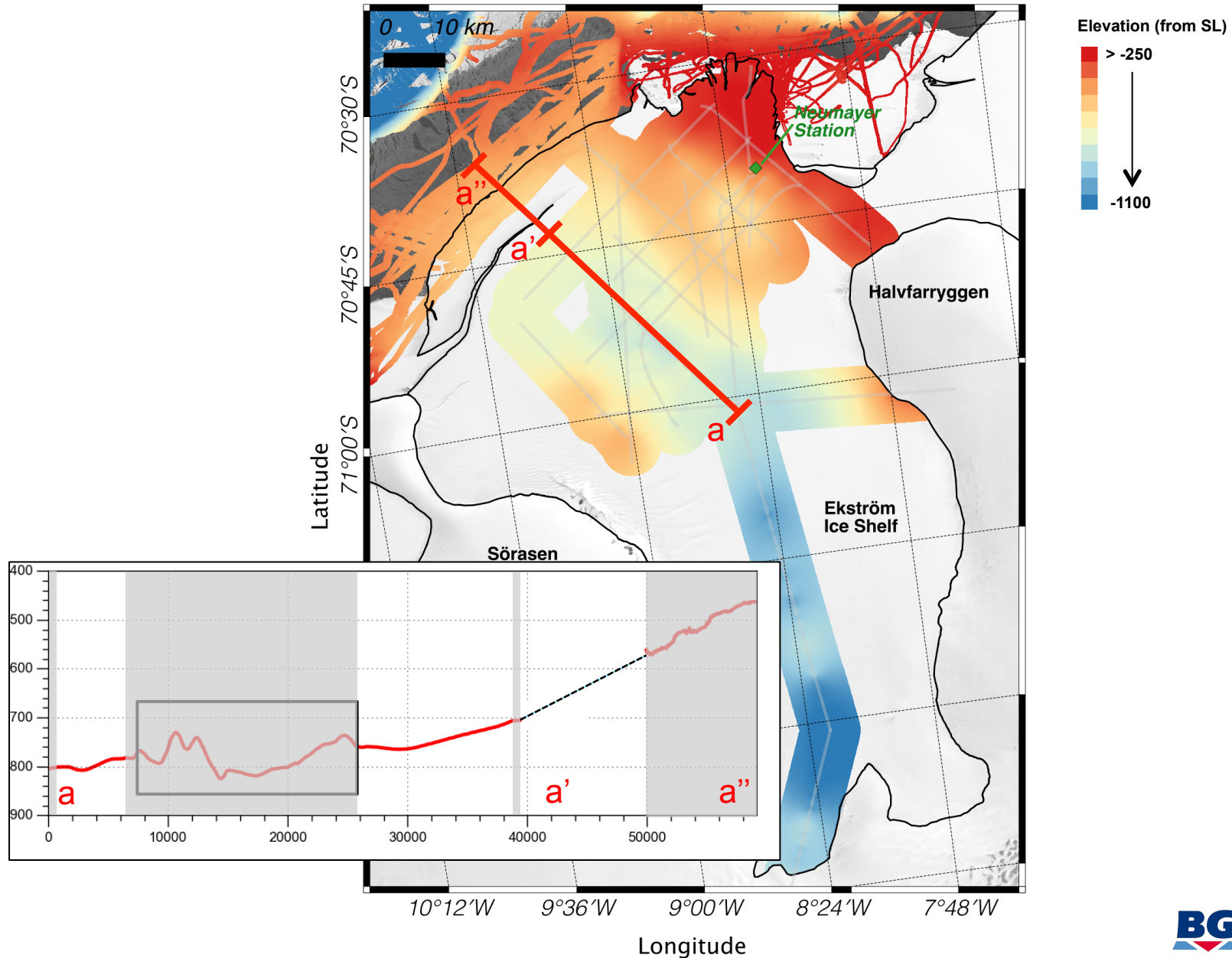
Palaeo-trough



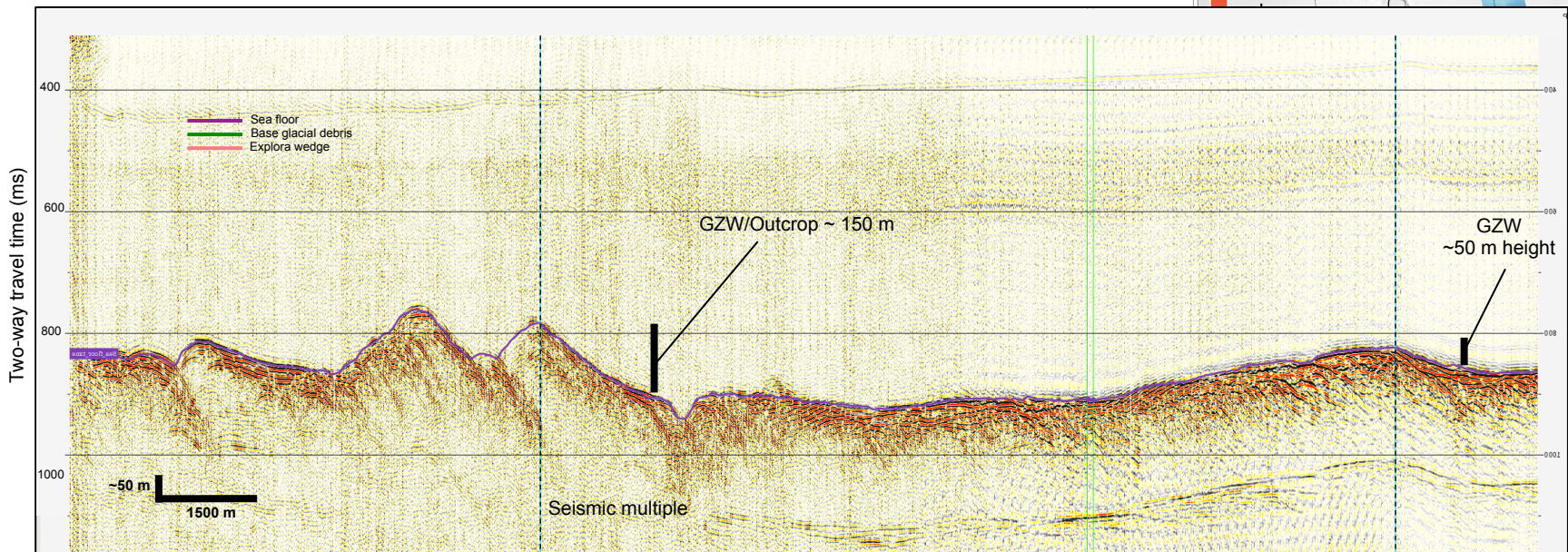
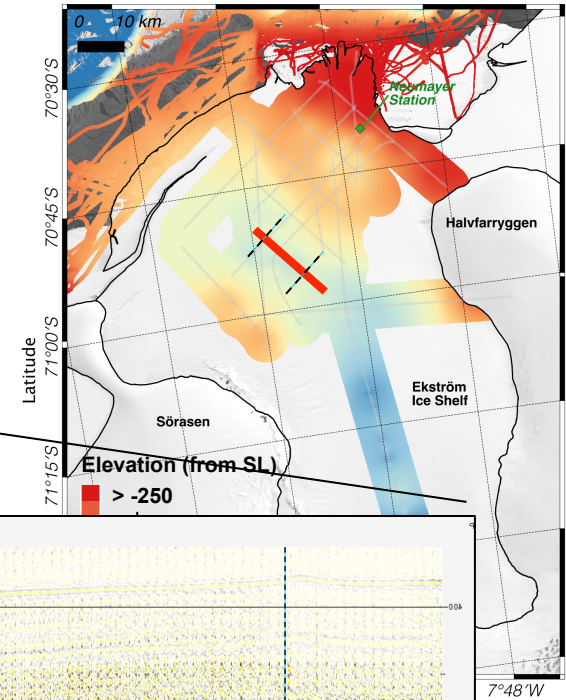
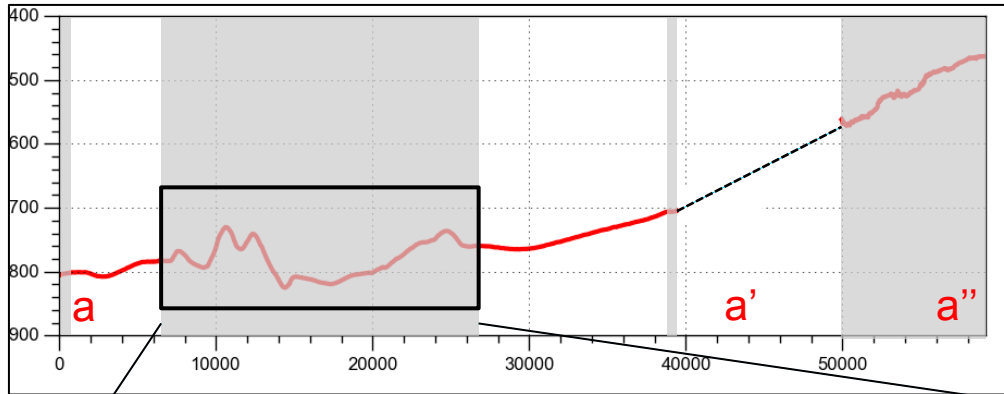
Palaeo-trough



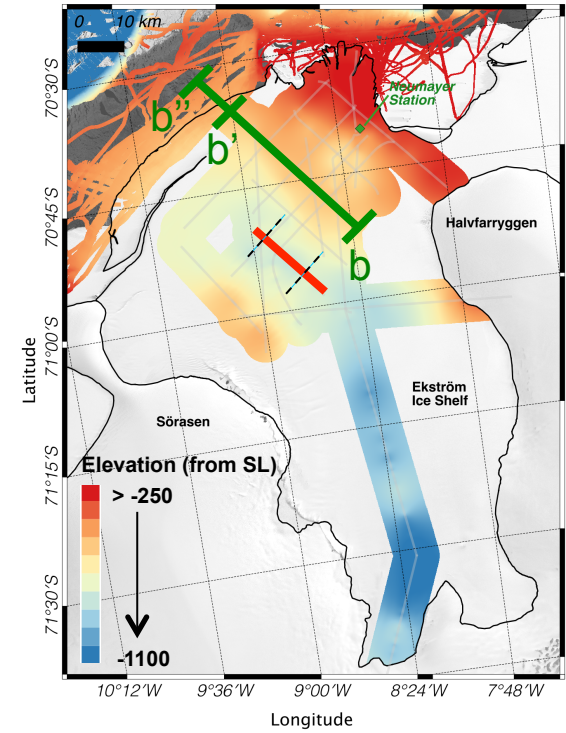
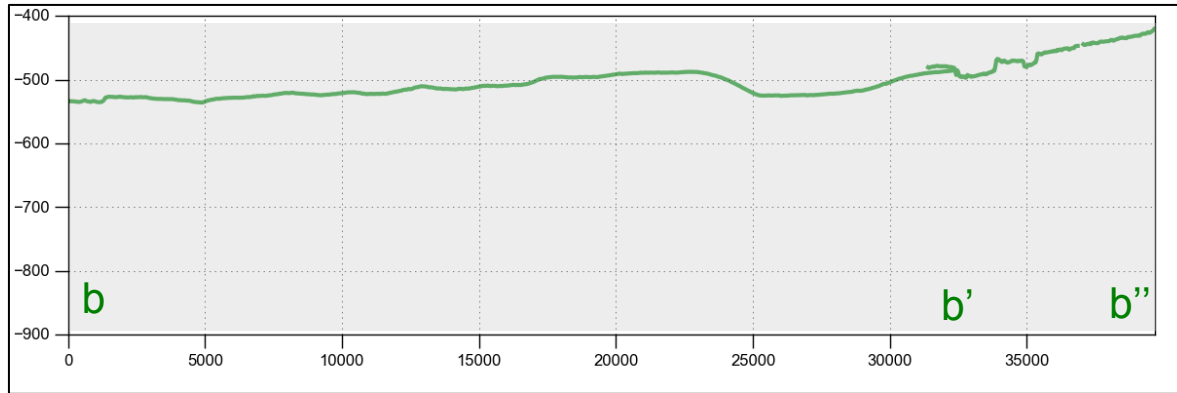
Palaeo-trough



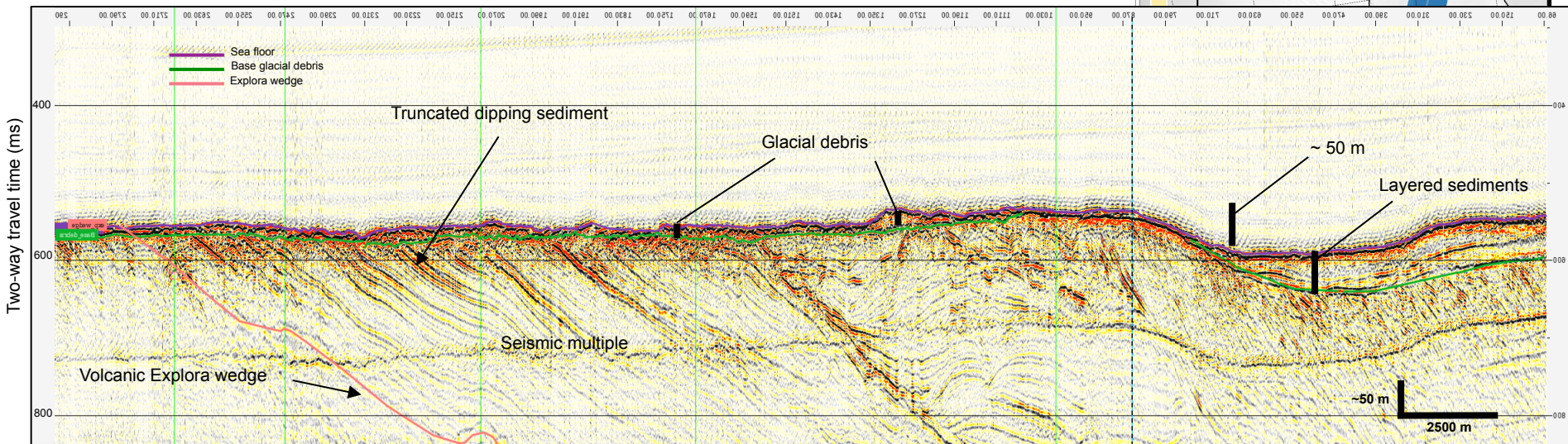
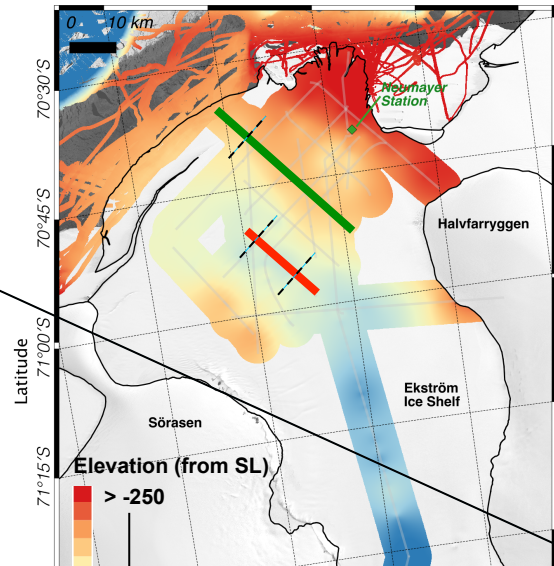
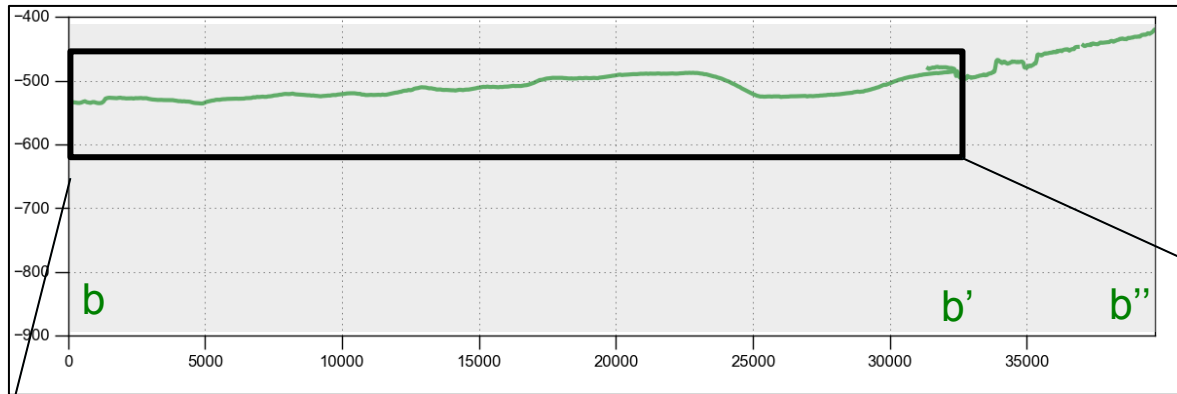
Grounding Zone Wedge



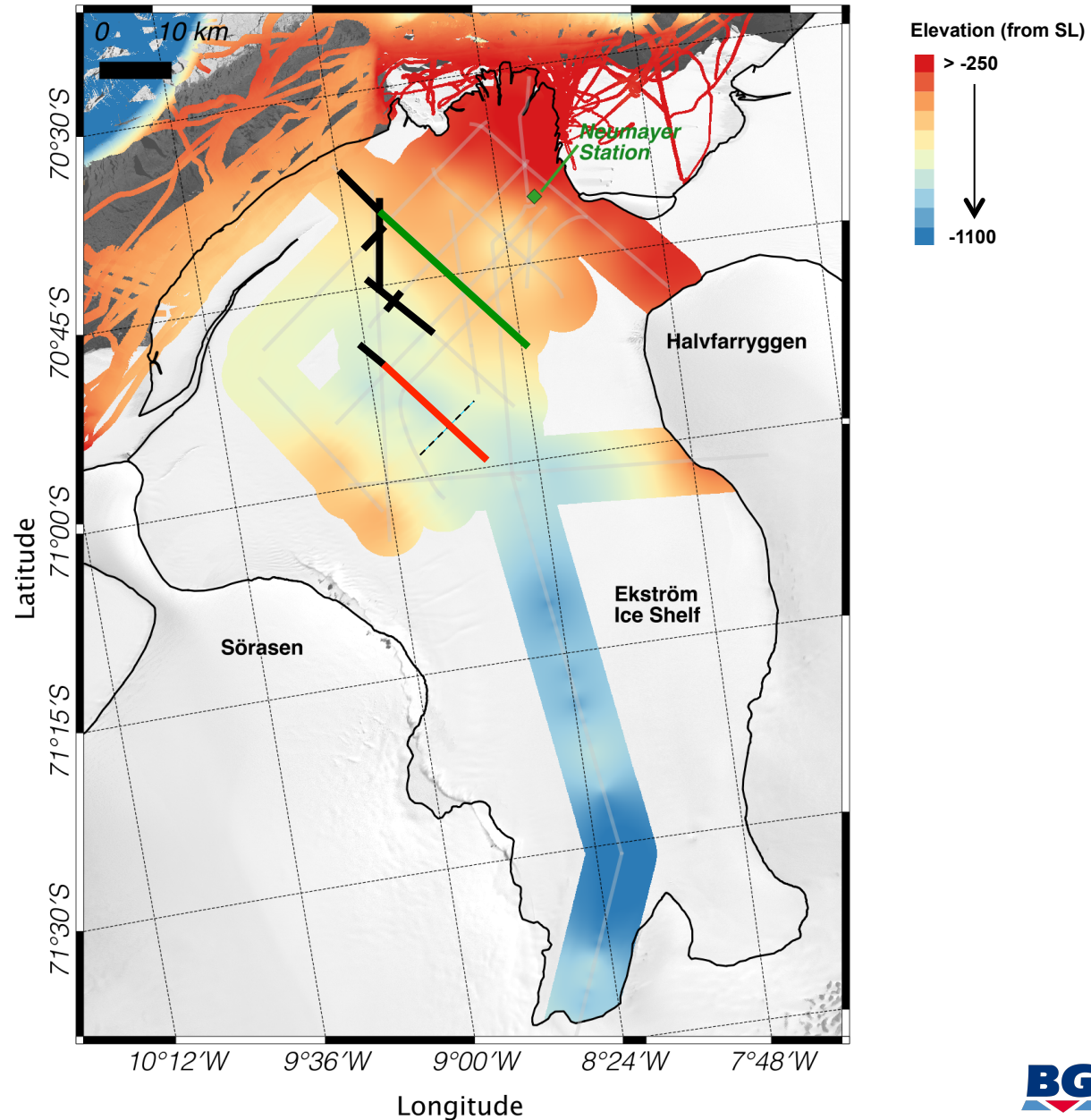
Grounding Zone Wedge



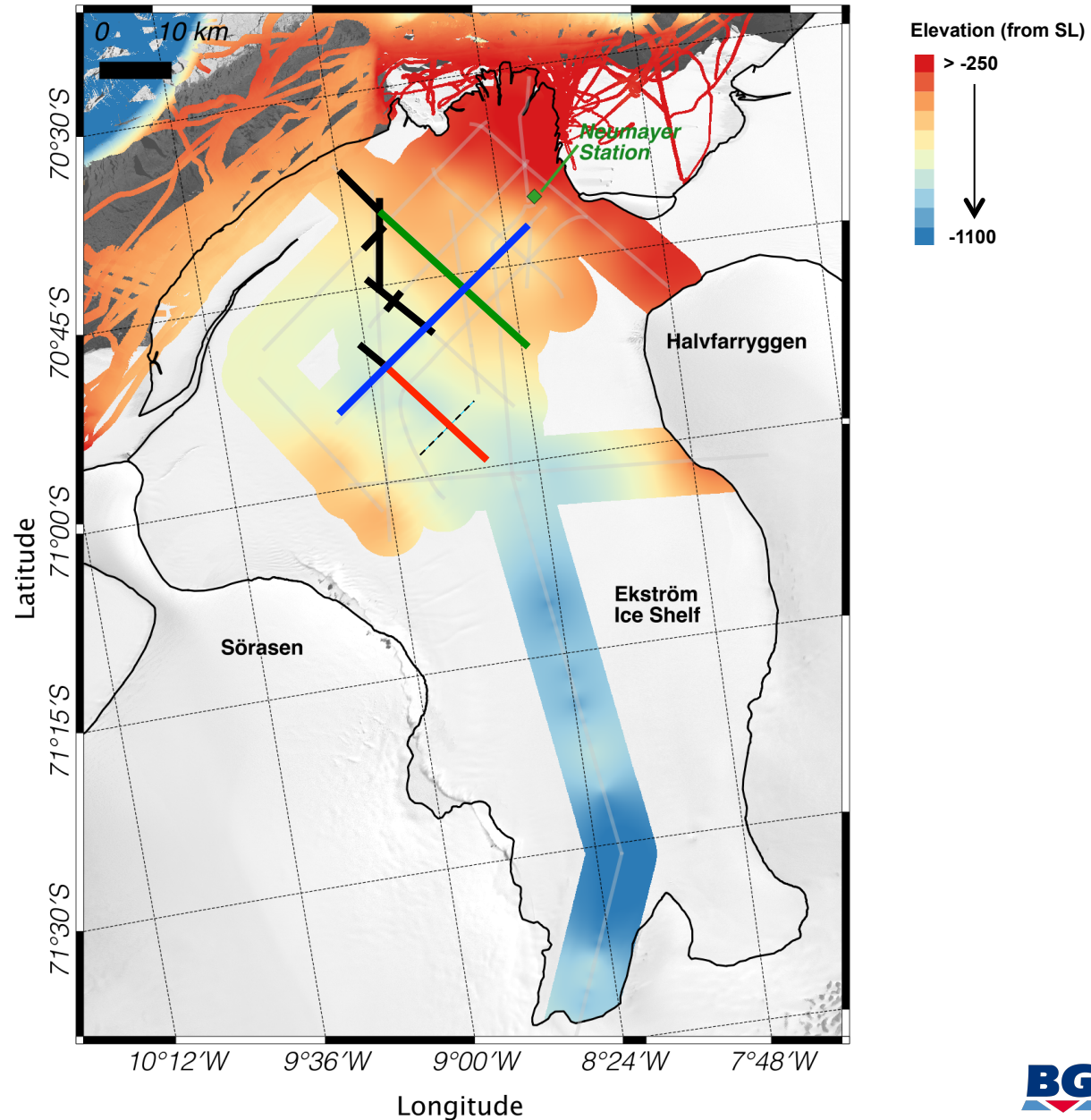
Grounding Zone Wedge



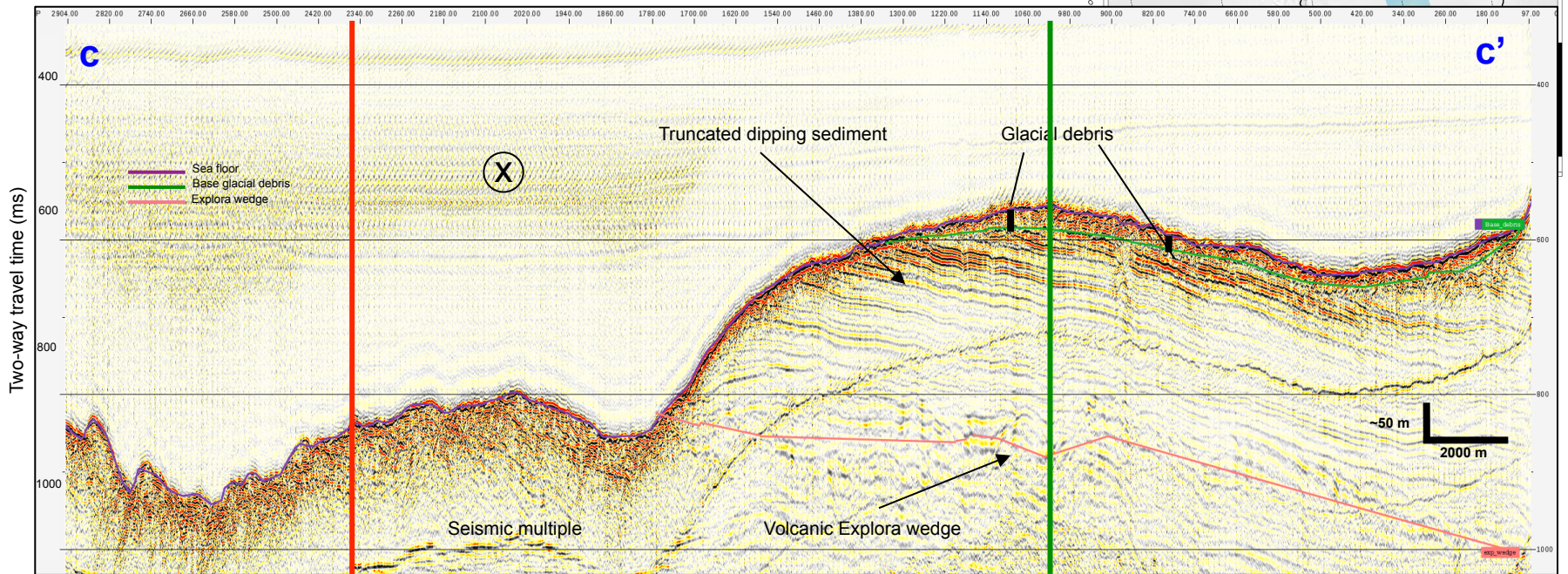
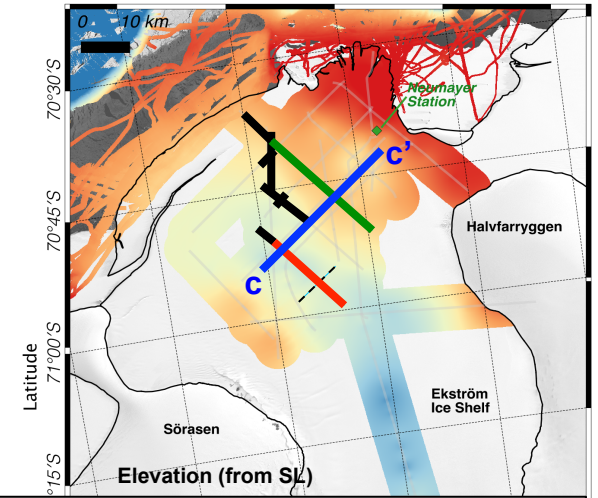
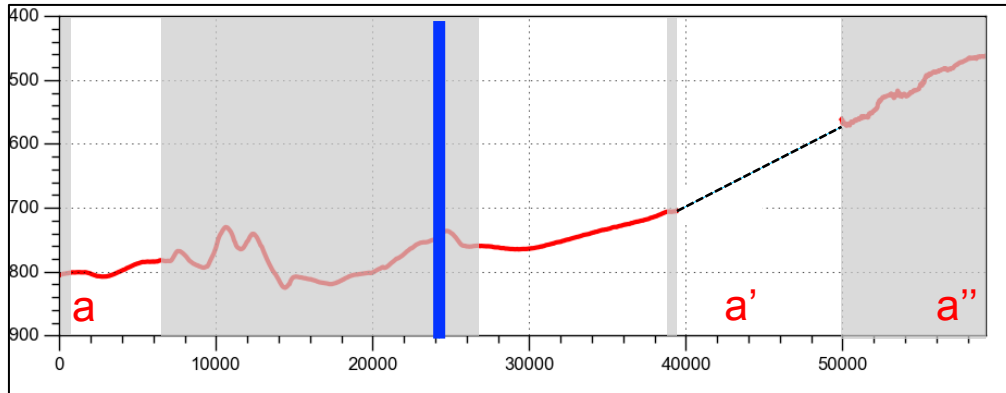
Grounding Zone Wedge - Extent



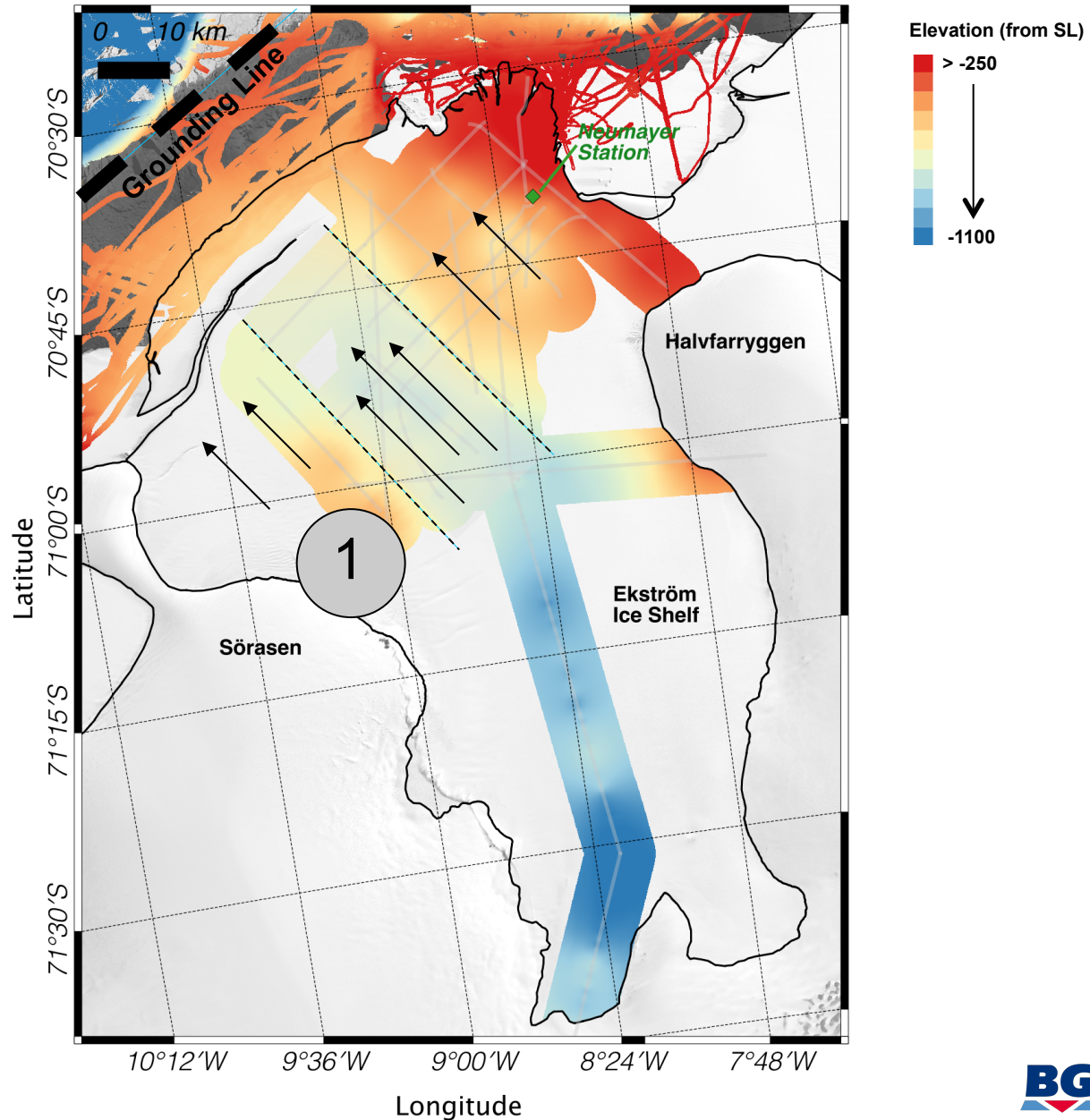
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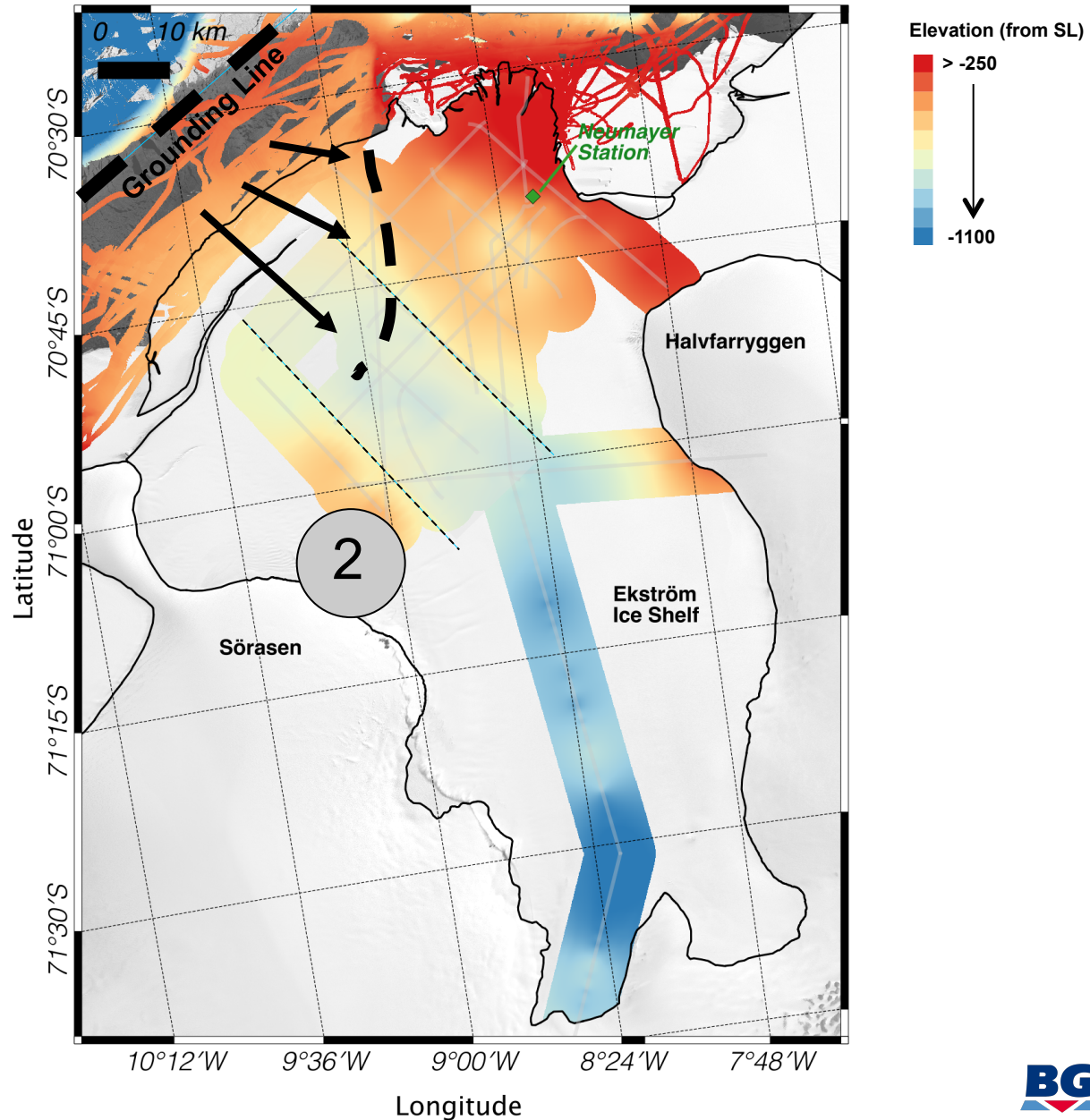
Grounding Zone Wedge – The Missing Part



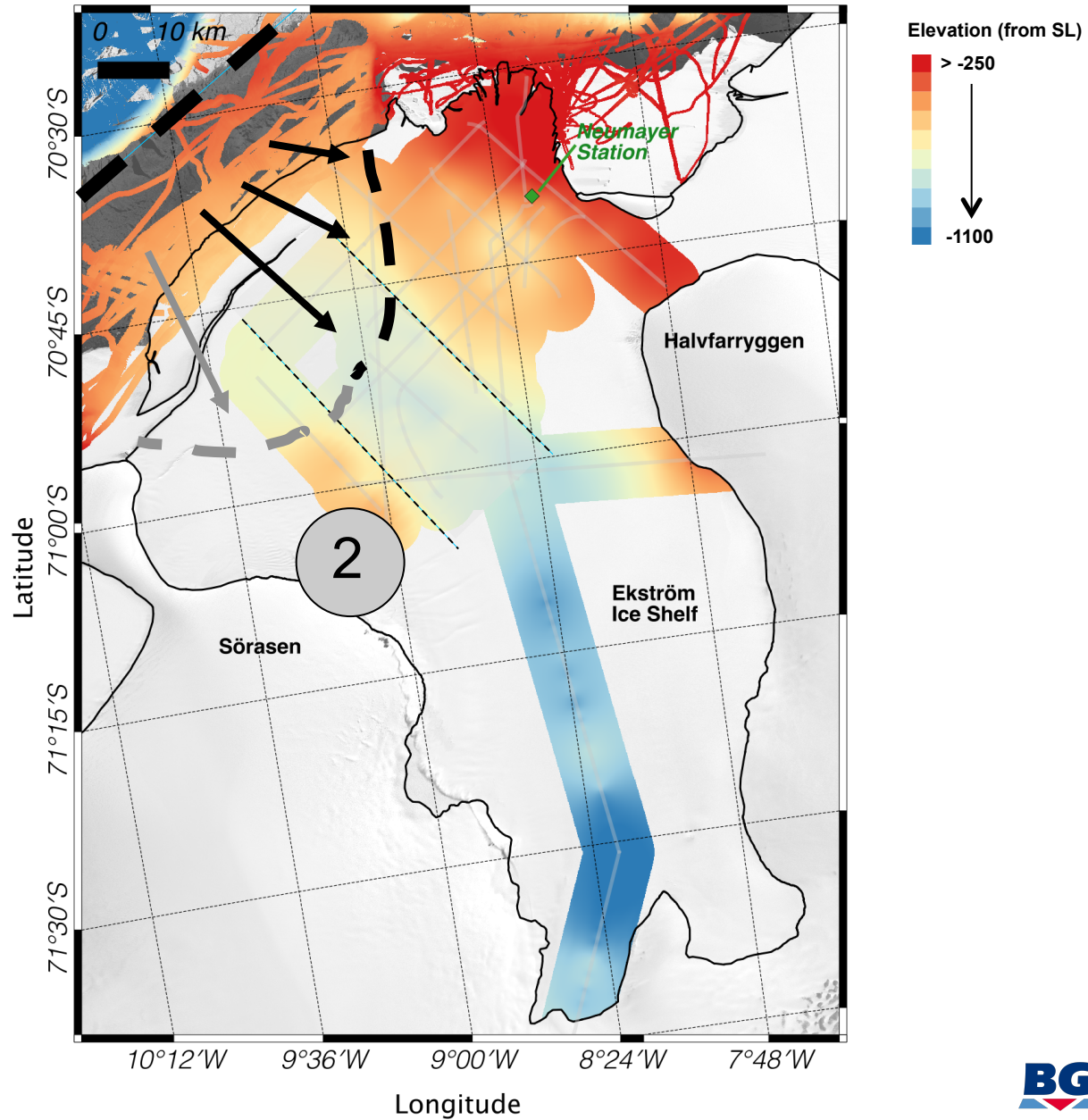
Preliminary Reconstruction



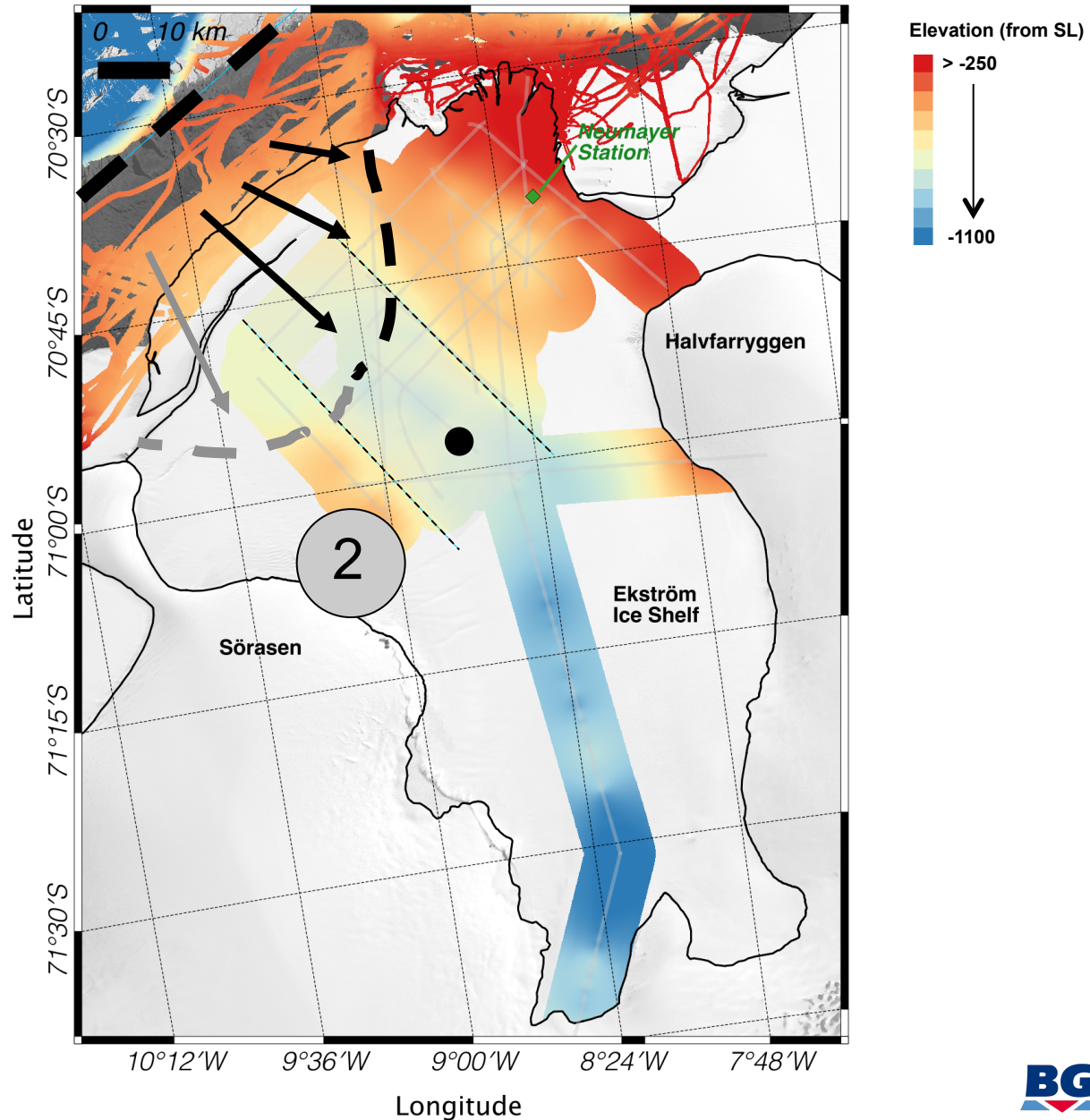
Preliminary Reconstruction



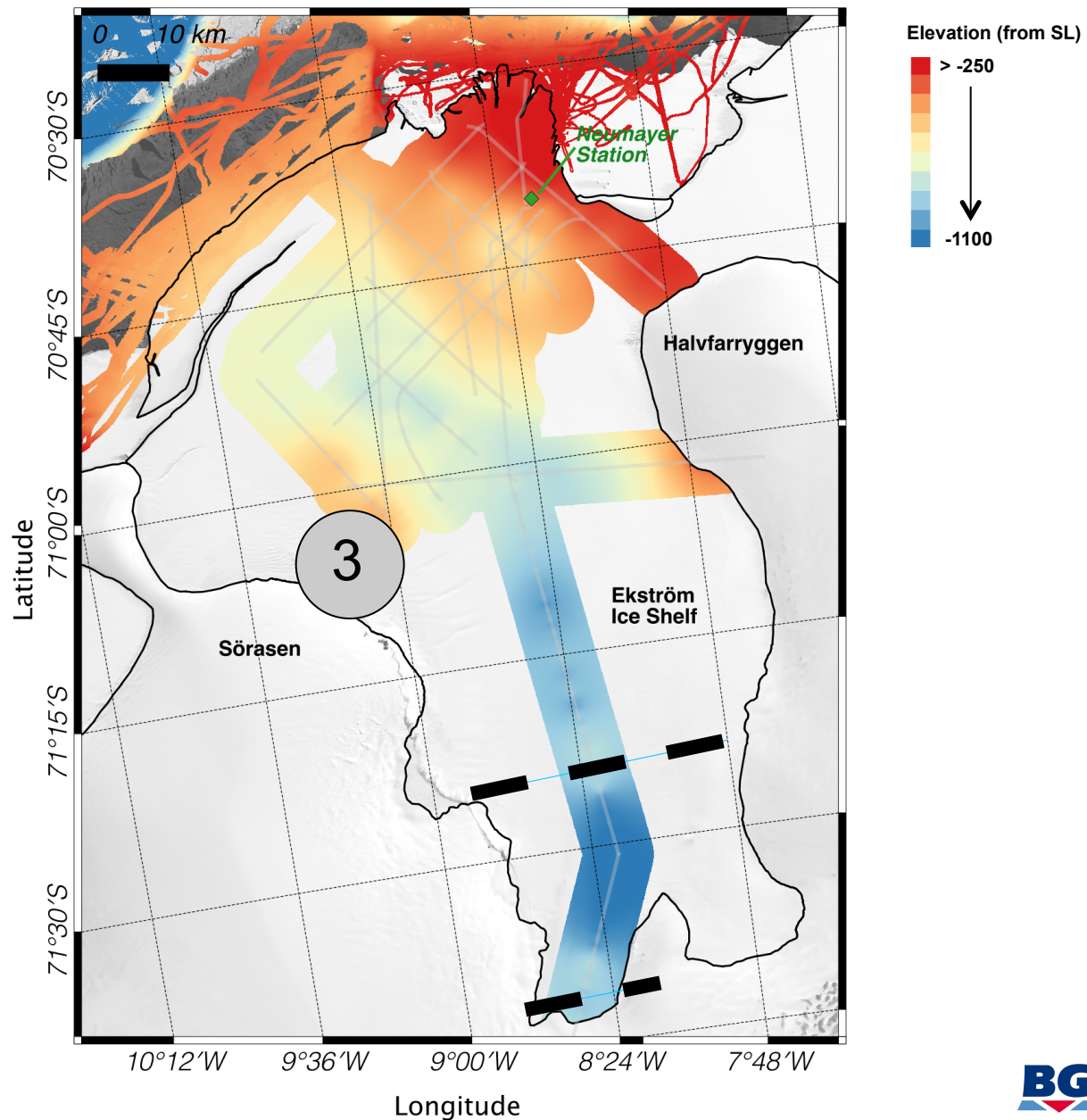
Preliminary Reconstruction



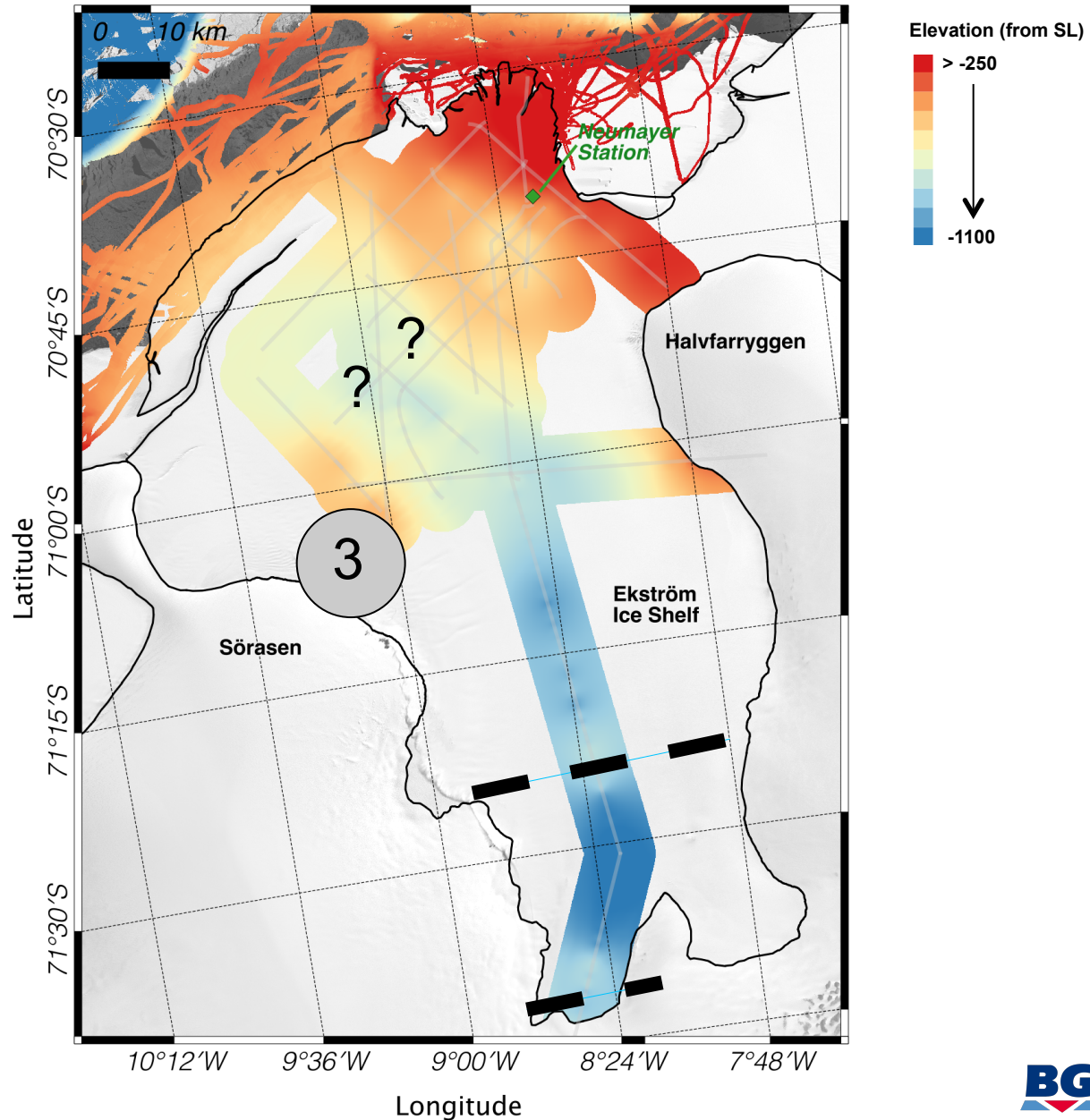
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- Evidence of a palaeo- ice stream trough beneath the Ekström ice shelf
- Rougher topography within the trough than in surrounding “smoother” areas
- Ice retreat features – layered grounding zone wedges found across the trough mouth allow us to begin to reconstruct retreat history of area

What this space!

- A whole host of other features seen at and beneath sea-floor
- Age of sediments can be retrieved through sub-shelf drilling and sediment sampling – 2018/19 season.

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Thank you!

Grounding Line Extension

