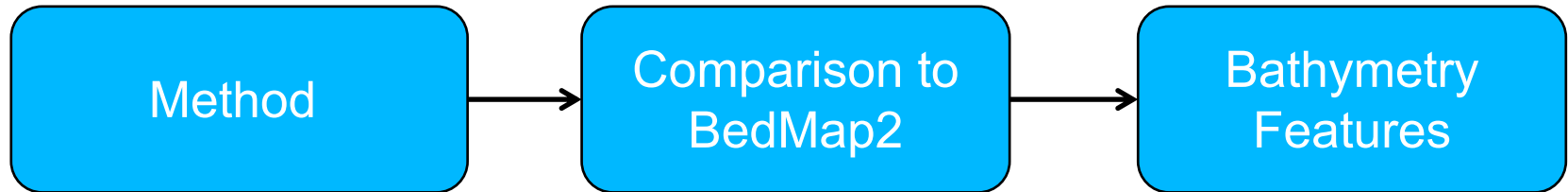


# What lies beneath: A detailed bathymetry of the sea-floor below Ekström Ice Shelf, East Antarctica

Emma C. SMITH<sup>1</sup>

Reinhard DREWS<sup>2</sup>, Todd EHLERS<sup>2</sup>, Dieter FRANKE<sup>3</sup>, Christoph GAEDICKE<sup>3</sup>, Coen HOFSTEDE<sup>1</sup>, Gerhard KUHN<sup>1</sup>, Astrid LAMBRECHT<sup>4</sup>, Christoph MAYER<sup>4</sup>, Ralf TIEDEMANN<sup>1,5</sup>, and Olaf EISEN<sup>1,5</sup>



<sup>1</sup>Alfred-Wegener-Institut (AWI), Germany, <sup>2</sup>Department of Geosciences, University of Tübingen, Germany

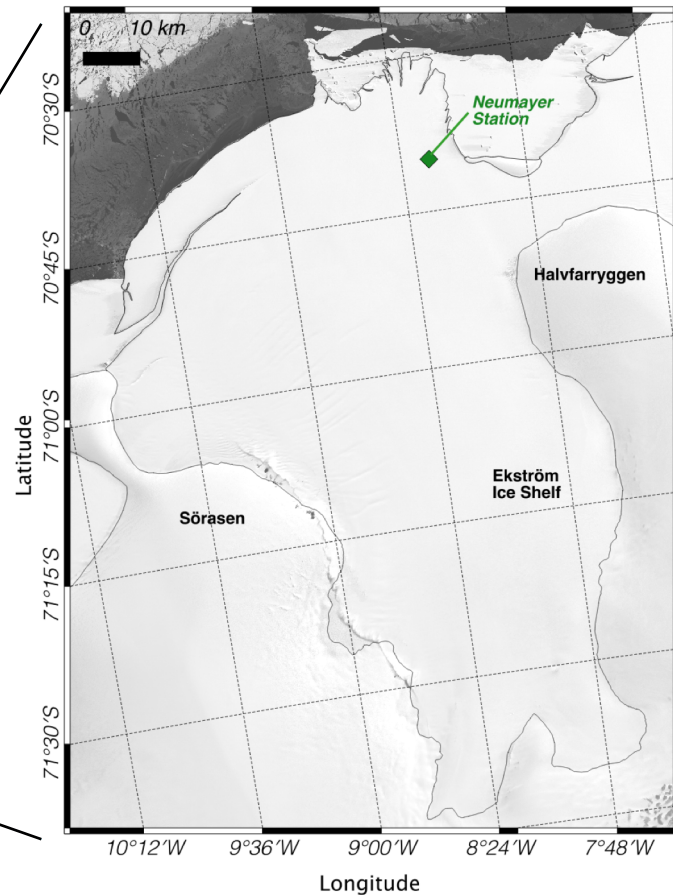
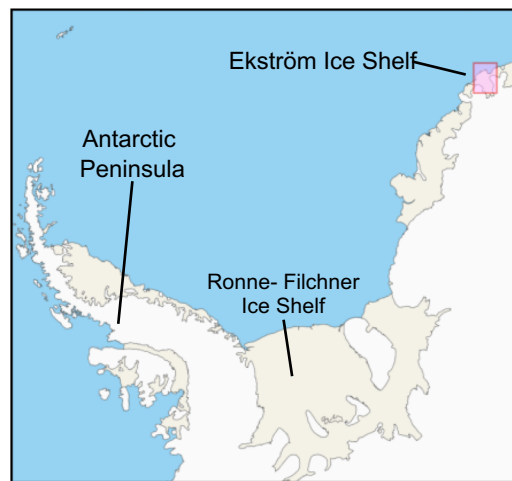
<sup>3</sup>BGR, Germany, <sup>4</sup>Geodesy and Glaciology, Bavarian Academy of Sciences and Humanities, Germany,

<sup>5</sup>Department of Geosciences, University of Bremen, Germany

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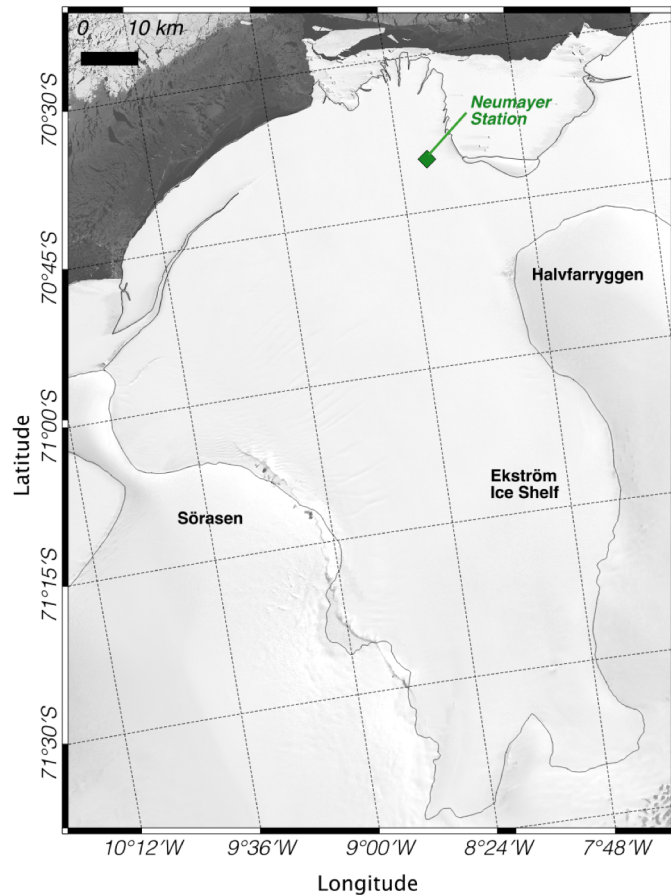


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- Sea floor topography → past ice dynamics
- Cavity → ocean circulation and ice melt
- **Better SLR Predictions!**



# What lies beneath: A detailed bathymetry of the sea-floor below Ekström Ice Shelf, East Antarctica

**Emma C. SMITH**<sup>1</sup>

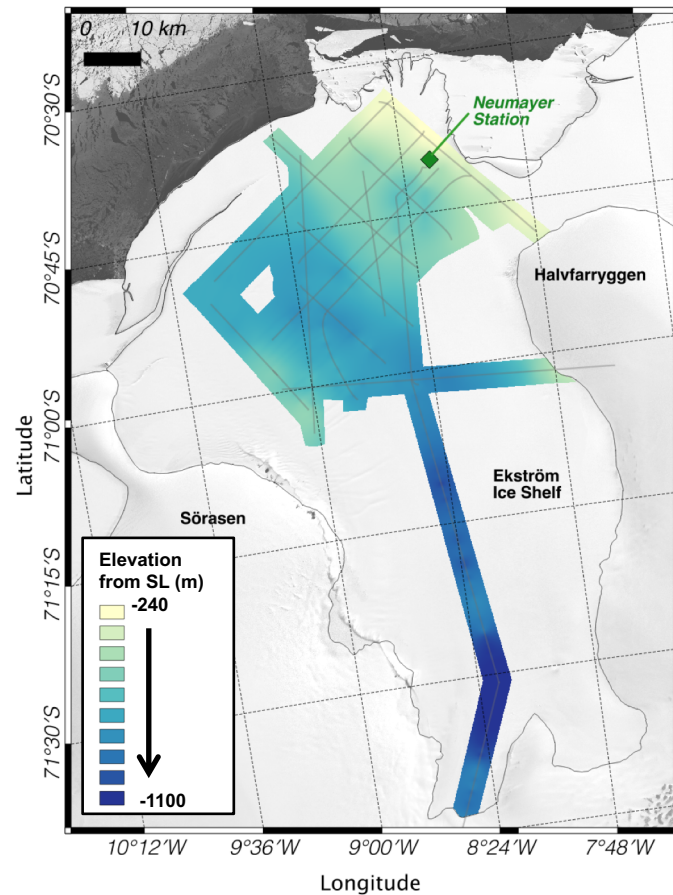
Reinhard DREWS<sup>2</sup>, Todd EHLERS<sup>2</sup>, Dieter FRANKE<sup>3</sup>, Christoph GAEDICKE<sup>3</sup>,  
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MAYER<sup>4</sup>, Ralf TIEDEMANN<sup>1,5</sup>, and Olaf EISEN<sup>1,5</sup>



~700 km of high  
quality (up to 10  
fold) seismic data

Key Findings:

- Sea-floor trough
- Glacial debris deposits 10-60 m thick
- Deviates from BedMap2 by up to 700 m





Method

Comparison to BedMap2

Bathymetry Features

# Vibroiseis on Ice!



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



← SPs 75 – 750 m →

● ———▶ 1500 m, 60 channels

**Sweep:** 10 – 220 Hz  
**Time:** 10 seconds

METHOD: Vibroseis



Method

Comparison to BedMap2

Bathymetry Features

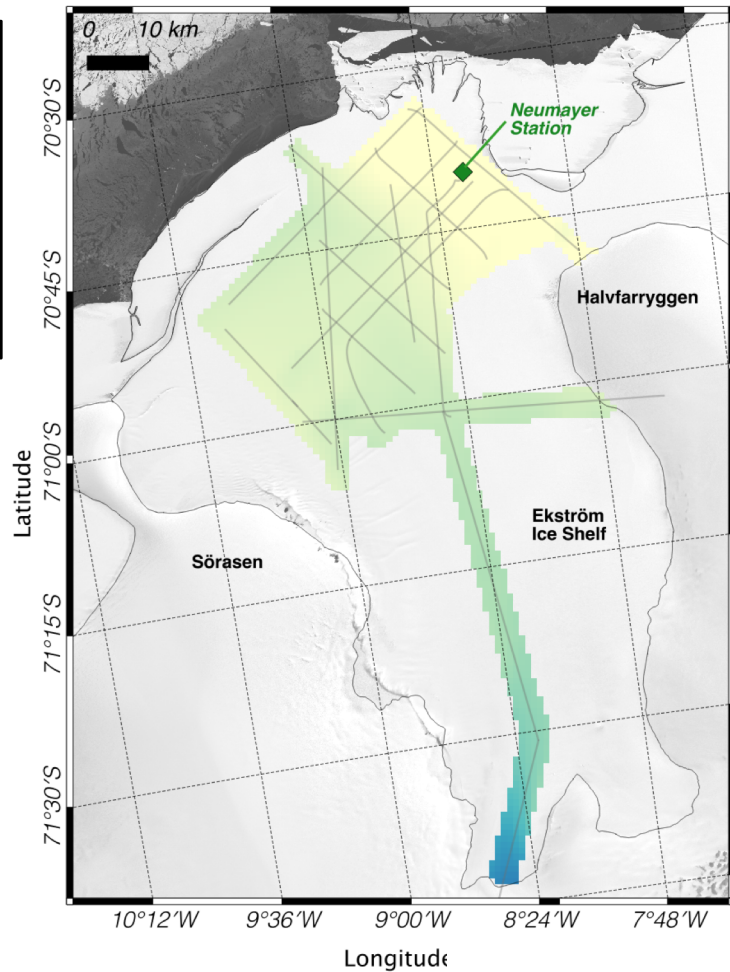
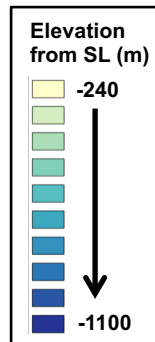
# Comparison to Bedmap2

Bedmap2

Seismic  
Bathymetry

Difference

Comparison





Method

Comparison to BedMap2

Bathymetry Features

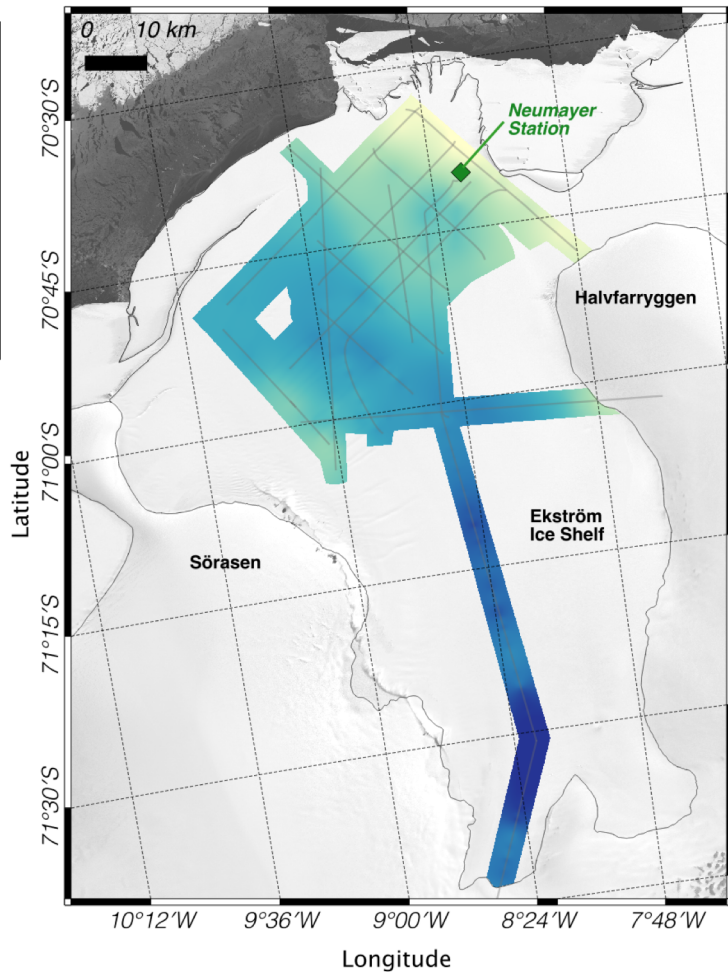
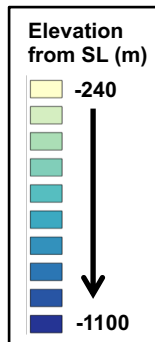
# Comparison to Bedmap2

Bedmap2

Seismic  
Bathymetry

Difference

Comparison





Method

Comparison to BedMap2

Bathymetry Features

# Comparison to Bedmap2

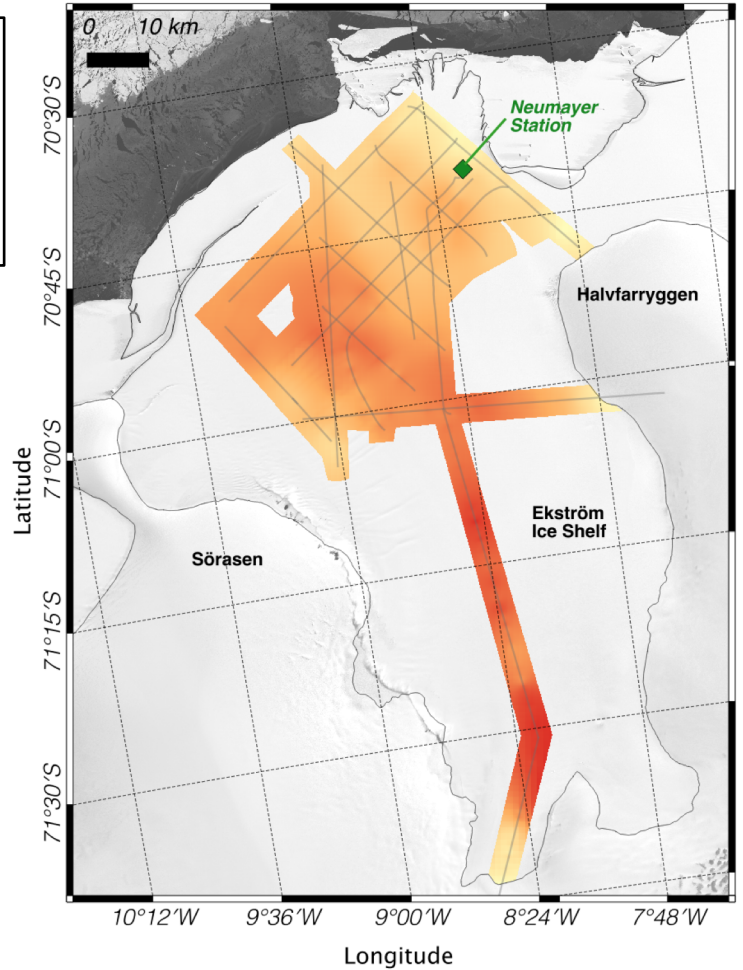
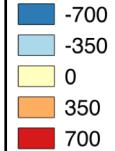
Bedmap2

Seismic  
Bathymetry

Difference

Comparison

Bedmap -  
Seismic (m)







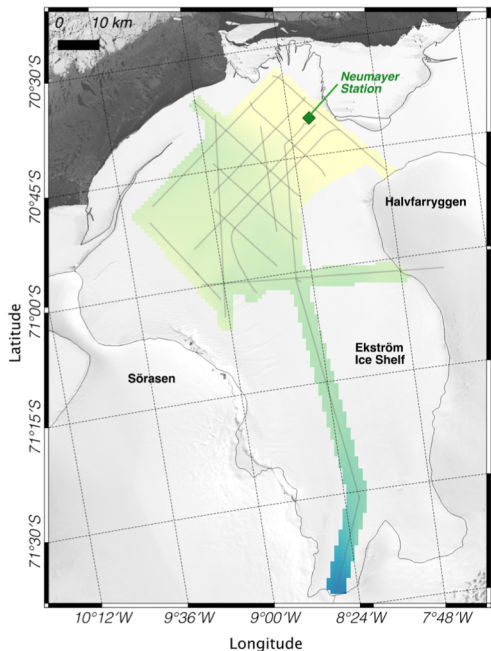
Method

Comparison to BedMap2

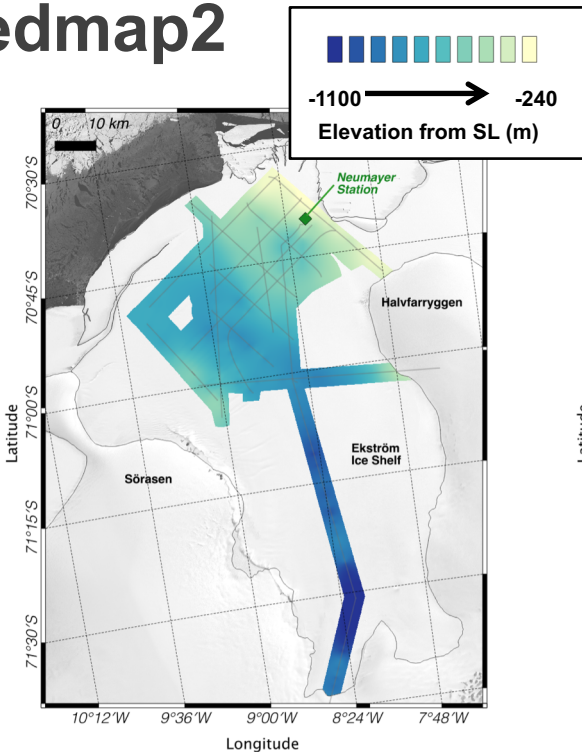
Bathymetry Features

# Comparison to Bedmap2

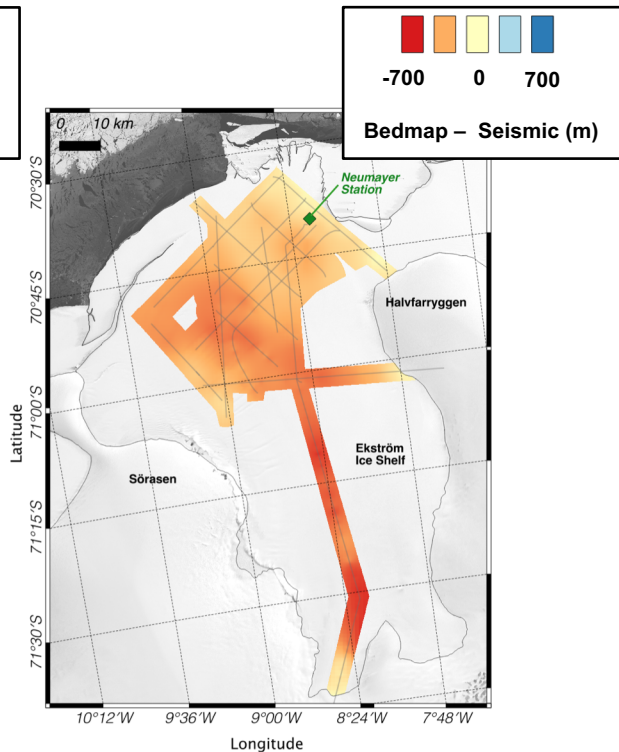
COMPARISON



Bedmap2



Seismic  
Bathymetry



Difference



Method

Comparison to BedMap2

Bathymetry Features

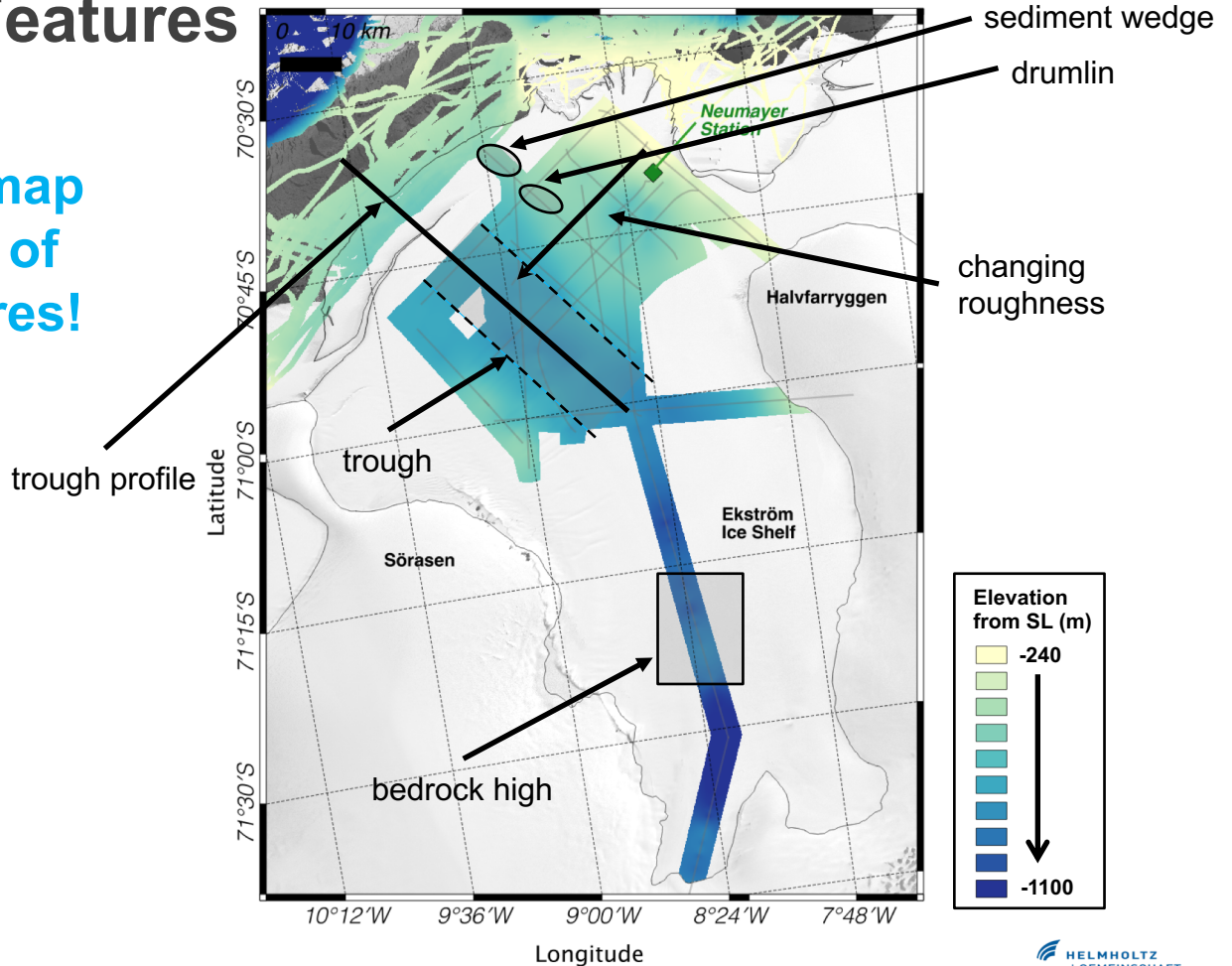
# Bathymetry Features

Click on the map to see some of the key features!

FEATURES

With annotation

Without annotation





Method

Comparison to BedMap2

Bathymetry Features

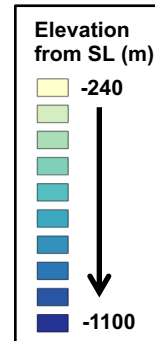
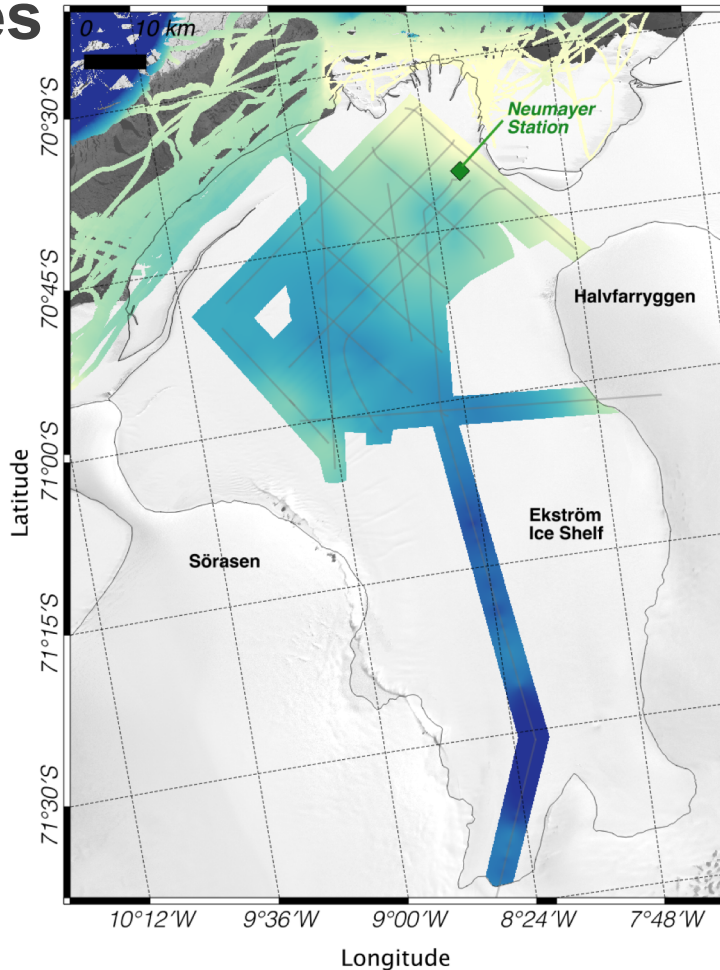


# Bathymetry Features

FEATURES

With  
annotation

Without  
annotation



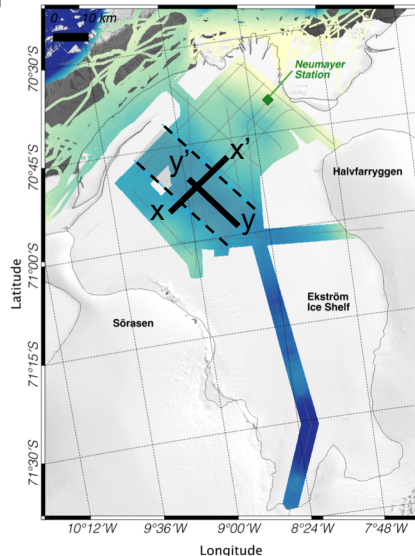
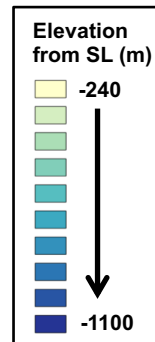
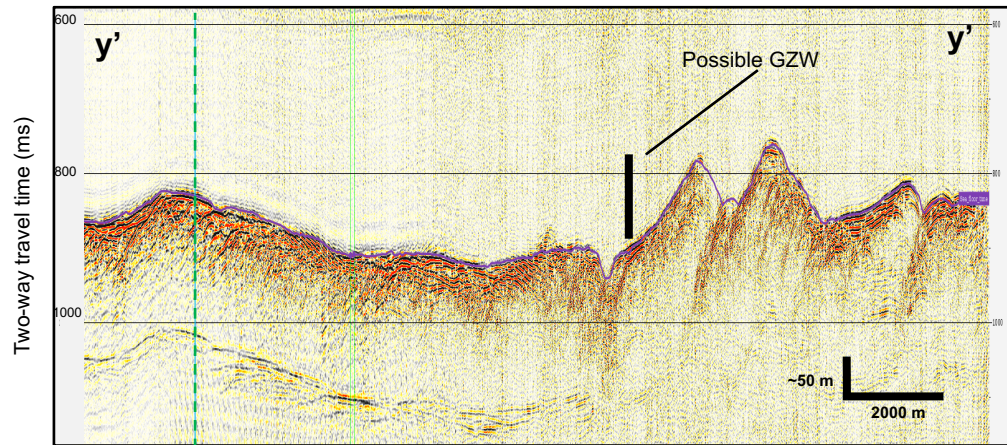


Method

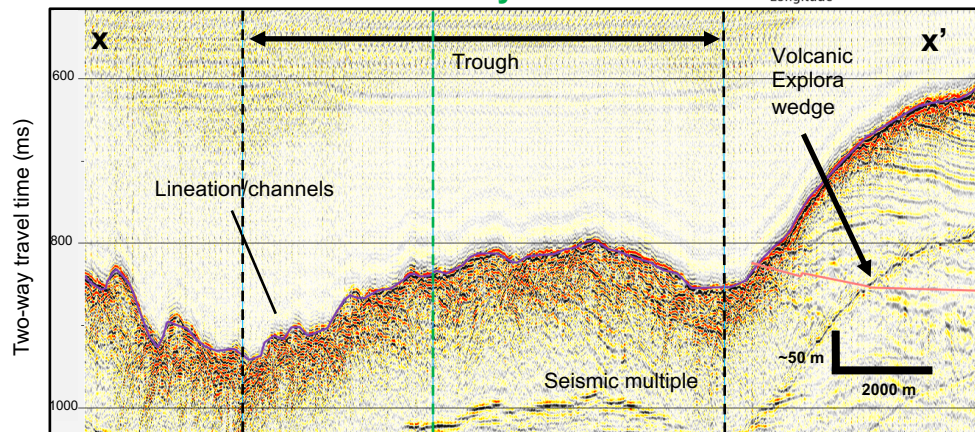
Comparison to BedMap2

Bathymetry Features

# Sea-floor Trough



line y



Back to Map

FEATURES



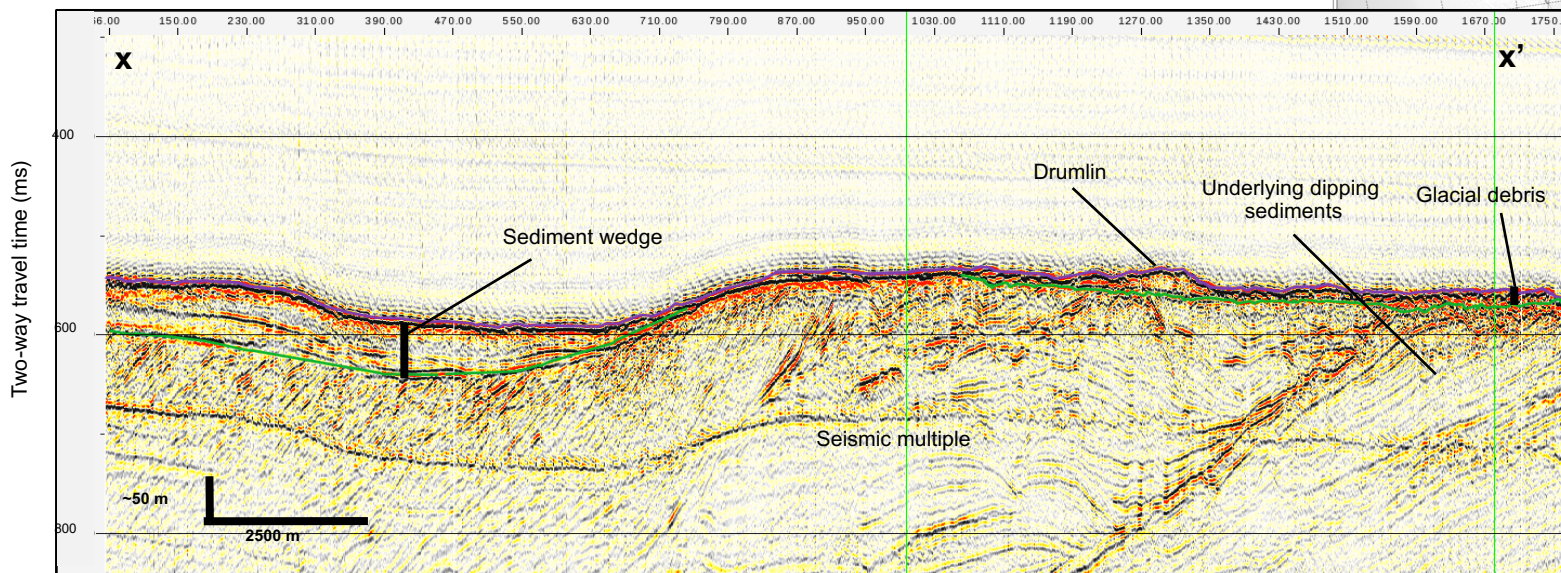
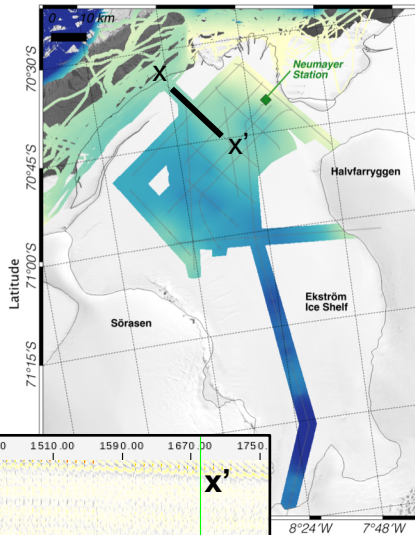
Method

Comparison to BedMap2

Bathymetry Features

# Drumlin and glacial

Back to Map





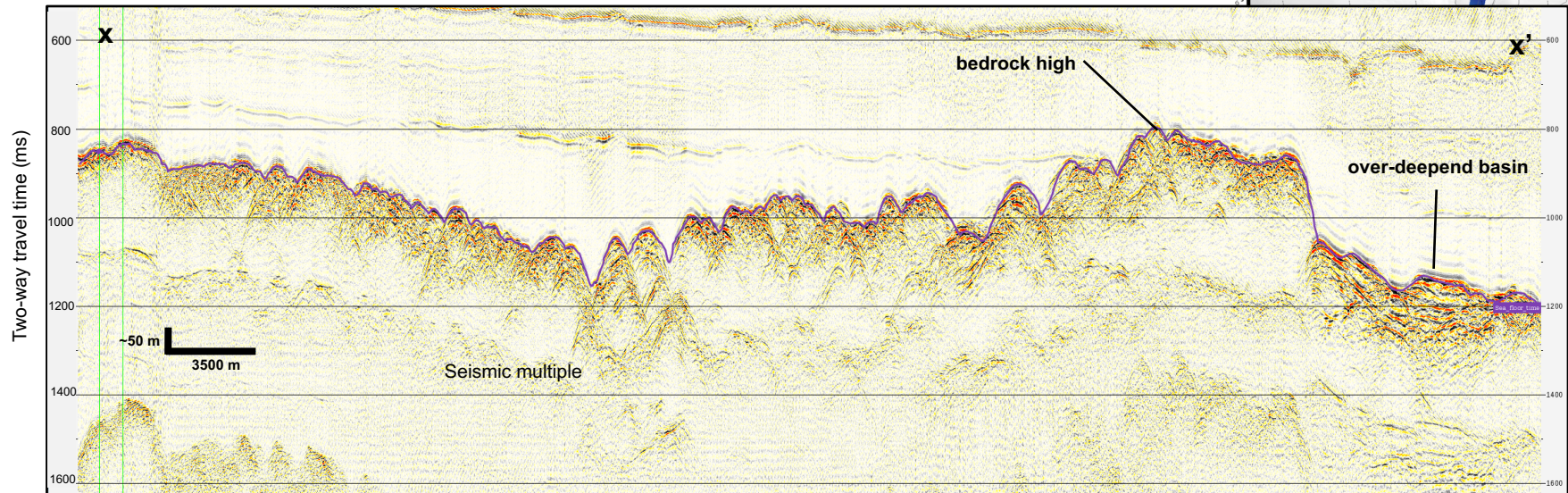
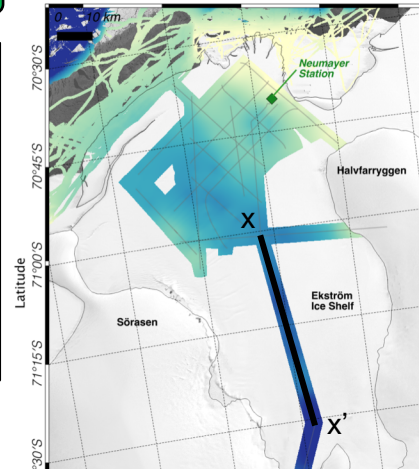
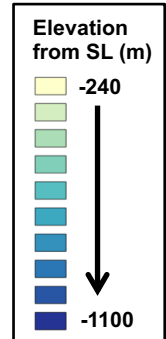
Method

Comparison to BedMap2

Bathymetry Features

# Bedrock high and overdeepend basin

Back to Map



FEATURES



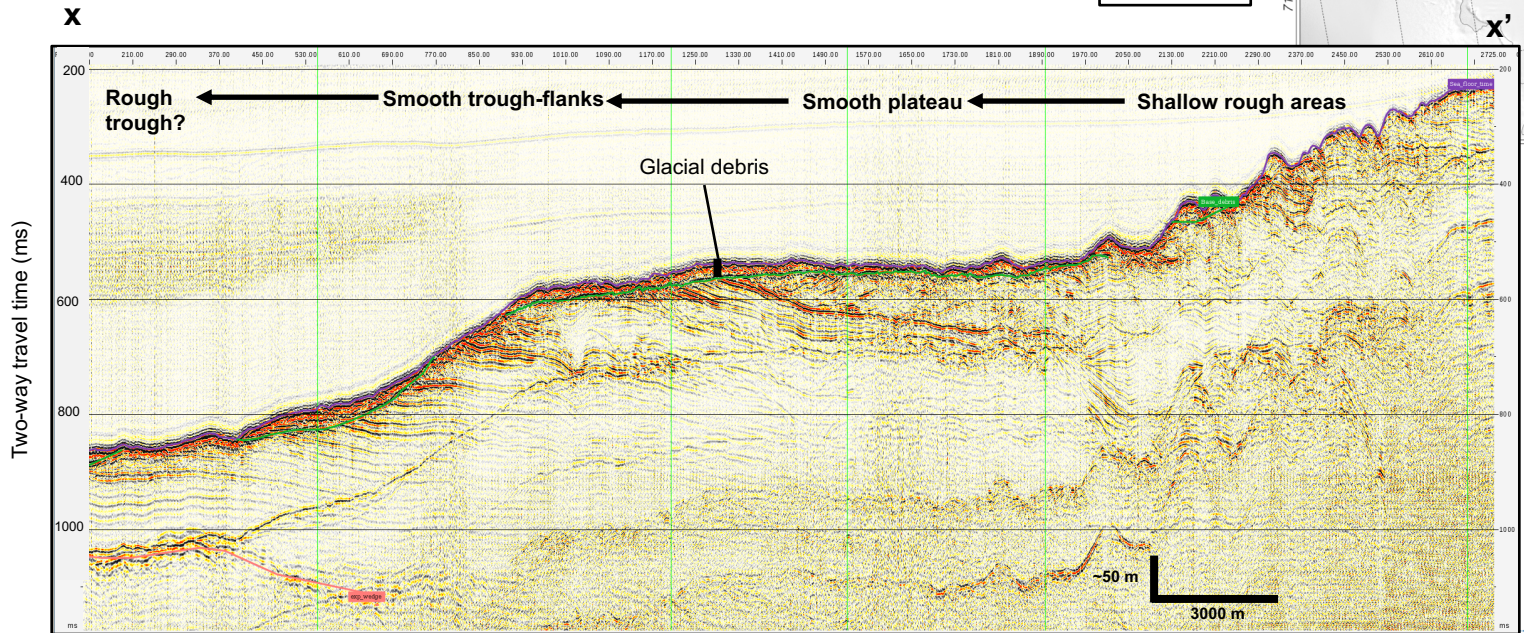
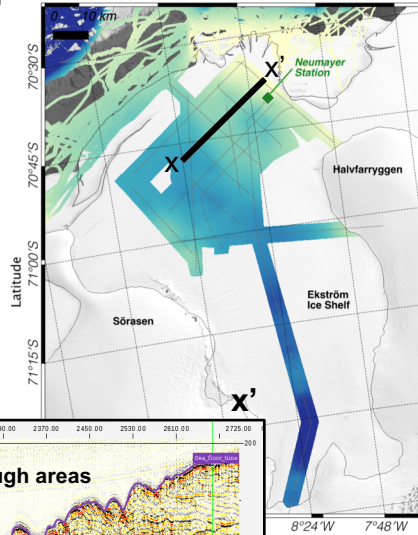
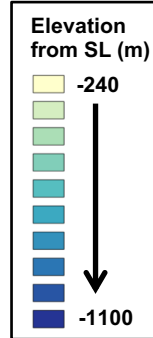
Method

Comparison to BedMap2

Bathymetry Features

# Bedrock high and overdeepened basin

Back to Map



FEATURES



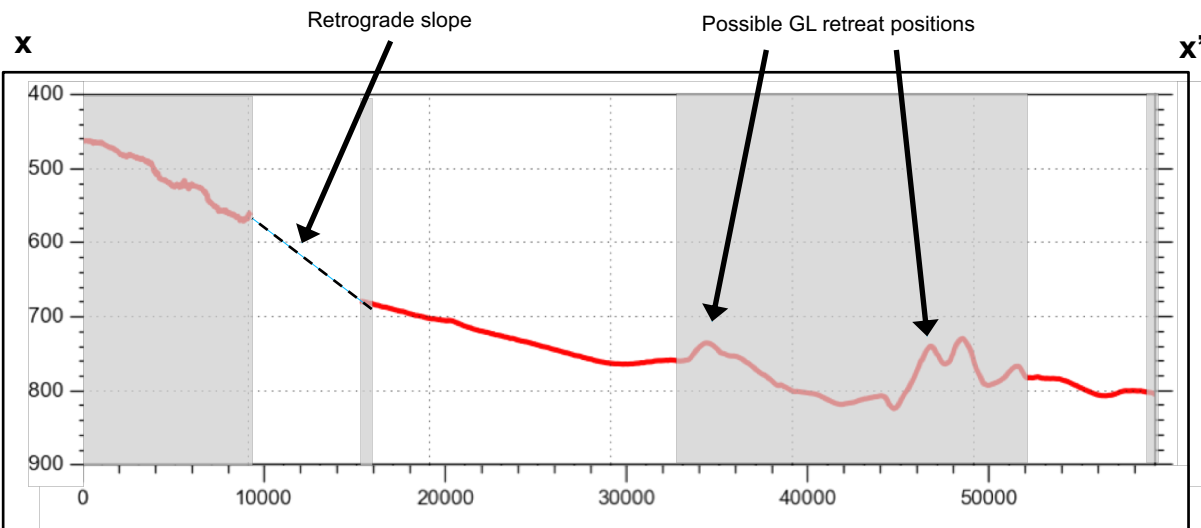
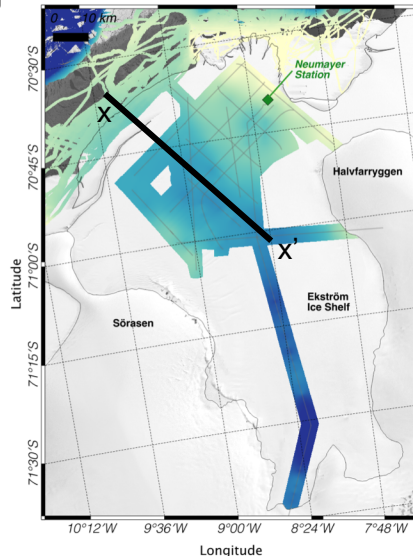
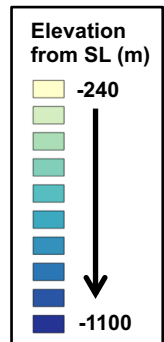
Method

Comparison to BedMap2

Bathymetry Features

# Bedrock high and overdeepened basin

Back to Map



■ = constrained by data



**Whoops – you are at THE END!**  
**Click to return to main menu**

