

# Reconstruction of the White Sea Basin during the late Younger Dryas

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## 1. INTRODUCTION

- The palaeoenvironments in the White Sea Basin during the late Younger Dryas are poorly understood and partly controversial.
- The nature, extent and the connection of the White Sea with the Barents Sea and the Baltic Basin are not known in detail

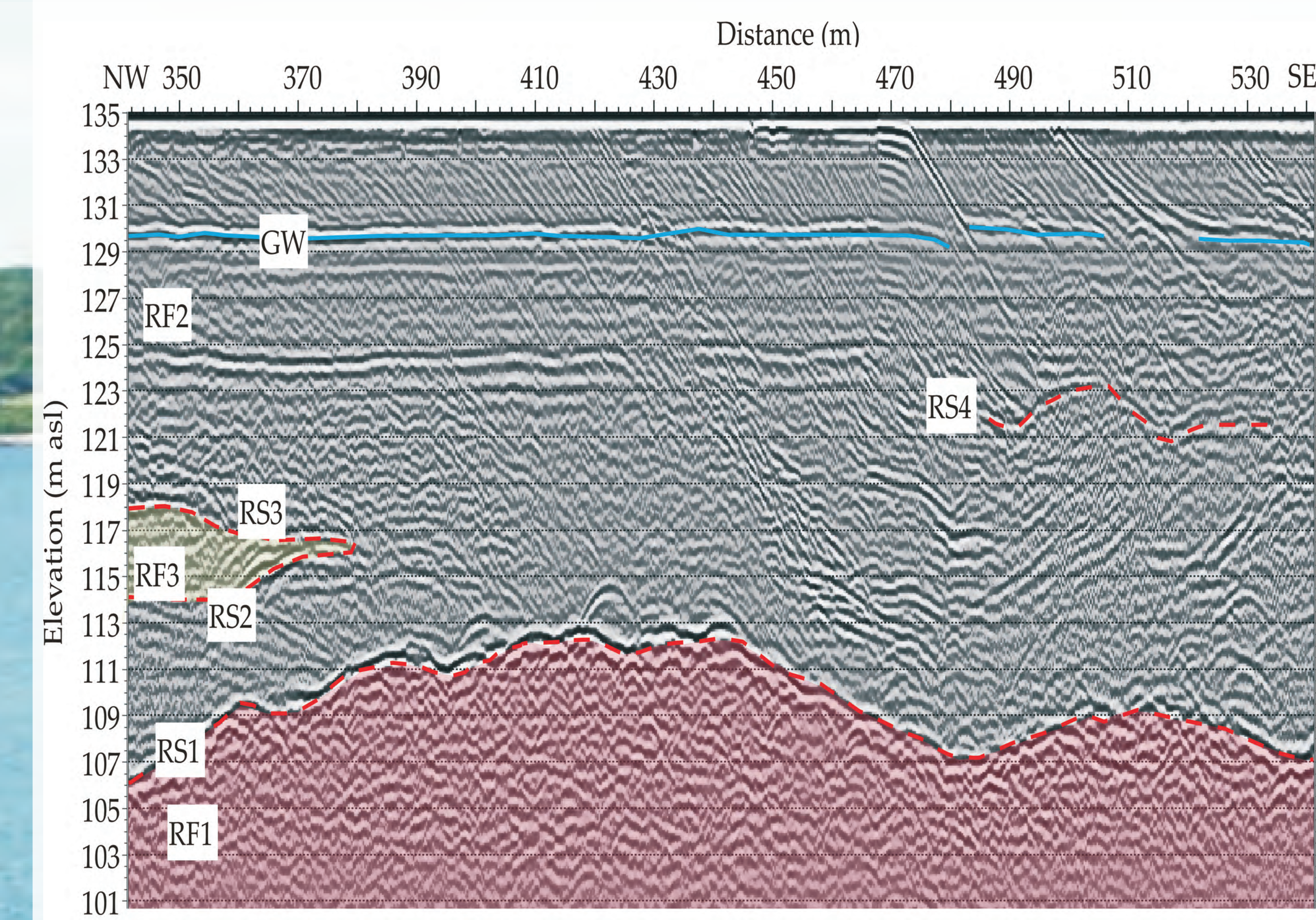


Fig. 1. Part of the ground-penetrating radar profile from the Lake Mikkolanjärvi site.

**Interpretation:** radar facies **RF1** (red tinting): crystalline bedrock, erosionally truncated by radar surface **RS1**. **RF2**: foreset bedding of a glaciofluvial delta, downlapping to **RS1**. **GW**: groundwater table.

- It has been suggested earlier that the basin was occupied by huge dead-ice masses, occupied by a glacial lake or the connection to the Barents Sea was open.
- To shed light into these controversies, glaciofluvial plains in the Kalevala end moraine zone were re-interpreted using satellite images, geomorphology, sedimentology and

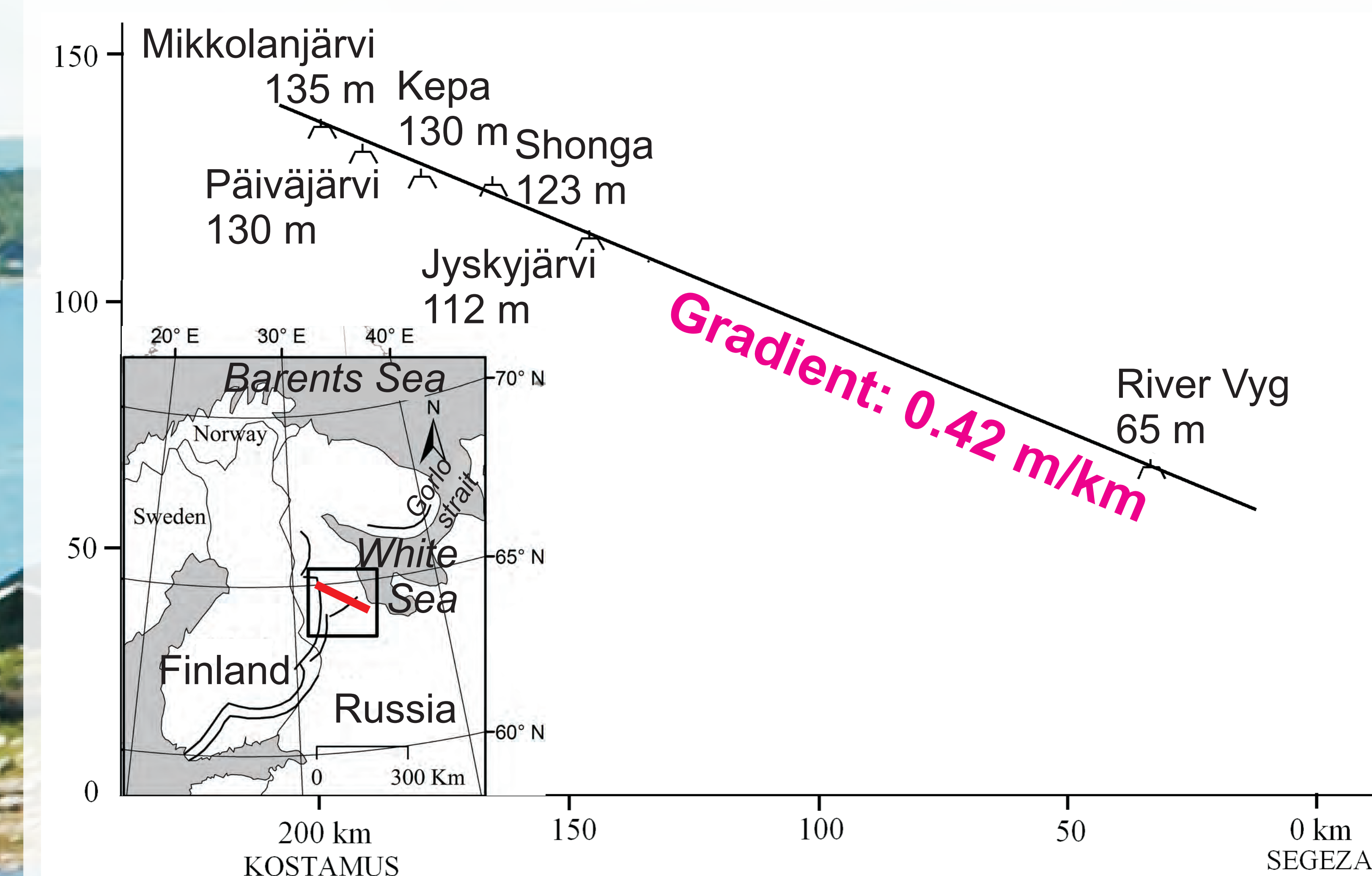


Fig. 2. Distance diagram and the elevations of the delta surfaces and highest terraces used to calculate the glacio-isostatic uplift gradient for the western side of the White Sea. The inset map shows the location of the baseline (in red) and Younger Dryas end moraines (black lines). Black square shows the study area.

ground penetrating radar (GPR).

- The former water level altitudes were used to numerically reconstruct the White Sea Basin during the late Younger Dryas.

## 2. RESULTS

- In three sites out of four the sediments were deposited in a deltaic setting and were interpreted to represent Gilbert-type deltas.

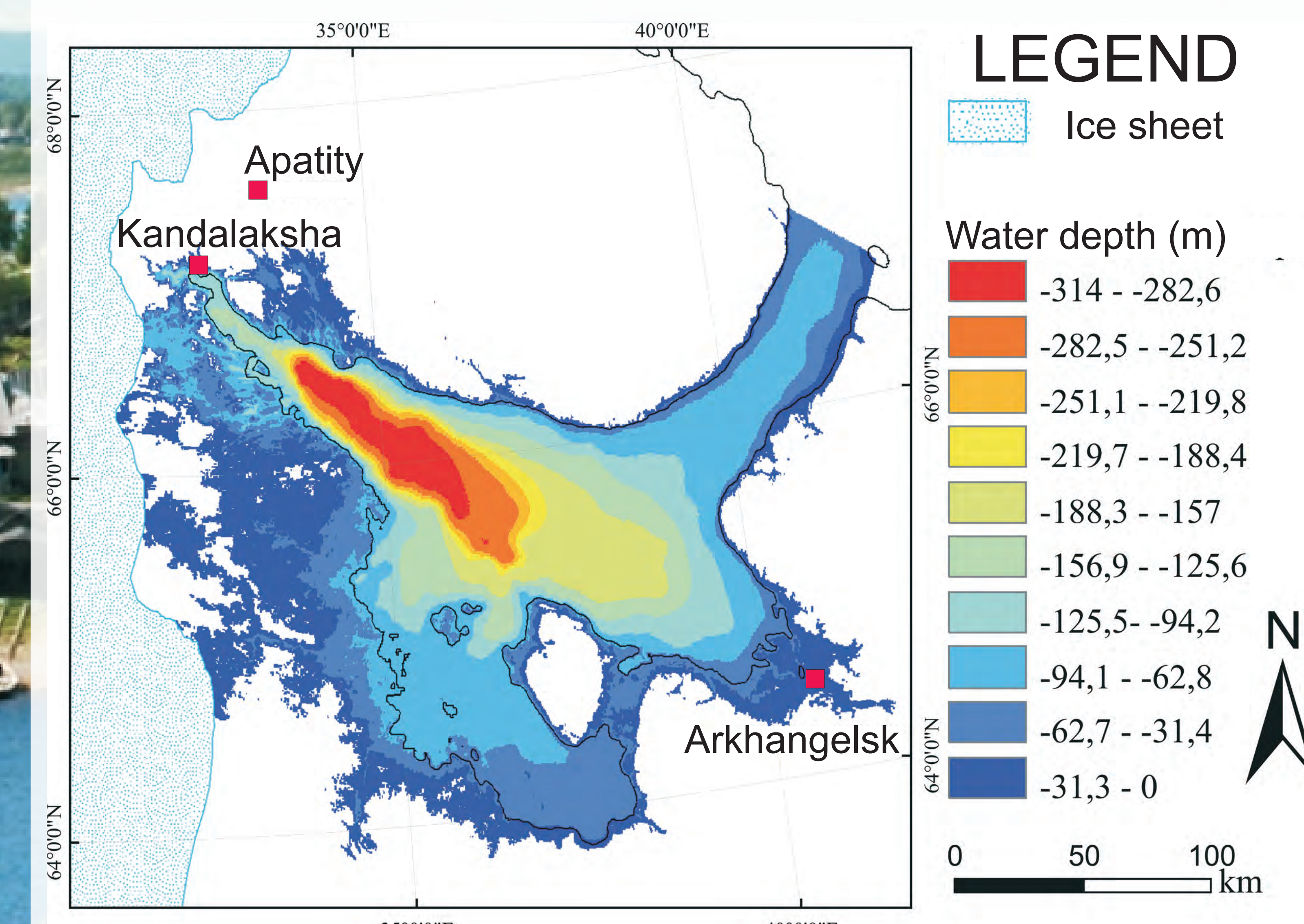


Fig. 3. Reconstructed water depth of the White Sea Basin during the late Younger Dryas. The ice-margin was on the Kalevala end moraine and on its extensions during the late Younger Dryas.

- The deltas grew in to the contemporary water level and using the altitudes of the modern ground surfaces a shoreline gradient 0.42m/km was obtained.

## 3. CONCLUSIONS

- 1) GPR survey indicates that the studied glaciofluvial plains in the Kalevala formation represent Gilbert-type deltas.
- 2) Using delta levels and shoreline altitudes, the shoreline gradient of 0.42 m/km was obtained for the area east of the Kalevala end moraine.
- 3) Reconstruction of the White Sea during the late Younger Dryas indicates that the water body was more extensive than it is today, inundating the present onshore areas at the western side of the White Sea and in the areas adjacent to the city of Arkhangelsk.
- 4) The White Sea was connected to the Barents Sea via the Gorlo Strait and was separated from the Baltic basin by the Maaselkä–Uikujärvi threshold.