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Faroese Geological Survey

Characterisation of the aquifer in Straumsvik with respect to the saline-fresh groundwater interface

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Iceland GeoSurvey

CHARACTERISATION OF THE AQUIFER IN STRAUMSVIK WITH RESPECT TO THE SALINE-FRESH GROUNDWATER INTERFACE

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[1] ÍSOR – Íslenskar orkurannsóknir

[2] Carbfix

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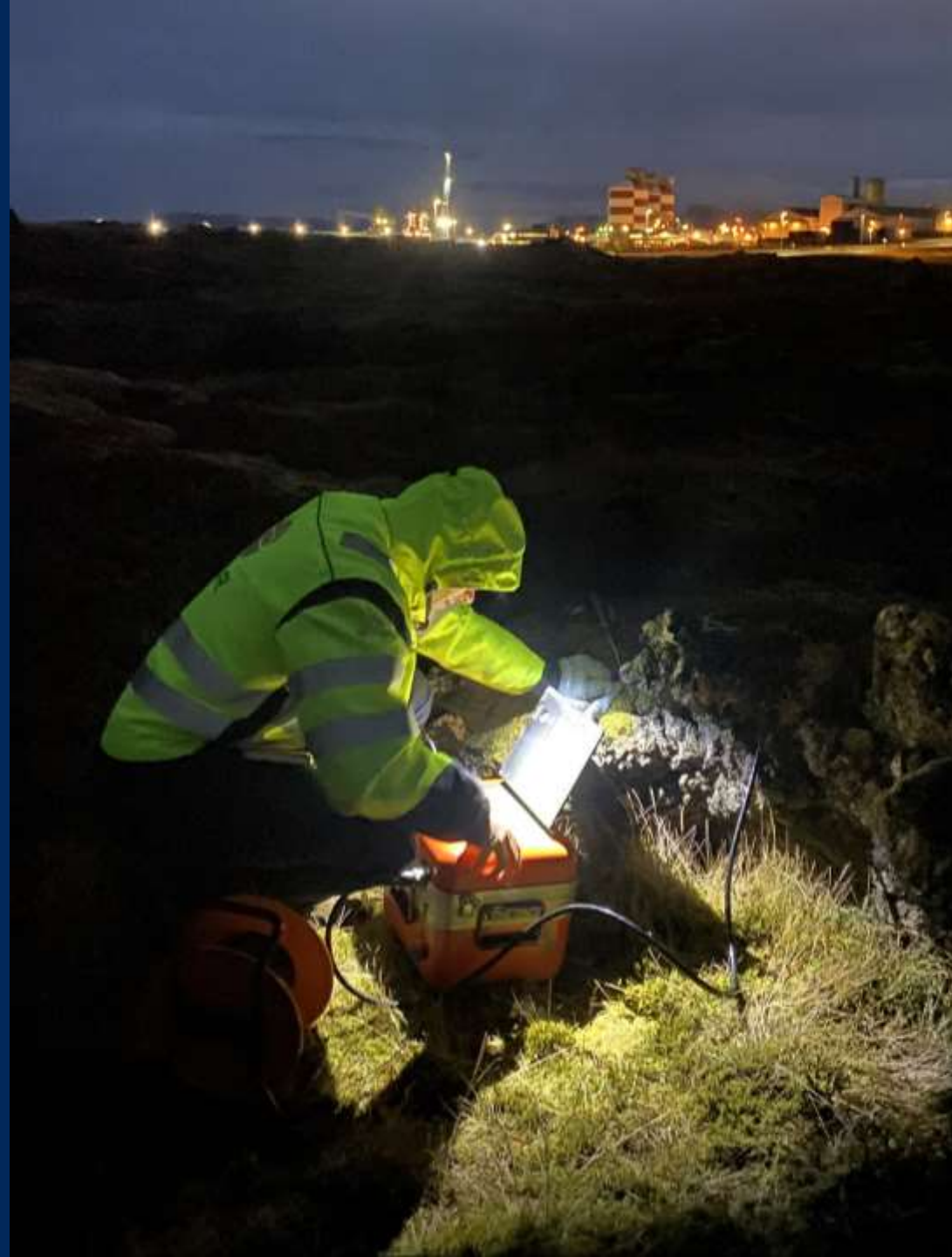

CARBFIX AND THE CODA TERMINAL PROJECT IN STRAUMSVIK

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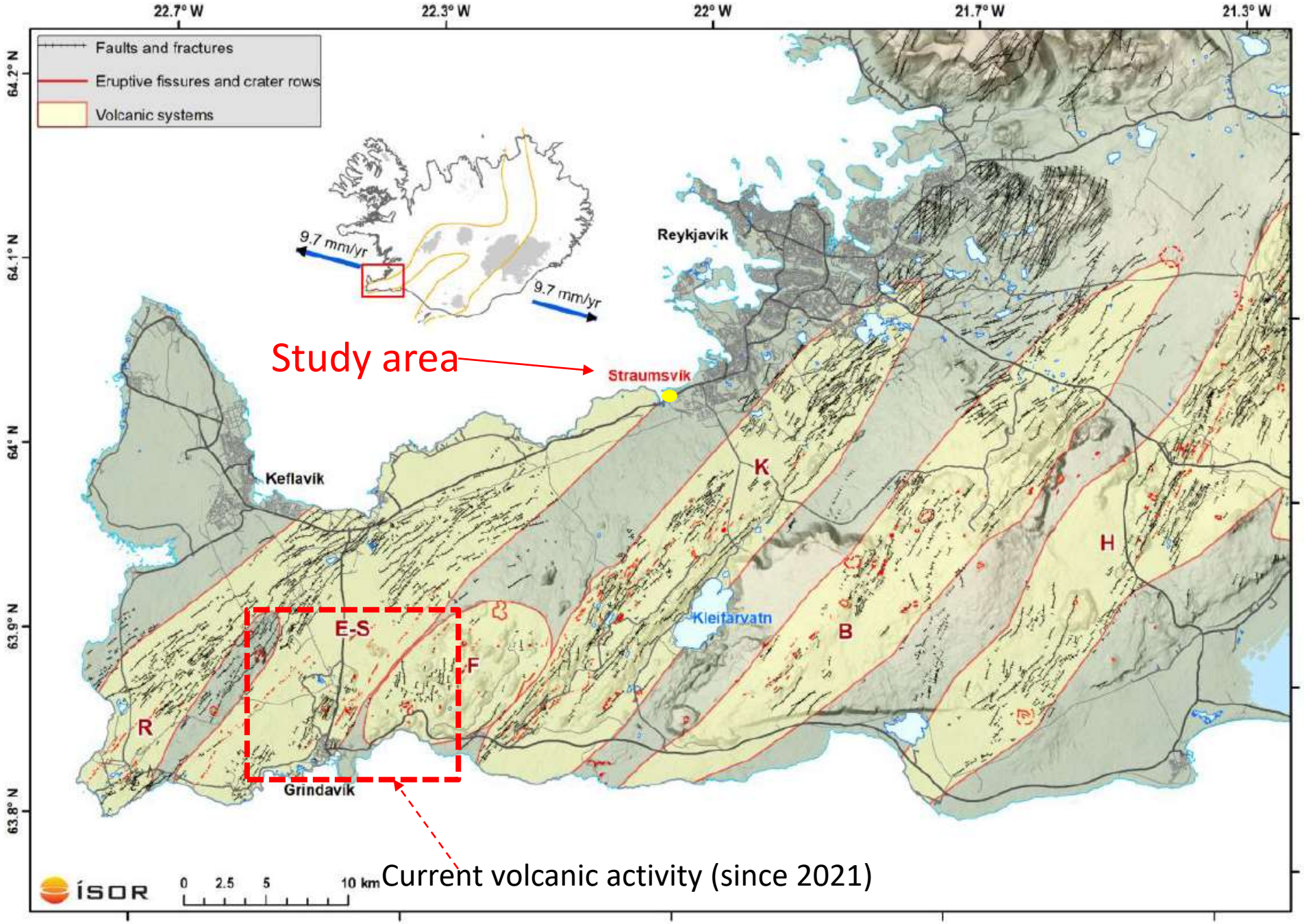
22.7° W
22.3° W
22° W
21.7° W
21.3° W
64.2° N
64.1° N
64° N
63.9° N
63.8° N
Faults and fractures
Eruptive fissures and crater rows
Volcanic systems
9.7 mm/yr
9.7 mm/yr
Reykjavik
Study area
Straumsvik
Keflavik
K
H
B
Kleifarvatn
E-S
F
R
Grindavik
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0 2.5 5 10 km
Current volcanic activity (since 2021)

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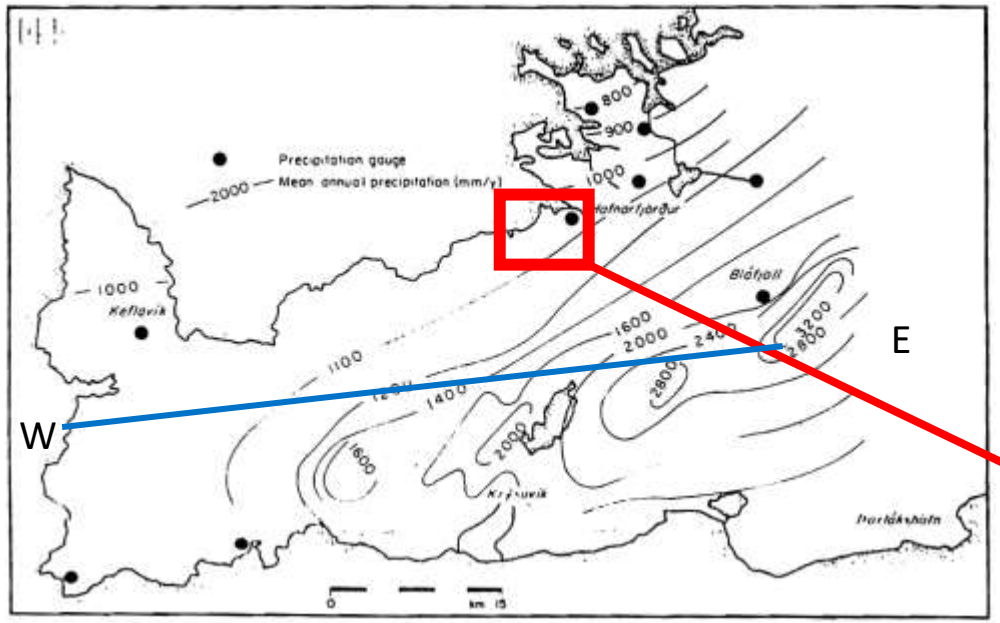
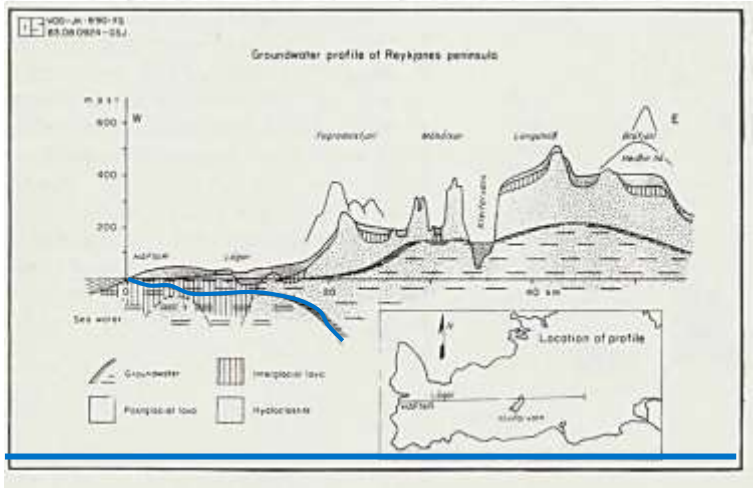
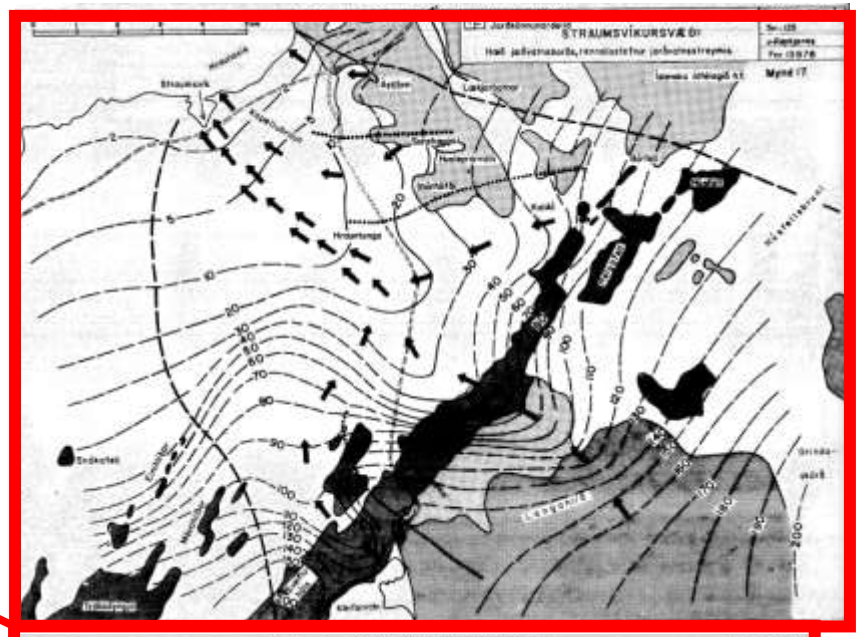
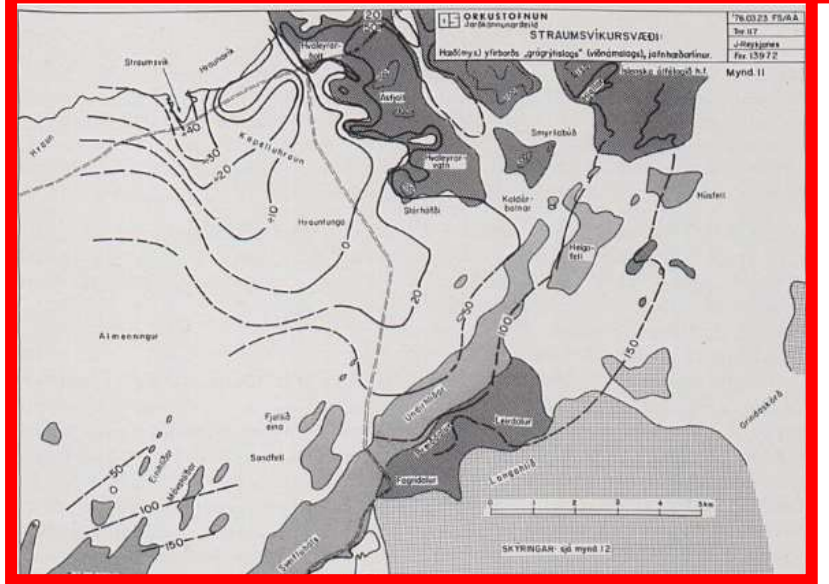
PREVIOUS GROUNDWATER STUDIES IN REYKJANES AND STRAUMSVIK

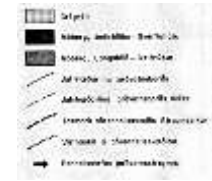




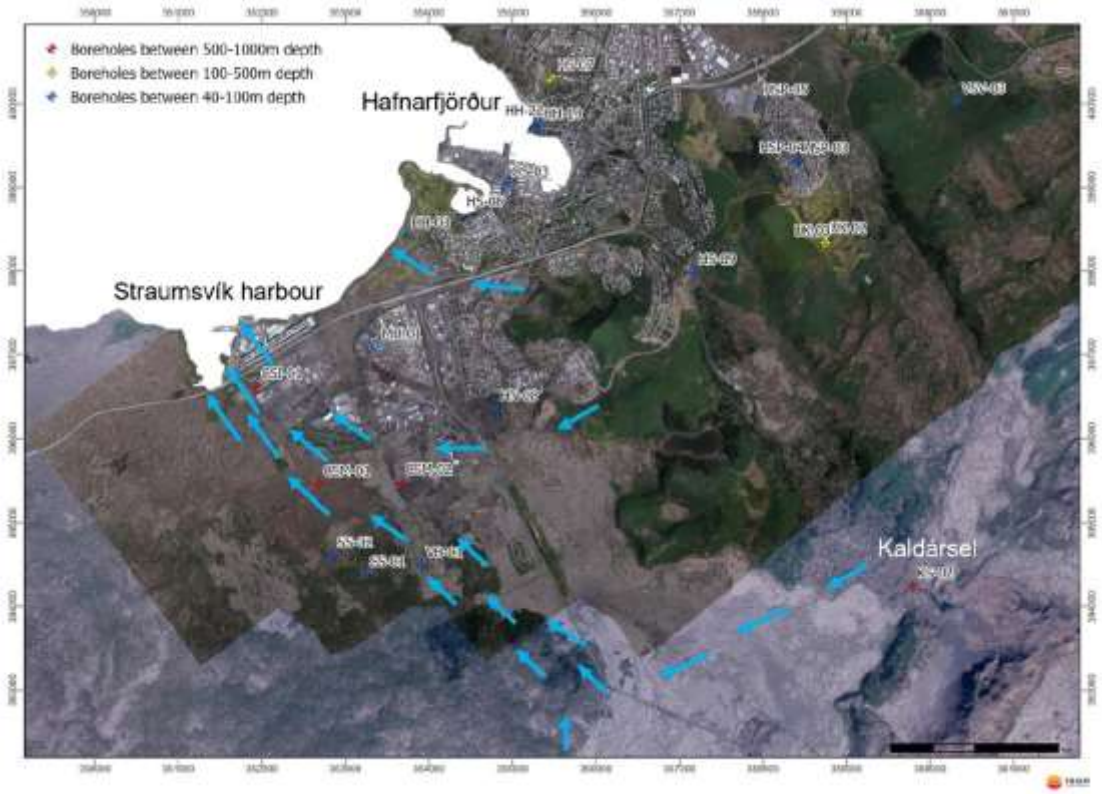
(Sigurðsson, 1976; Sigurðsson, 1998)

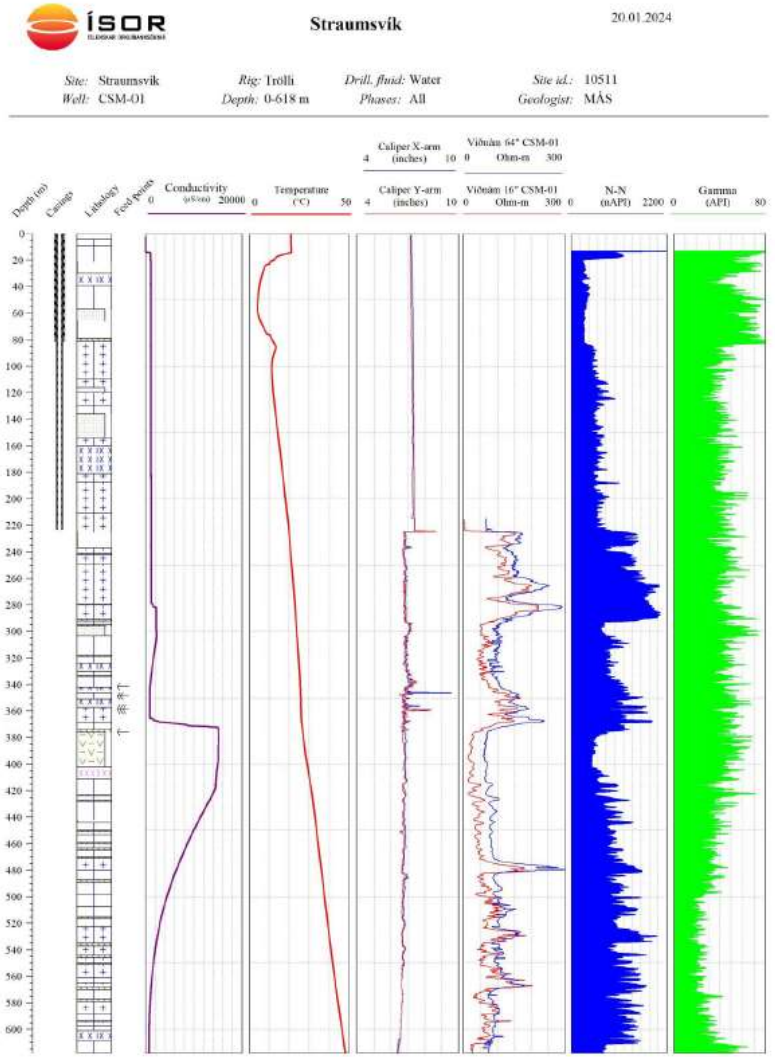






NEW EXPLORATION WELLS IN STRAUMSVIK





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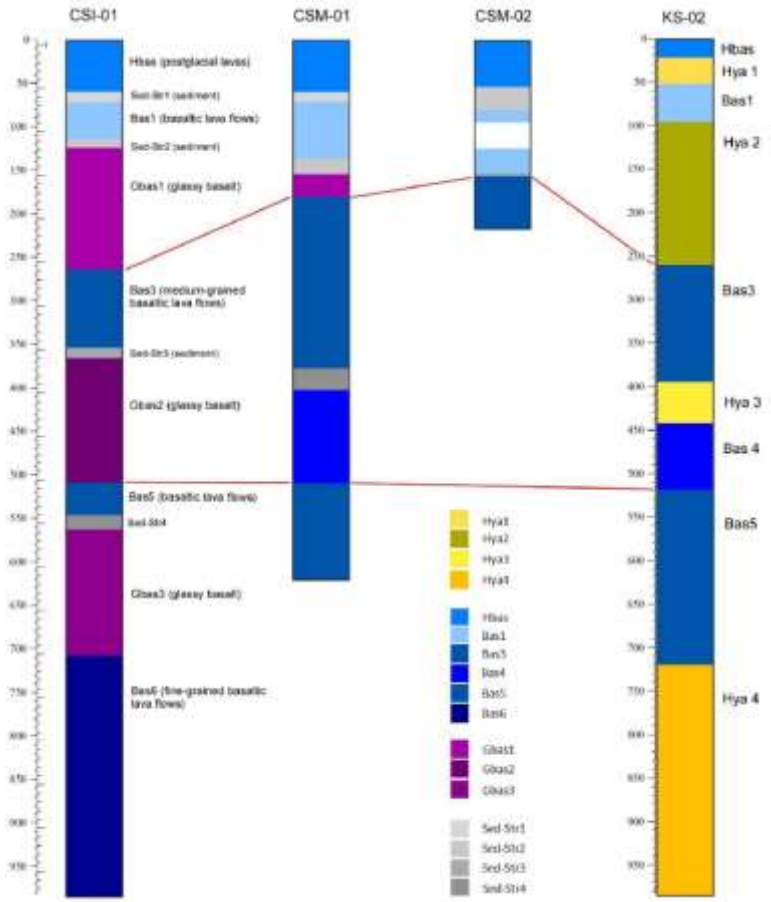
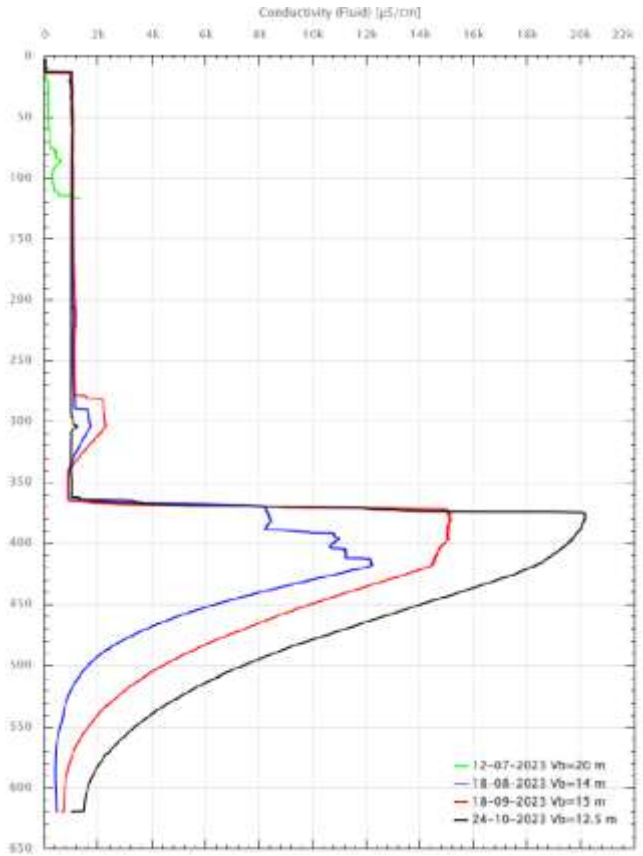
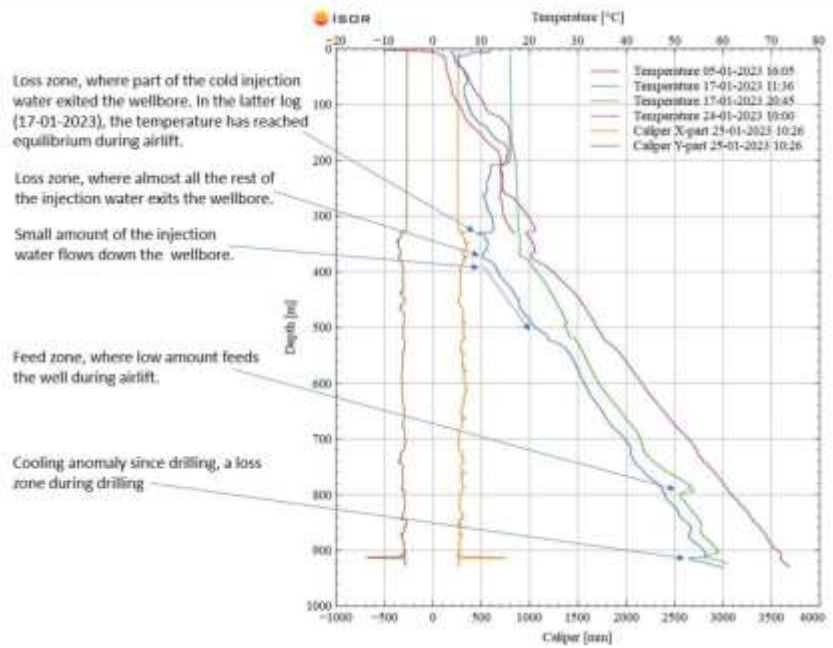
LOGGING OF THE NEW EXPLORATION WELLS







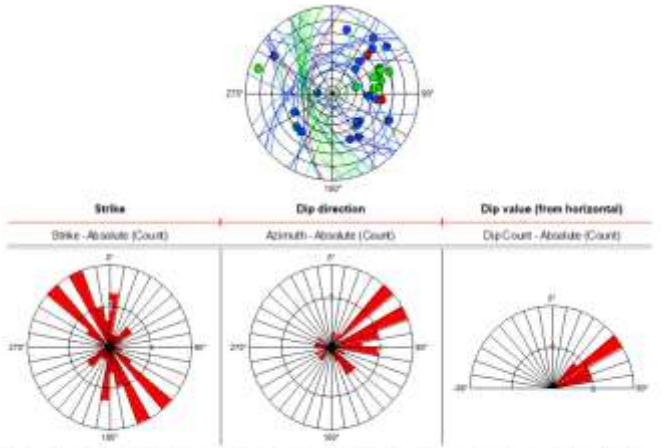


Figure 10. *Fractures identified with high confidence. Wulff plot above (upper hemisphere). Colour legend for Wulff plots is presented in Table 1.*

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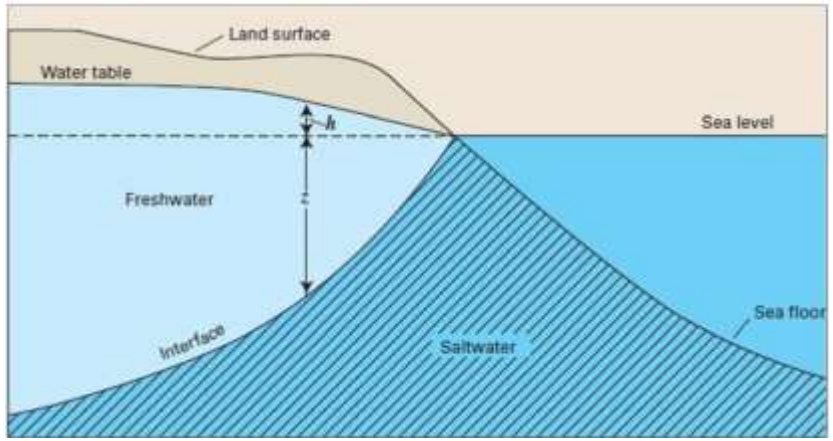
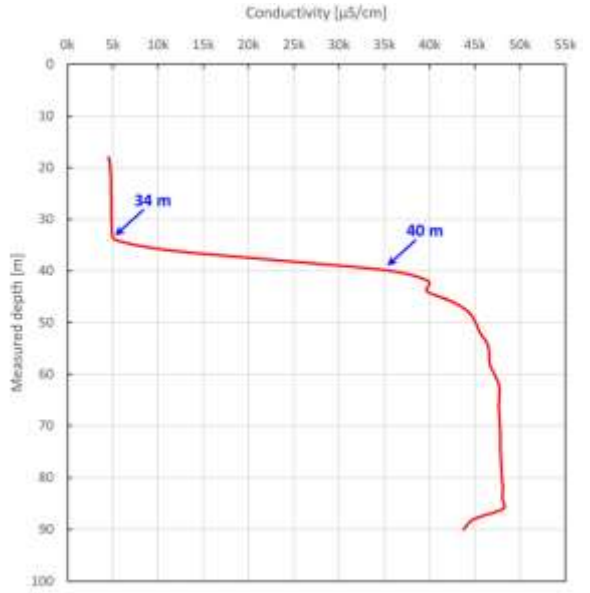
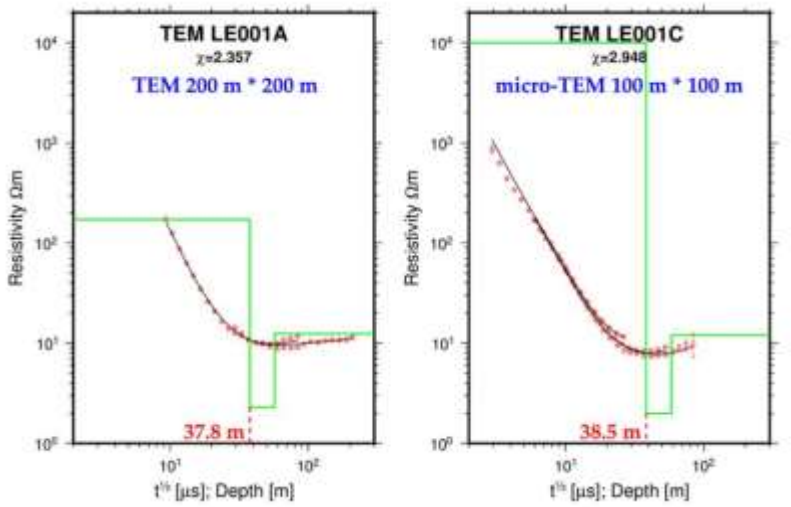
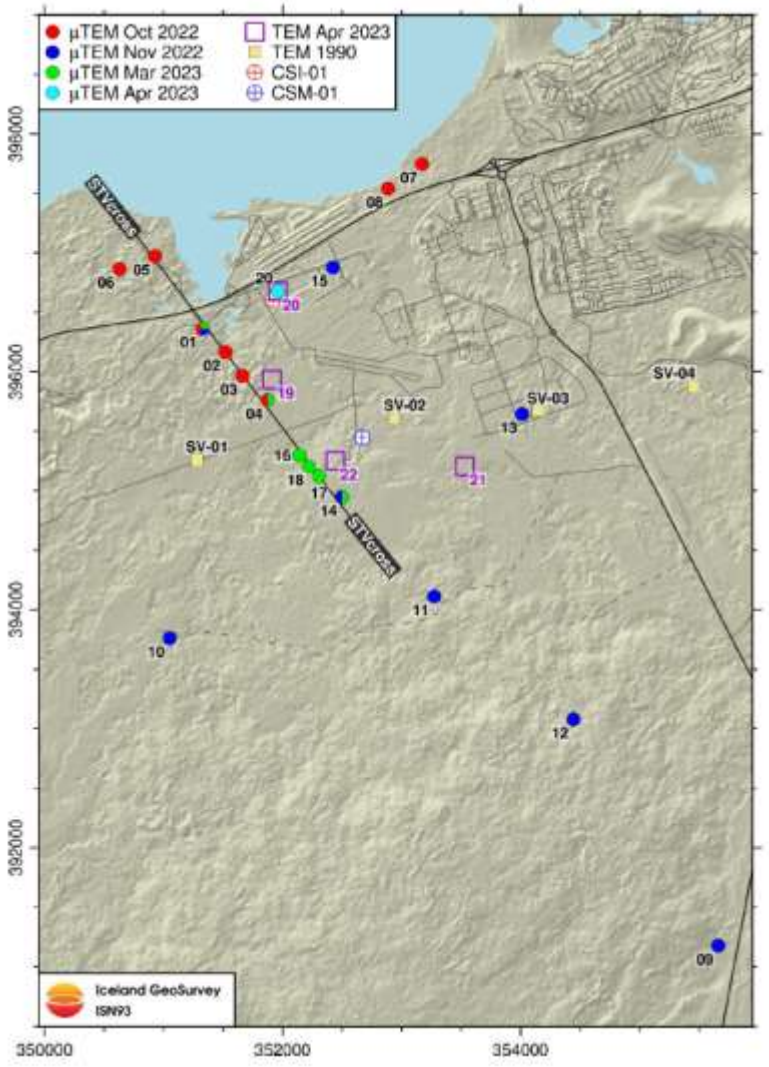
RESISTIVITY SURVEYS TO MAP THE DEPTH TO SALINE FRESH INTERFACE

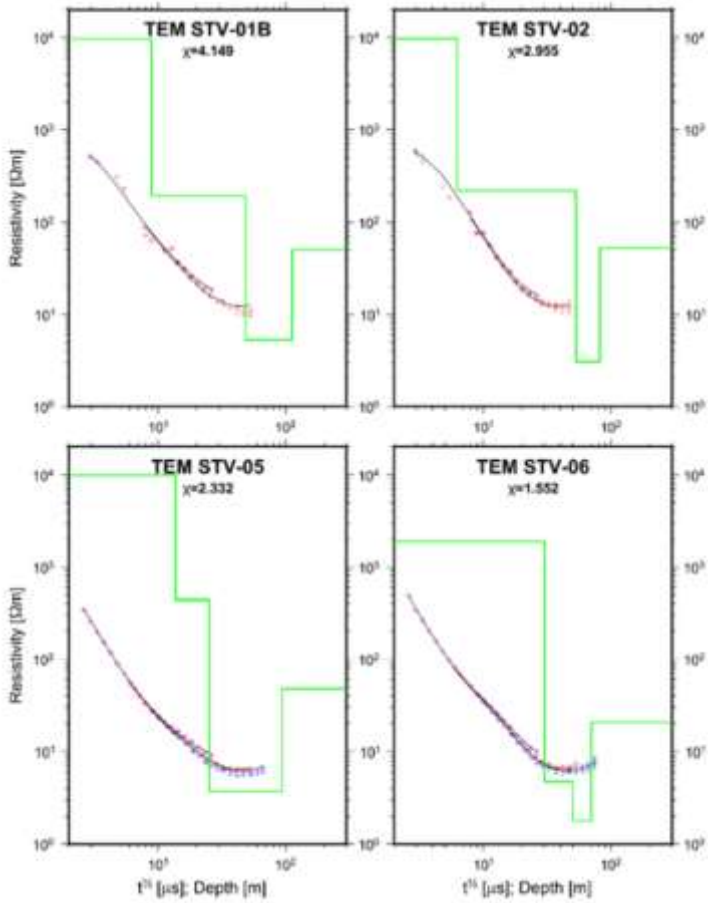






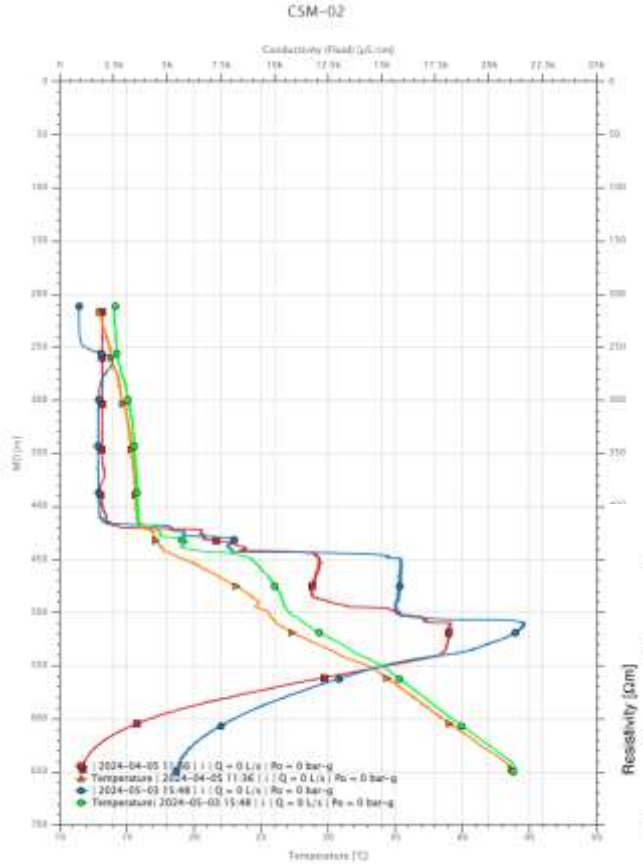
RESISTIVITY SURVEYS TO MAP THE DEPTH TO SALINE FRESH INTERFACE

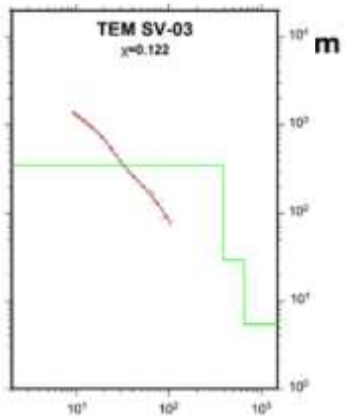


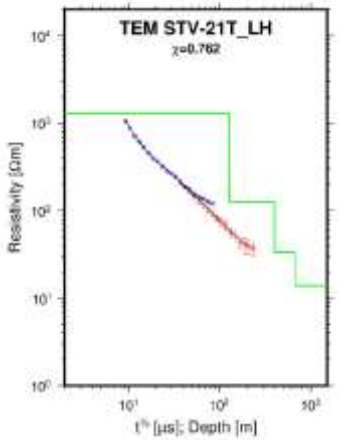


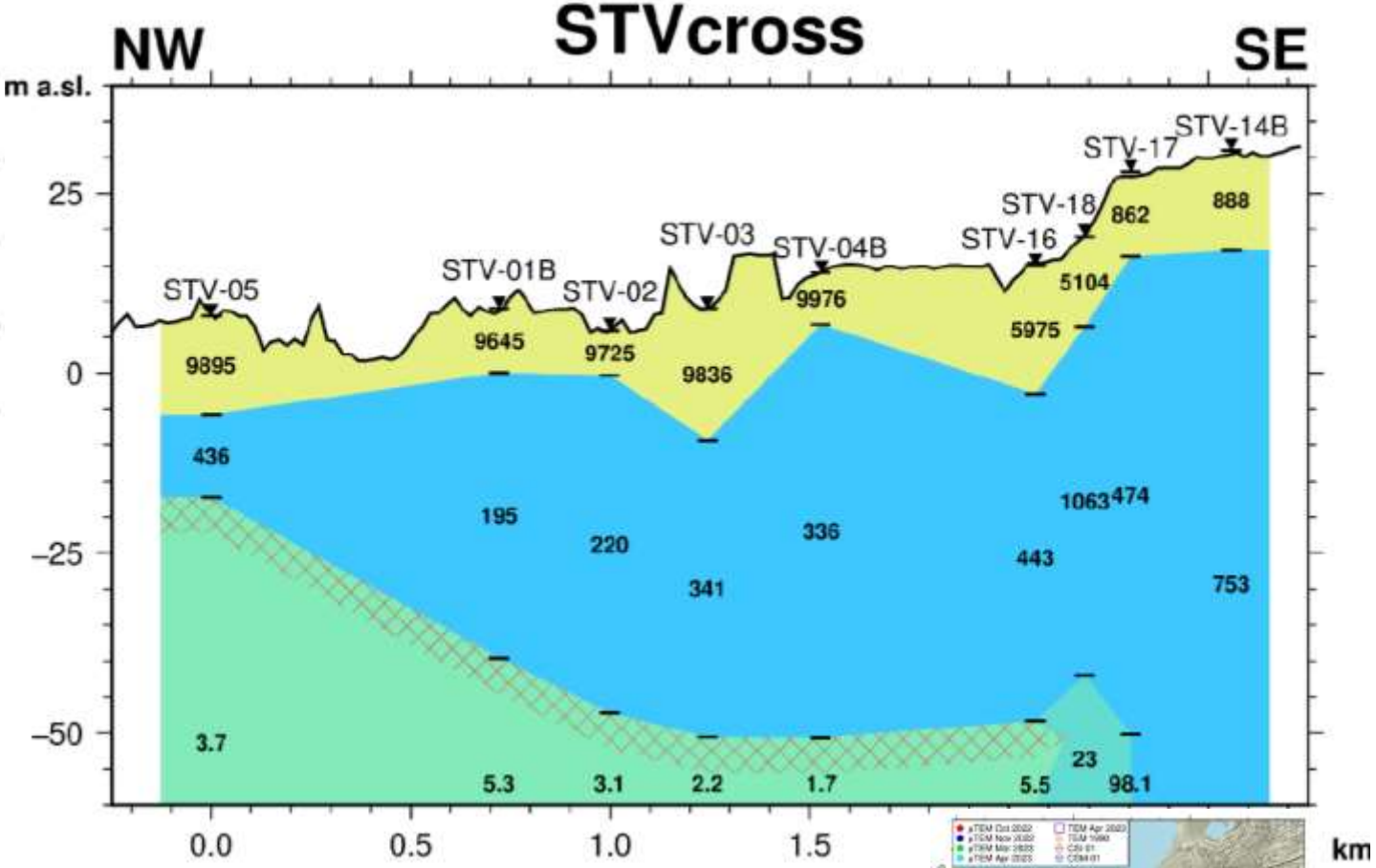
1D models for 4 TEM soundings. For each model, the green line shows the final resistivity model, the magenta/red/blue dots the measured data (237.5/62.5/25 Hz,respectively) and the black line the calculated response of the model.

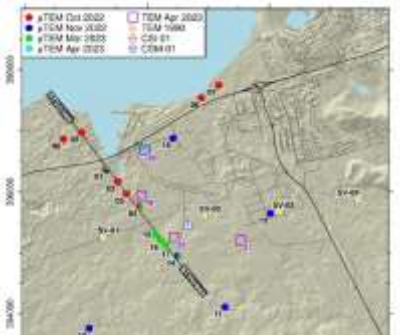
RESISTIVITY SURVEYS TO MAP THE DEPTH TO SALINE FRESH INTERFACE



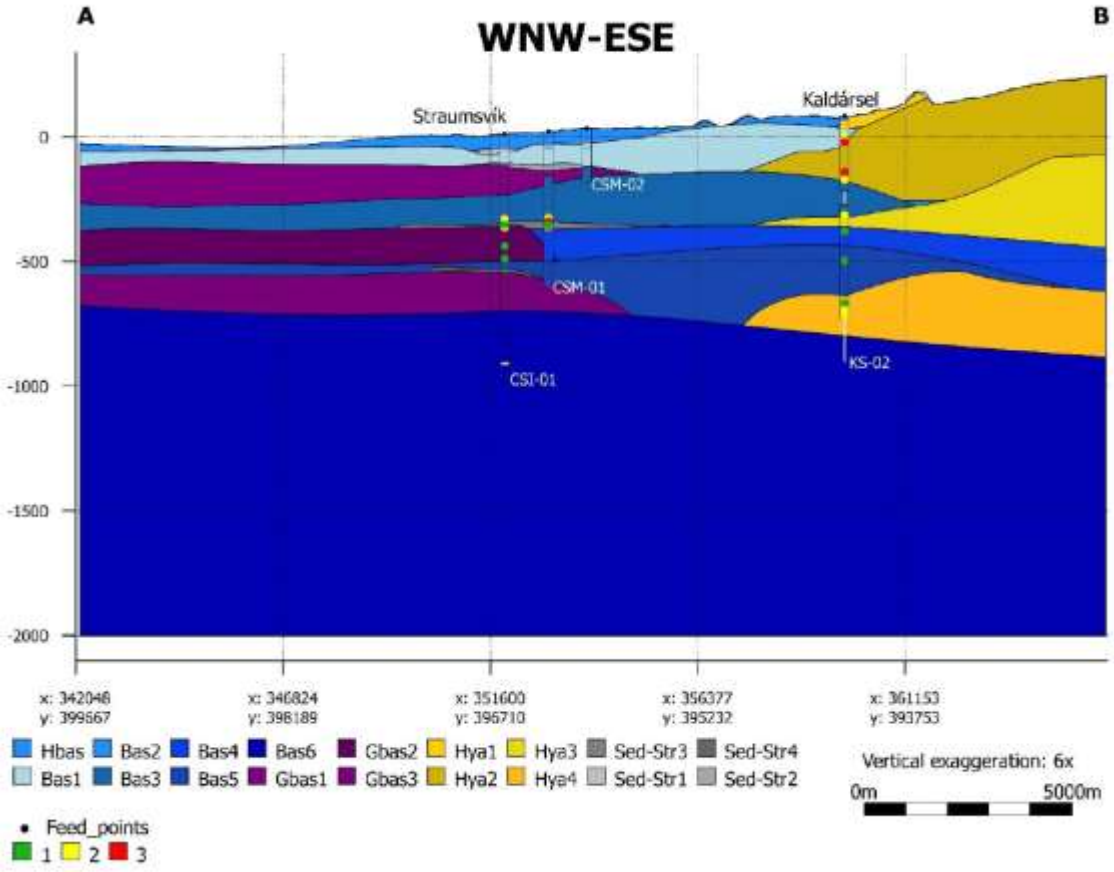








A 3D GEOLOGICAL MODEL WITH A FOCUS ON 3 ASPECTS



- **Lithology and mineralogy** – favourable geochemical composition (mafic & ultra-mafic > felsic rocks) and abundant mafic minerals (olivine > pyroxene > feldspar);
- **Structures and tectonics -** Origin of permeability - permeable and fractured rock to provide the pathways for the injection fluid, access to surfaces for fluid-rock interaction, and sufficient pore and fracture volume for the mineralization process;
- **Mineral alteration** - secondary minerals that may influence the mineralization process or flow patterns (e.g., porosity decline with increased alteration extent).

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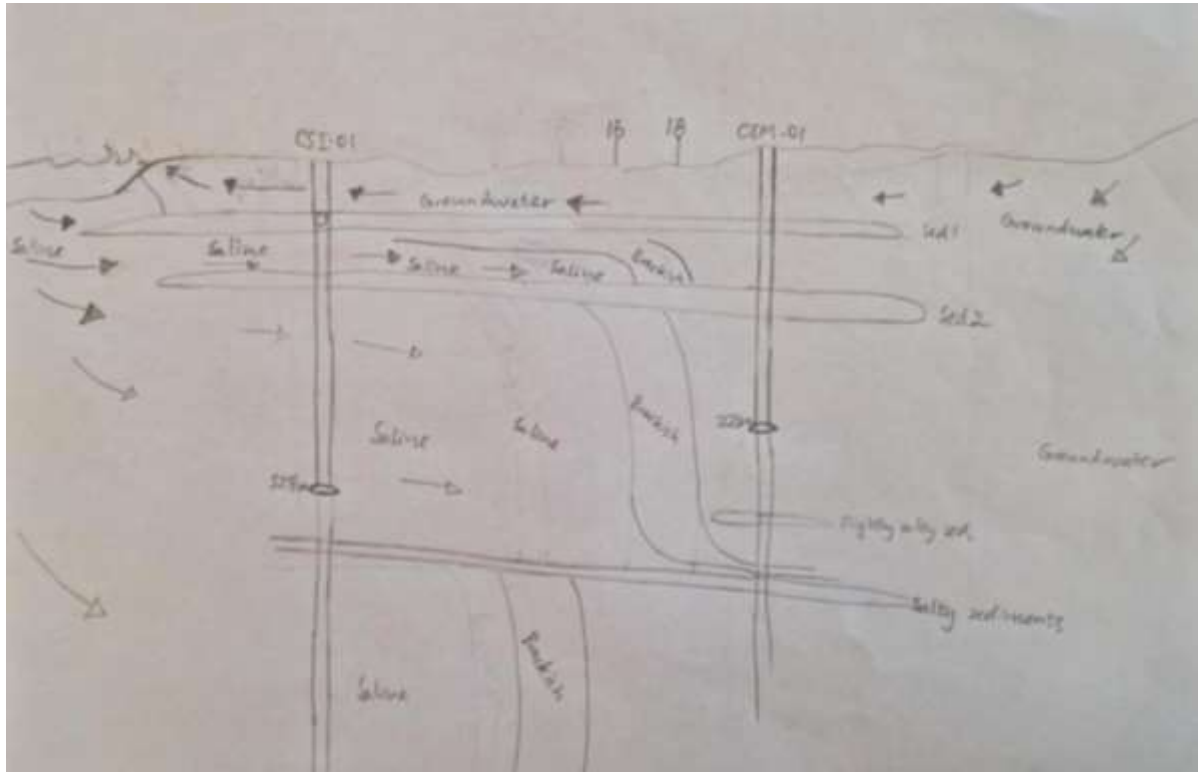
STILL SOME QUESTIONS REMAIN REGARDING THE SALINE-FRESH GROUNDWATER INTERFACE – ONGOING WORK



- The resistivity survey confirmed the deepening of the saline-fresh interface inland (NW-SE profile)
- The depth to the interface W-E is not well determined but signs of a saline- fresh interface at ~400 m
- More TEM soundings would be helpful as would slim wells for monitoring and logging

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