

Borehole Disposal of Radioactive Waste in Israel

Ofra Klein-Ben David

Geoff Freeze

David Sassani

Ran Calvo

Noa Balaban

Gilboa Peer

NRCN - Nuclear Research Center Negev

Geological Survey of Israel

Sandia National Laboratories



**Sandia
National
Laboratories**



Locating a geological disposal site in Israel

- Two operating research reactors
- No power nuclear generation
- Relatively small amount of waste*

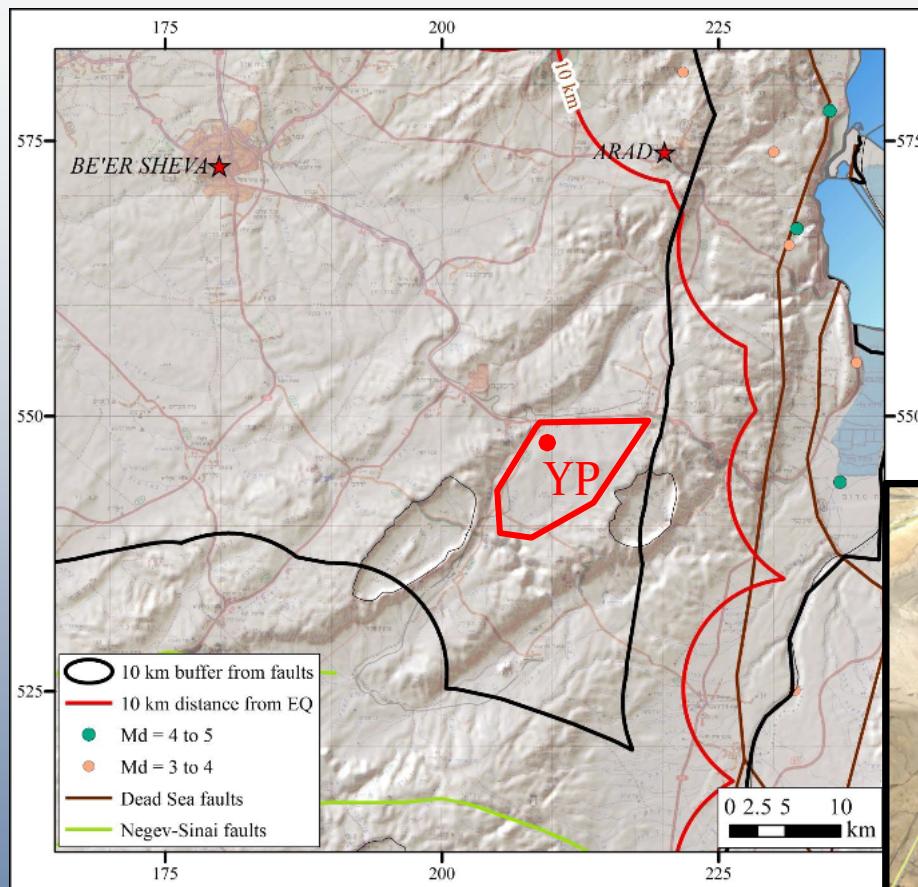
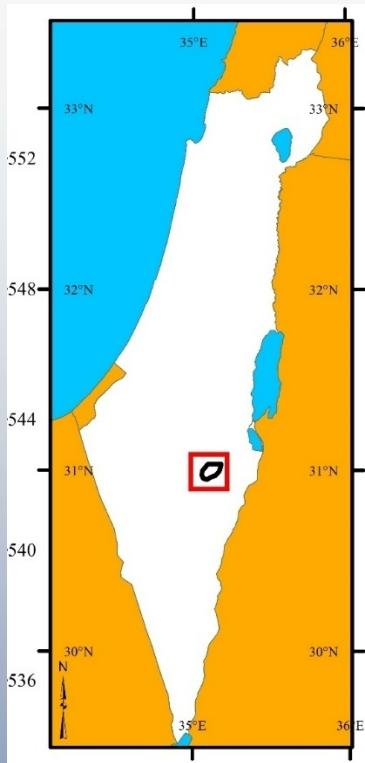
Challenges:

- The **small size** of the country
- The **large population density** in the central and northern parts
- High birth rate**, will limit future open spaces
- Proximity to the **active faults**
- The **common target rocks** for both cavern and DBH geological disposal are **unavailable** in Israel in thick, deep and un-fractured formations

Sustainable solutions

- **Negev** desert –
 - Farthest from active faults
 - Lowest population density
 - Low precipitation – deep vadose zone
- The **Yamin Plain** (YP) located in the NE of the **Negev** holds the licensed national site for radioactive waste since the 1960
- *We are conducting a **feasibility study** for locating a deep radioactive waste disposal site within the borders of the YP*

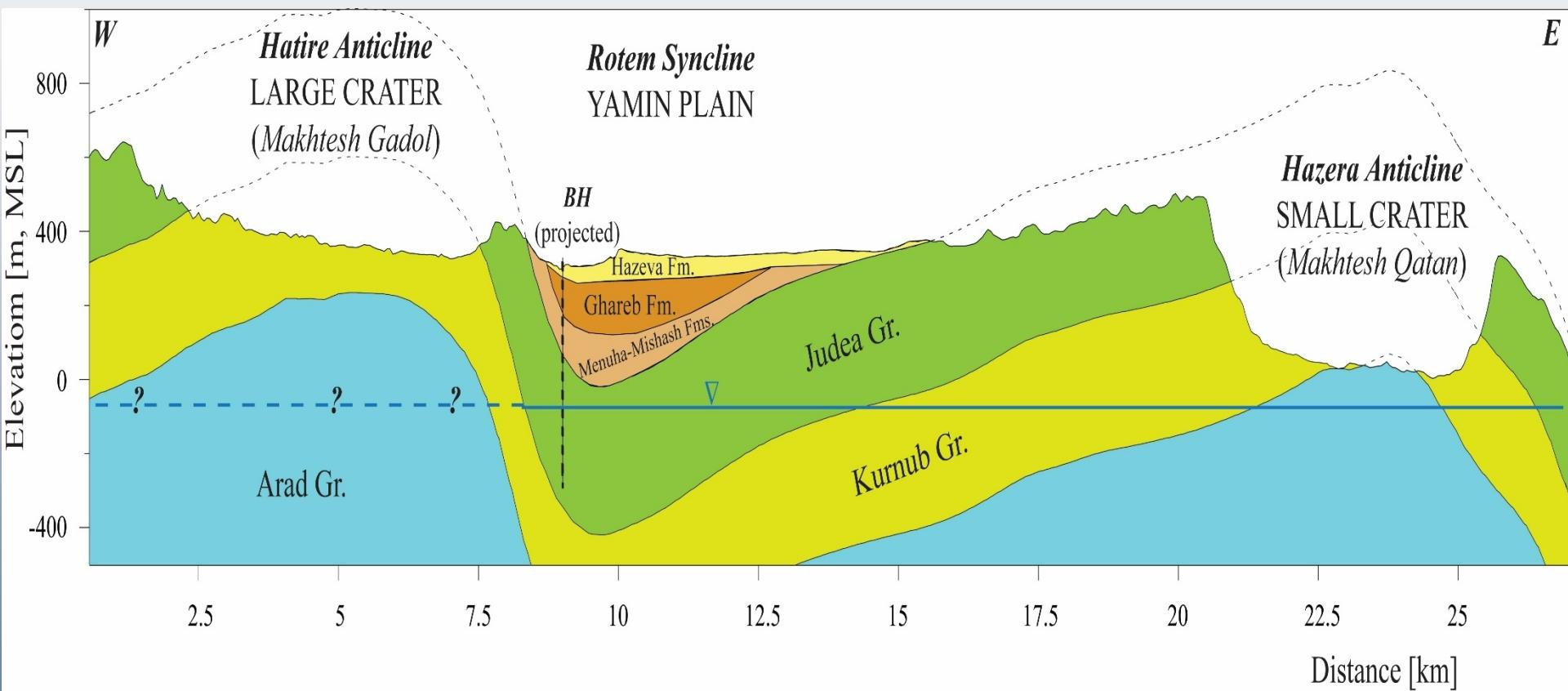
Location Map



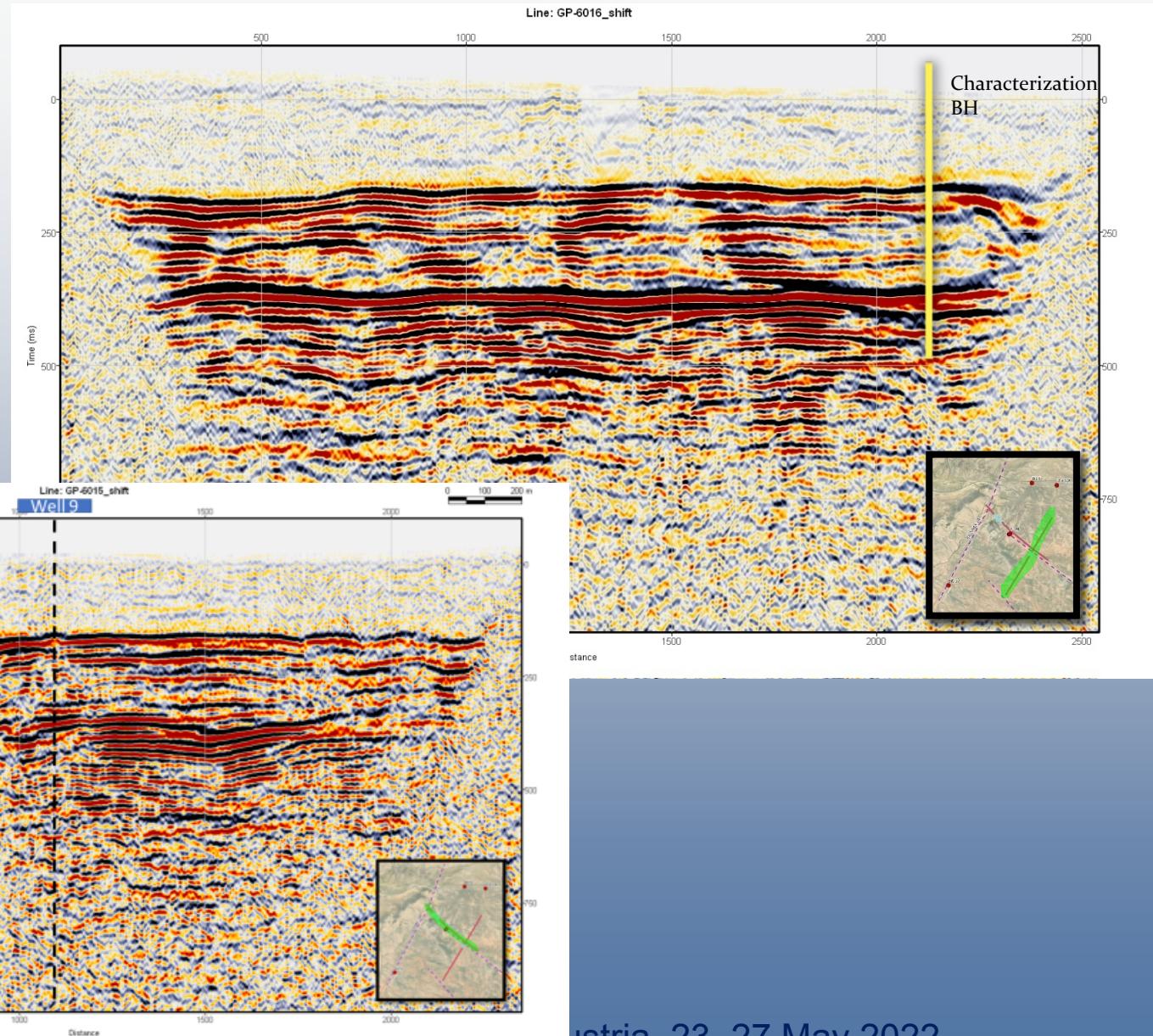
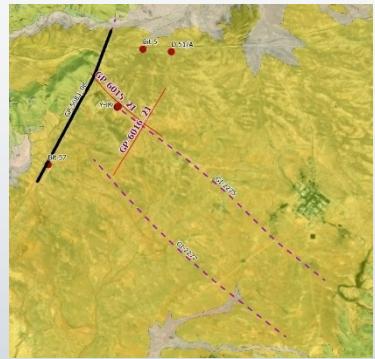
10 Km buffer zone from earthquakes
and active faults

Schematic cross-section

Schematic cross-section from Yeruham Plain through Yamin Plain
The vertical X7.5

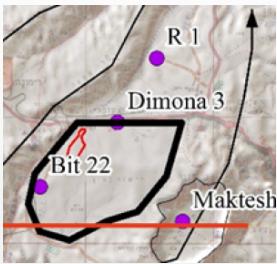


Seismic survey



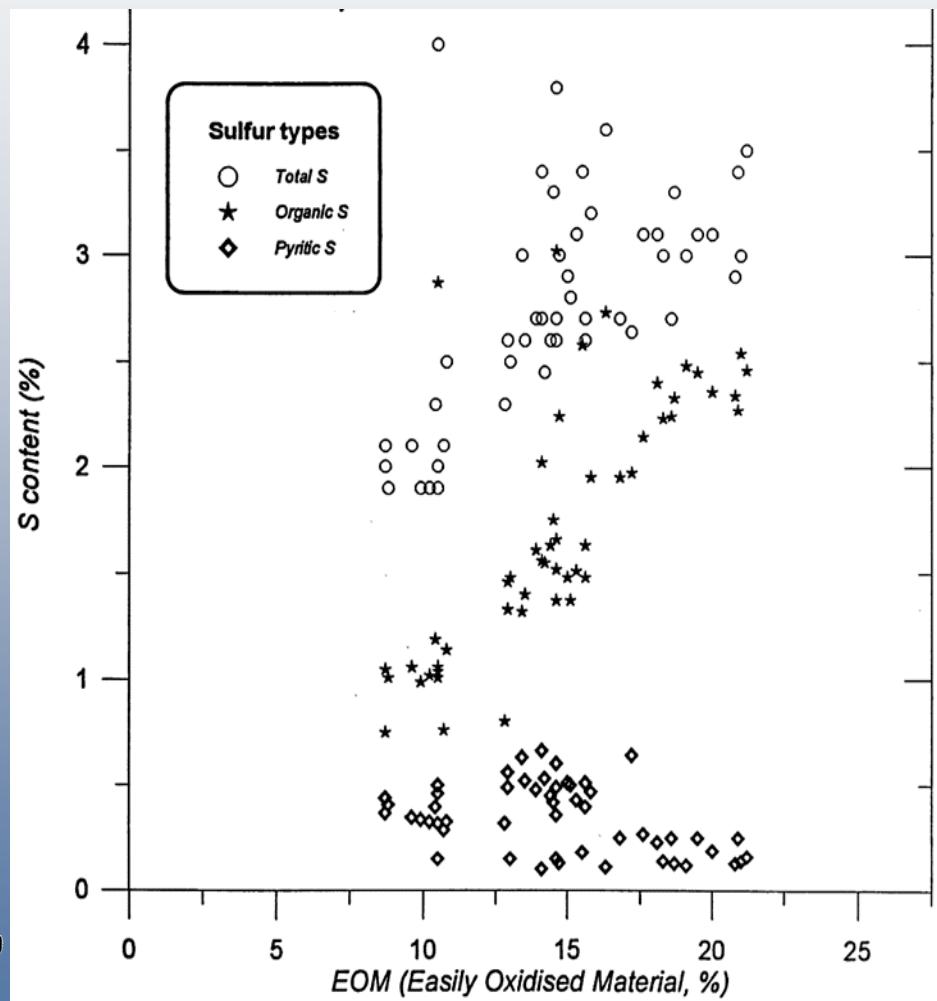
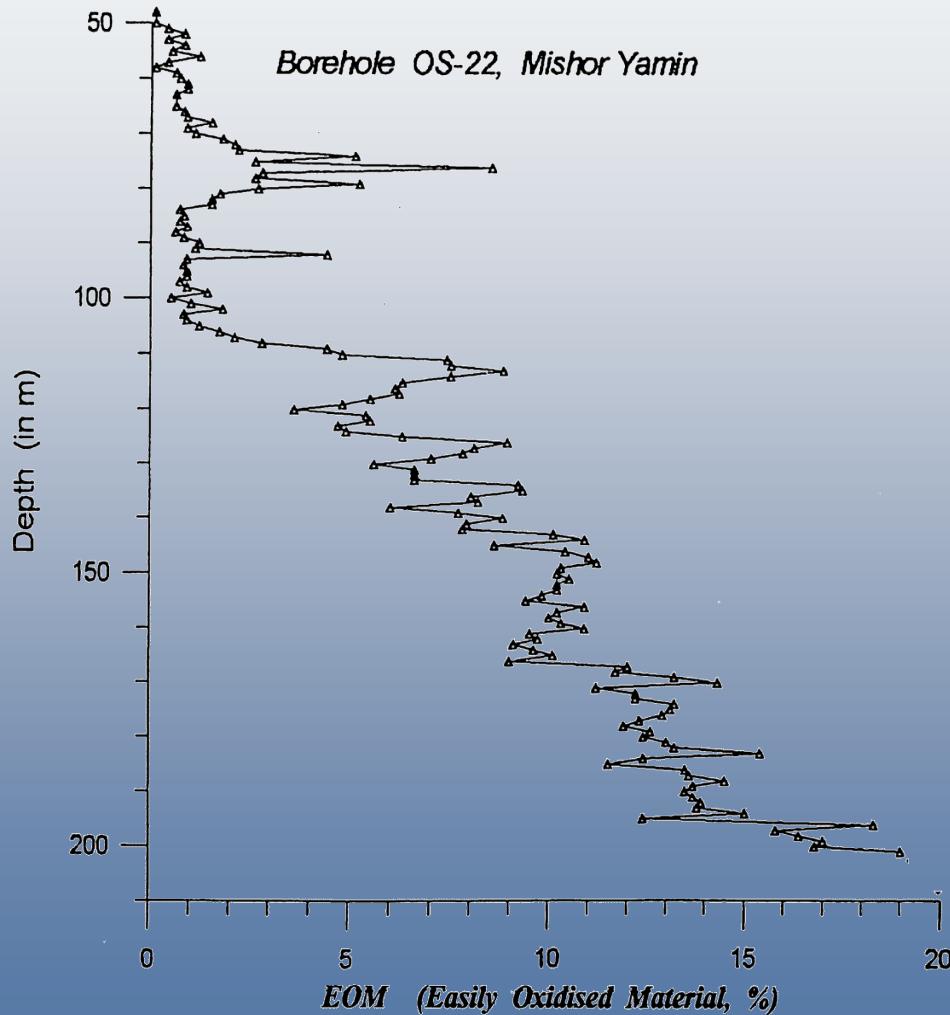
Potential host

- The Mount Scopus studied for its host rock potential
- Contains mainly chalk, marl, oil shale, chert, phosphate
- Current study focuses on the Ghareb Formation
 - Chalky Member - ~30 m (in the Rotem basin)
 - Marly Member - ~15 m
 - Oil Shale Member - ~70 m
- Contains Type IIS Kerogen (TOC up to ~25%) .
- Up to 20% clays (I/S, I, kaolinite, palygorskite).
- Truncated below the Hazeva Fm., absent in the eastern parts of the basin.



EOM and S content (Minster, 1996)

Kerogen- a main source of uncertainty under disposal conditions



Characterization Borehole



Summary

- The IAEC is studying the vadose zone in the Yamin plain as a host zone for deep radioactive waste disposal
- The Ghareb formation is being considered as a possible host rock
- In depth scientific understanding is needed to develop the safety case and performance assessment for disposal

ONE DAY, SON, ALL
THIS WILL BE YOURS

