The Israeli Seismic Network (ISN) –

Current condition and Future Plans

&

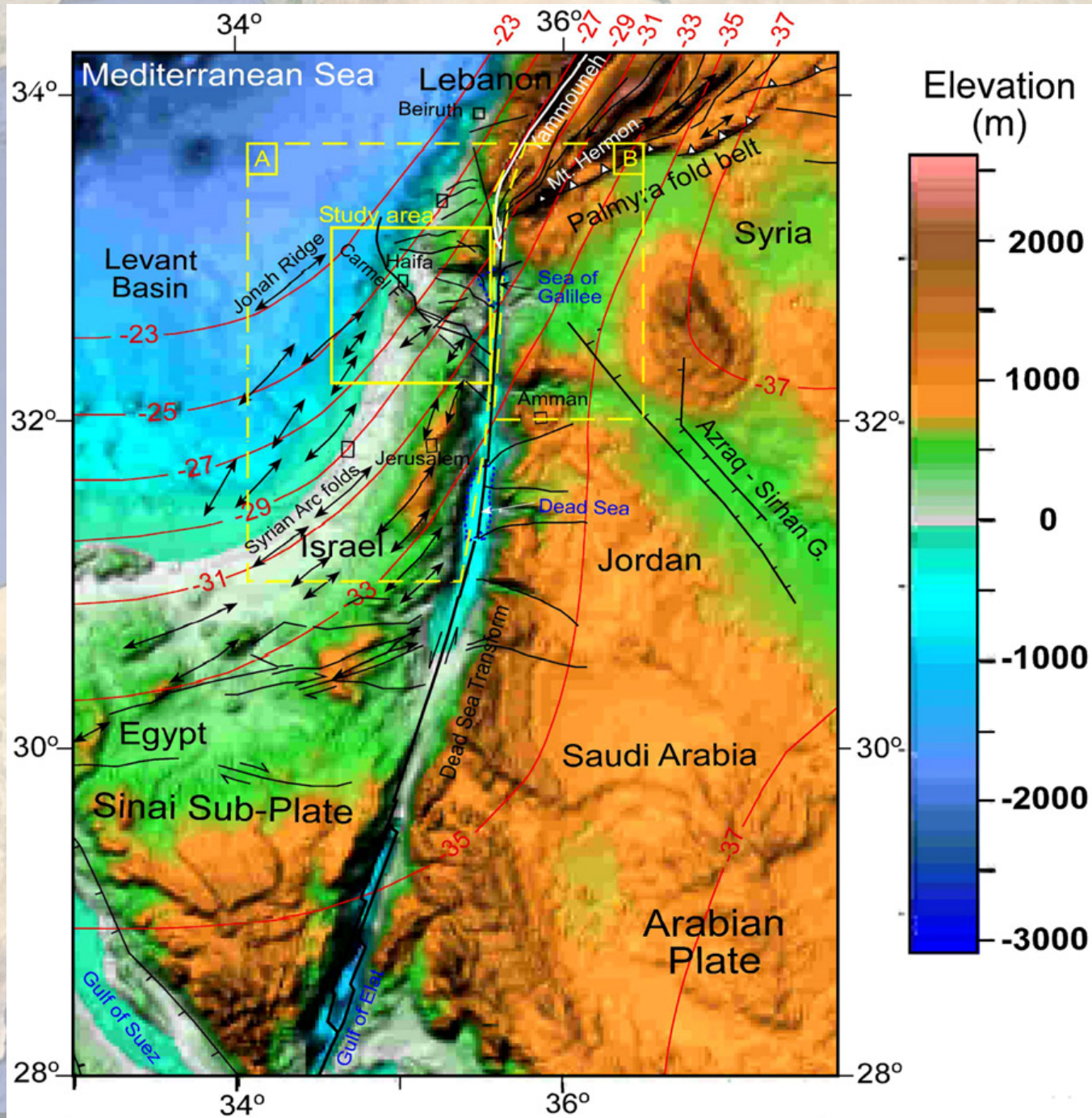
Research done by the

Israeli Antelope User Group (IAUG)

Ittai Kurzon

The Geological Survey of Israel

Geological Settings



Tour Guide

Presentation Outline

1. The Israeli Seismic Network - current stage
2. Future plans - upgrading the system and adding

   EEWS capabilities
3. Antelope users in Israel
4. Antelope uses in Research in Israel

1. The Israeli Seismic Network – Current Stage

- Short Period Analog stations – 10 stations,

  S-13 / L4-C

- Broadband Digital stations:

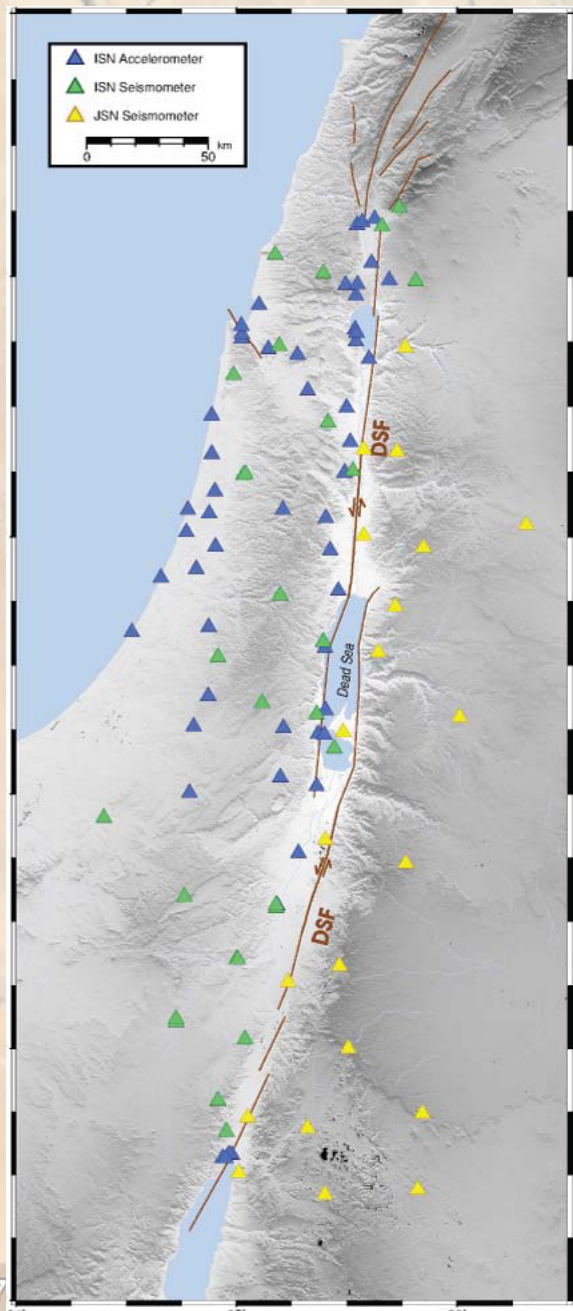
  - ISN – 11 stations, Trillium Compact 120s,

    Trident, VSAT

  - CTBTO – 2 3Ch stations, STS-2 / CMG-3T +

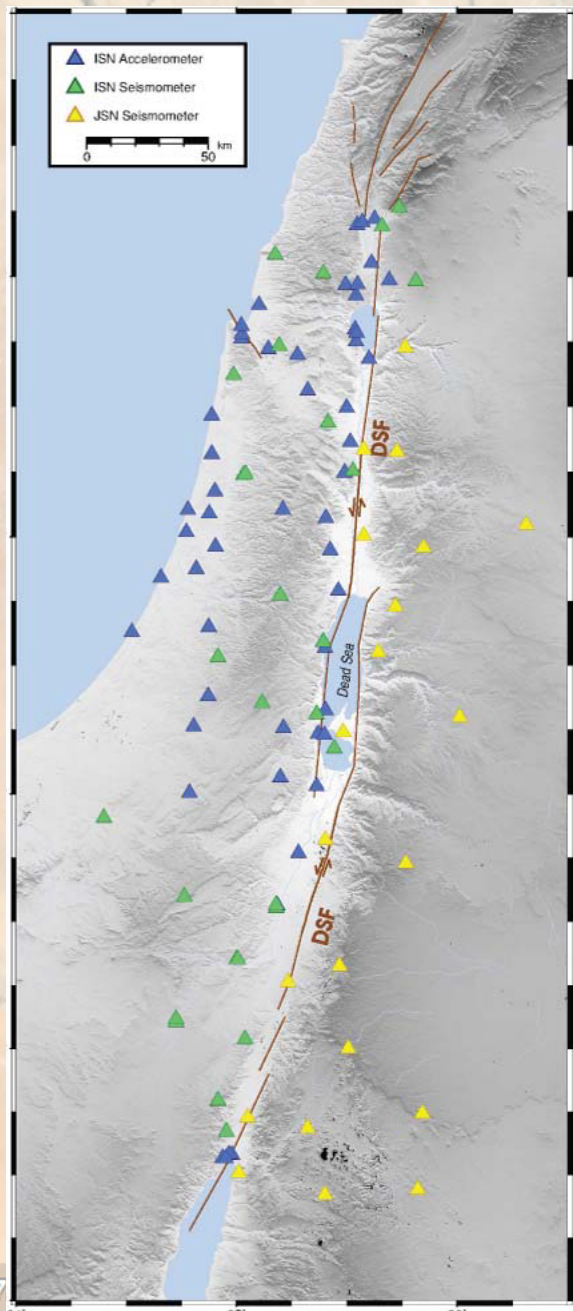
    Array of 16 vertical stations, CMG-3ESP,

    EuropeT, VSAT / Cellular / Optic



1. The Israeli Seismic Network – Current Stage

- Broadband Digital stations:
  - CNF – 6 stations, STS-2, EuropeT, Cellular
  - GE – 2 stations, STS-2 / Trillium 240, Q330HR, VSAT / Cellular
- Accelerometer Network – 51 triggered stations, A800, and others
- Jordanian Seismic Network ~ 20 stations,



2. Future plans - upgrading the system and adding EEWS capabilities

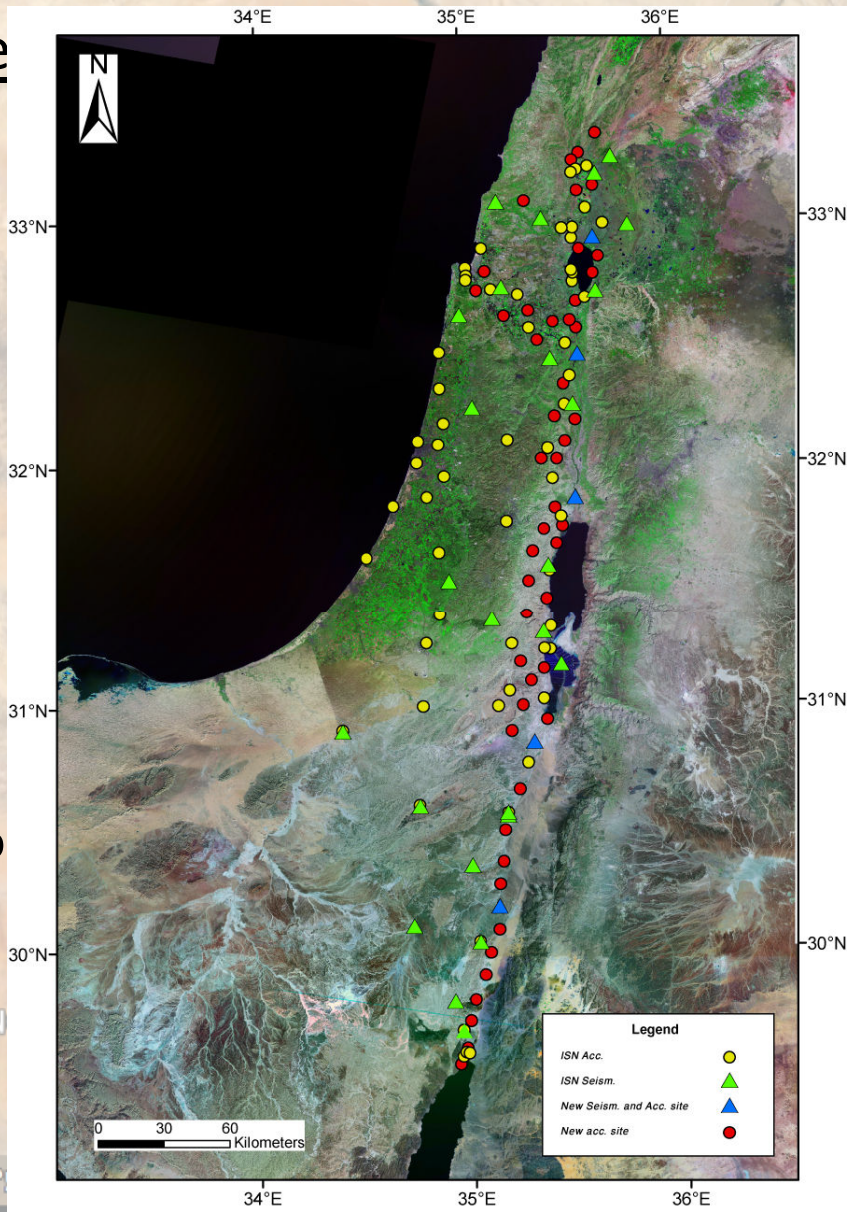
Upgrading the network to full real-time seismic network

132 stations:

- 35 stations each with both, broadband seismometer and strong motion accelerometer
- 97 stations each with a strong motion accelerometer

Many of the stations are located along our two main fault systems:

- The Dead Sea Fault
- The Carmel Fault

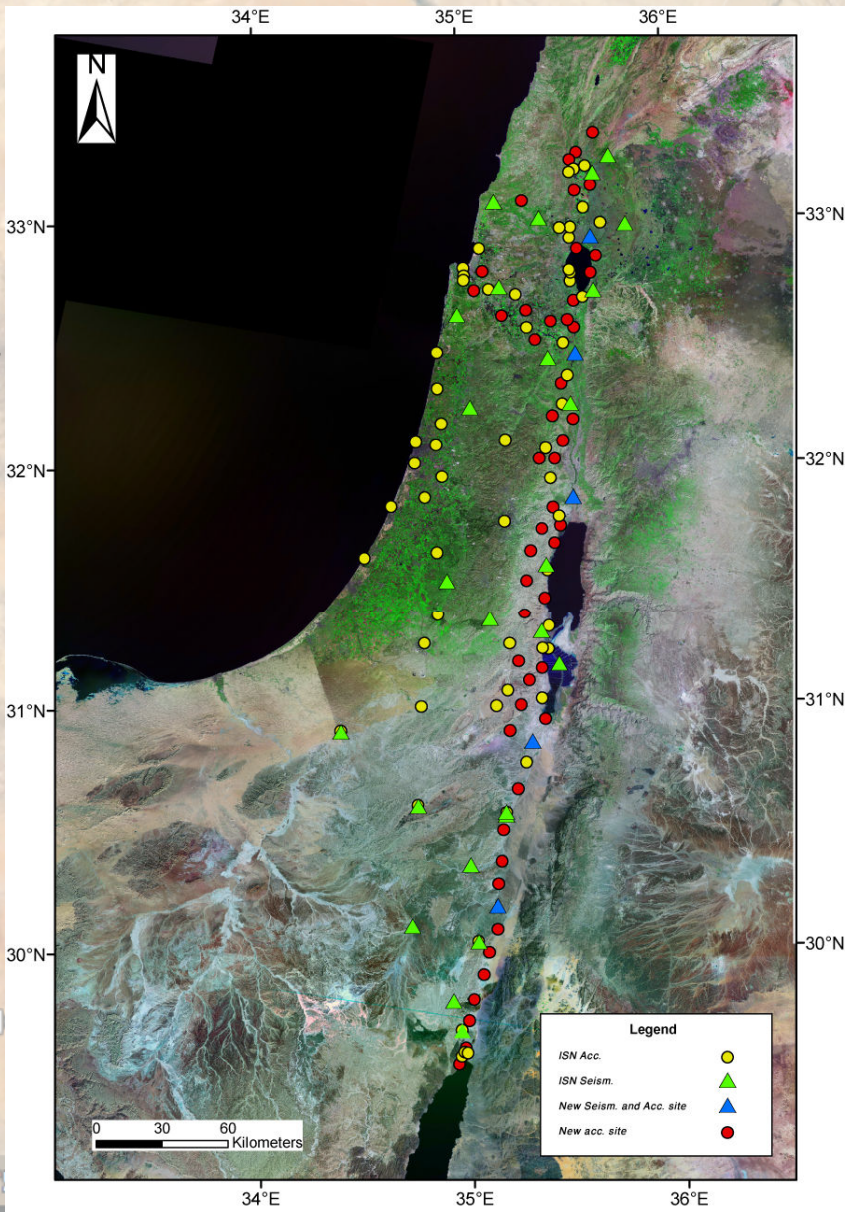


2. Future plans - upgrading the system and adding EEWS capabilities

Upgrading the network to full real-time seismic network

The stations are distributed through the country, with extra clustering of stations as a seismic fence along the two main fault systems.

- Focusing on the major seismo-tectonic hazardous sources in our region.
- For better real-time fast processing and future effective EEWS.



2. Future plans - upgrading the system and adding EEWS capabilities

Adding EEWS capabilities

- International committee (2012)
- Published a request for information (2014)
- Working on a tender for a turnkey solution (mid 2015)
- Applying noise measurements at the potential sites (2013-2015)
- Sending a postdoc scholar to Berkeley to study the EEWS algorithms and systems (2014-2016)
- Transferring the Division of Seismology at the Geophysical Institute to a new department at the Geological Survey (????-????)

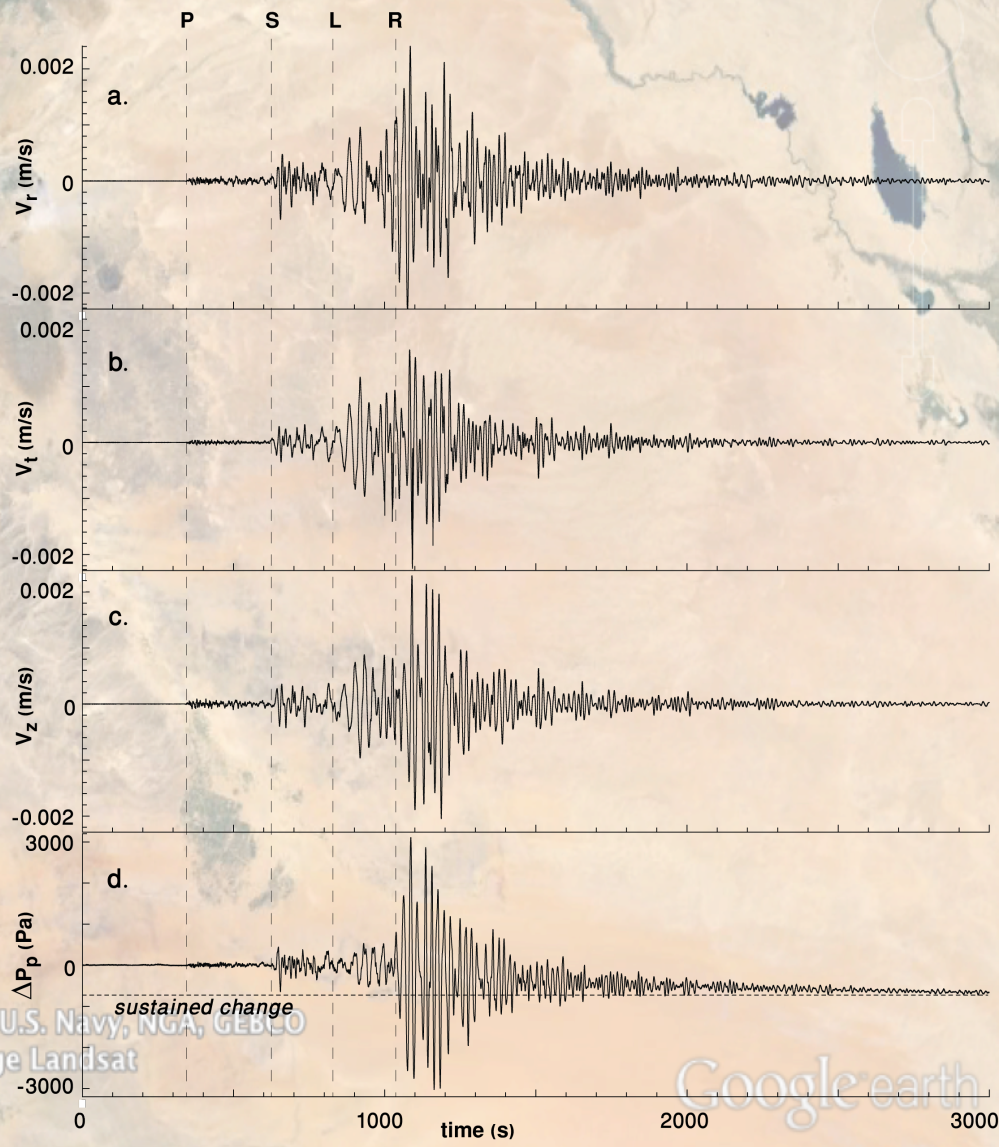
3. Antelope users in Israel

4. Antelope uses in Research in Israel

Hydroseismology –

- Joined Database of both seismic and hydrological measures
- Signal processing using Antelope and the Matlab toolbox.

- **With Dr. Eyal Shalev**



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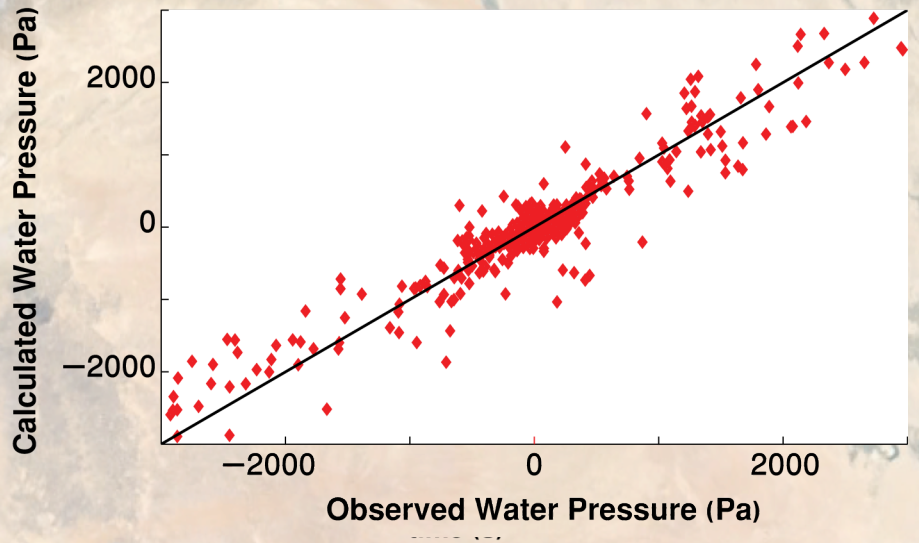
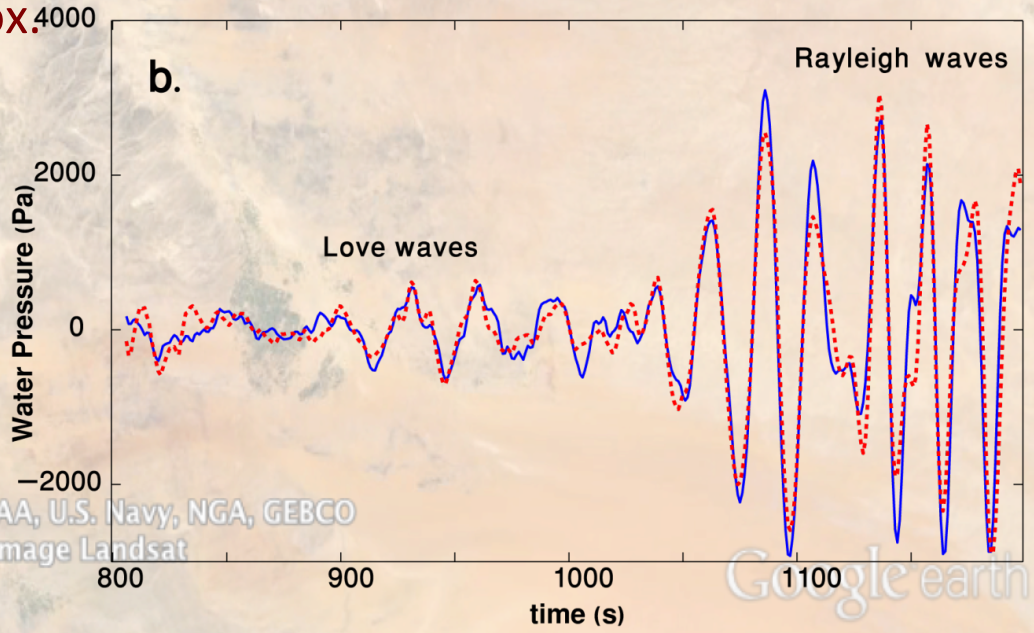




4. Antelope uses in Research in Israel

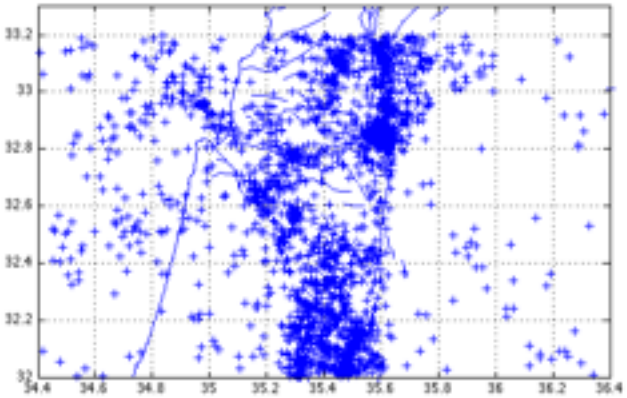
Re-Processing of the Israeli Seismic Catalogue

(1985 – 2015) –

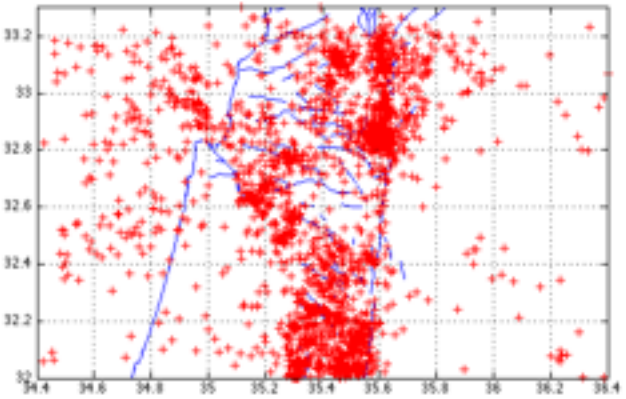
Galilee Subset

- **1985-2015**
- **2500 events**
- **1 < M < 3.5**
- **4 < Phases < 40**

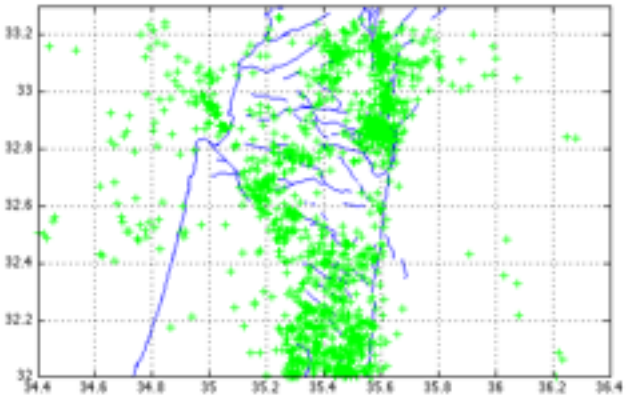
With Dr. Nadav Wetzler



Original GII



Antelope



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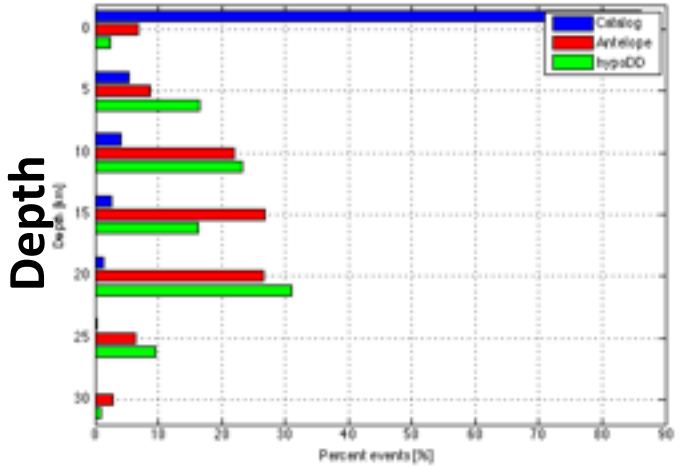

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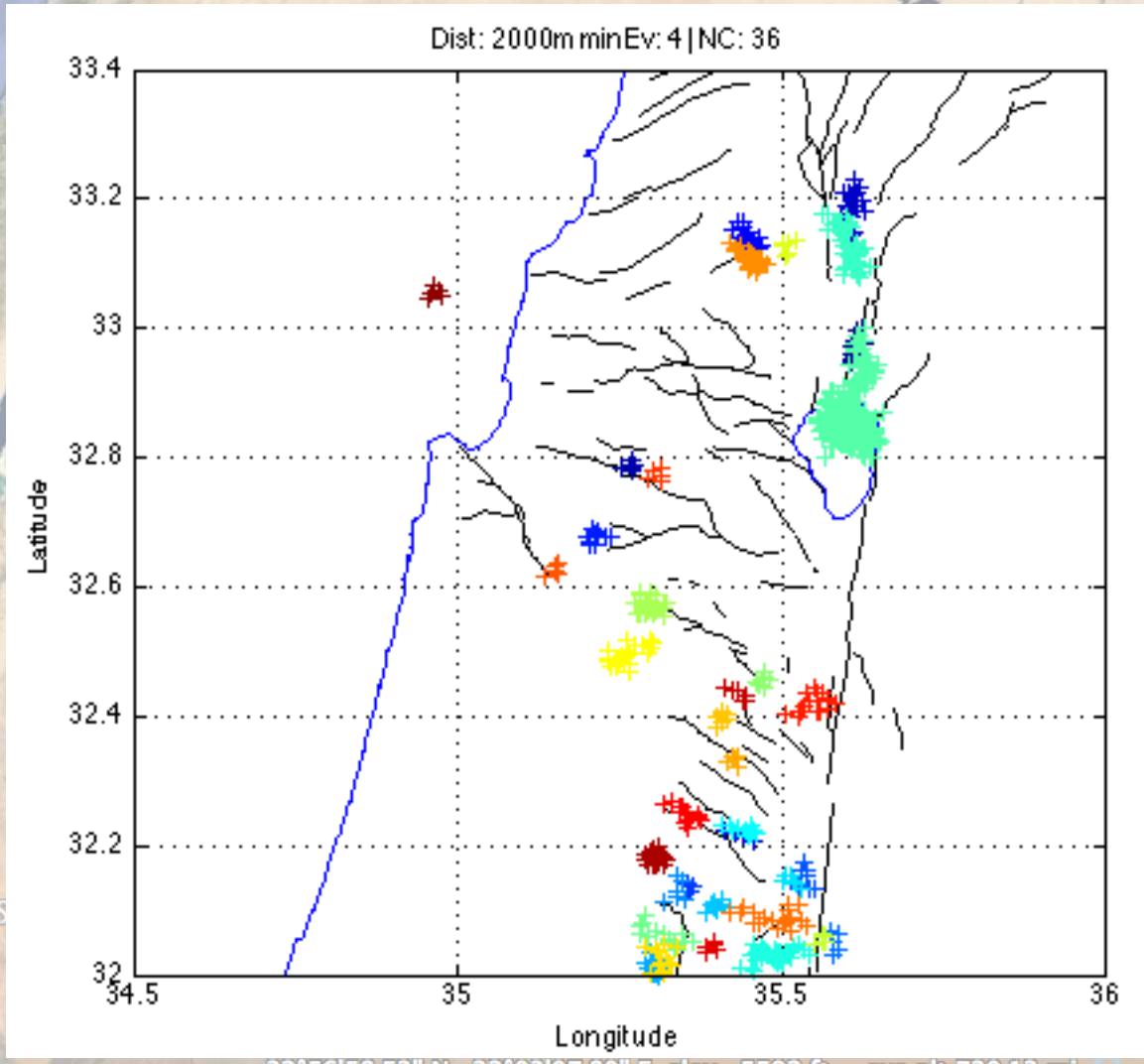
Re-Processing of the Israeli Seismic Catalogue

(1985 – 2015) –

Clustering of events -



4. Antelope uses in Research in Israel

Exploring a seismic swarm in the Sea of Galilee in October 2013

- Re-processing the waveforms, beginning with the detection level to increase the catalogue
- Deploying a portable network around the cluster area with a magnitude range of M > -2, and analyzing the seismicity for 6 months.

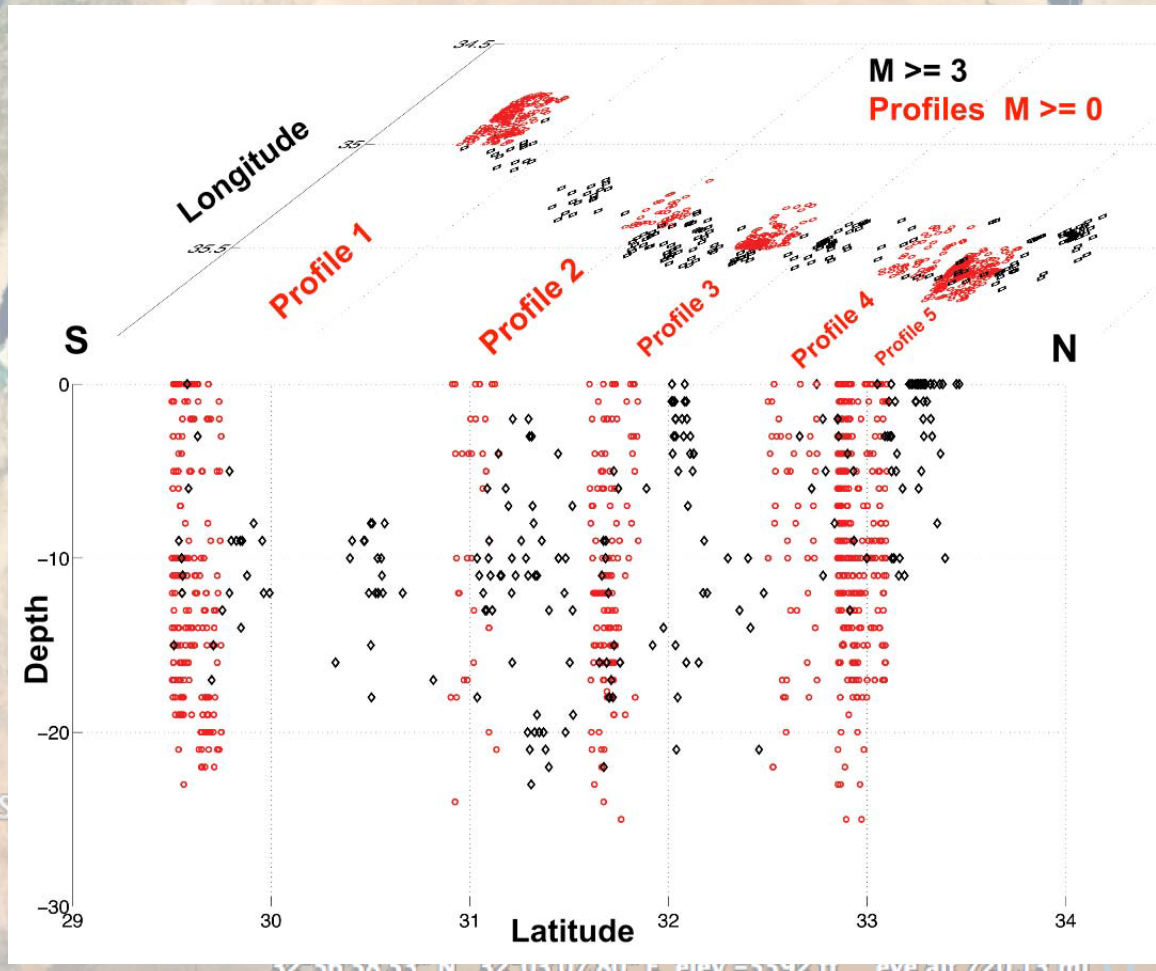
Tour Guide

4. Antelope uses in Research in Israel

Setting a new research portable network for high resolution studies of the Dead-Sea Fault

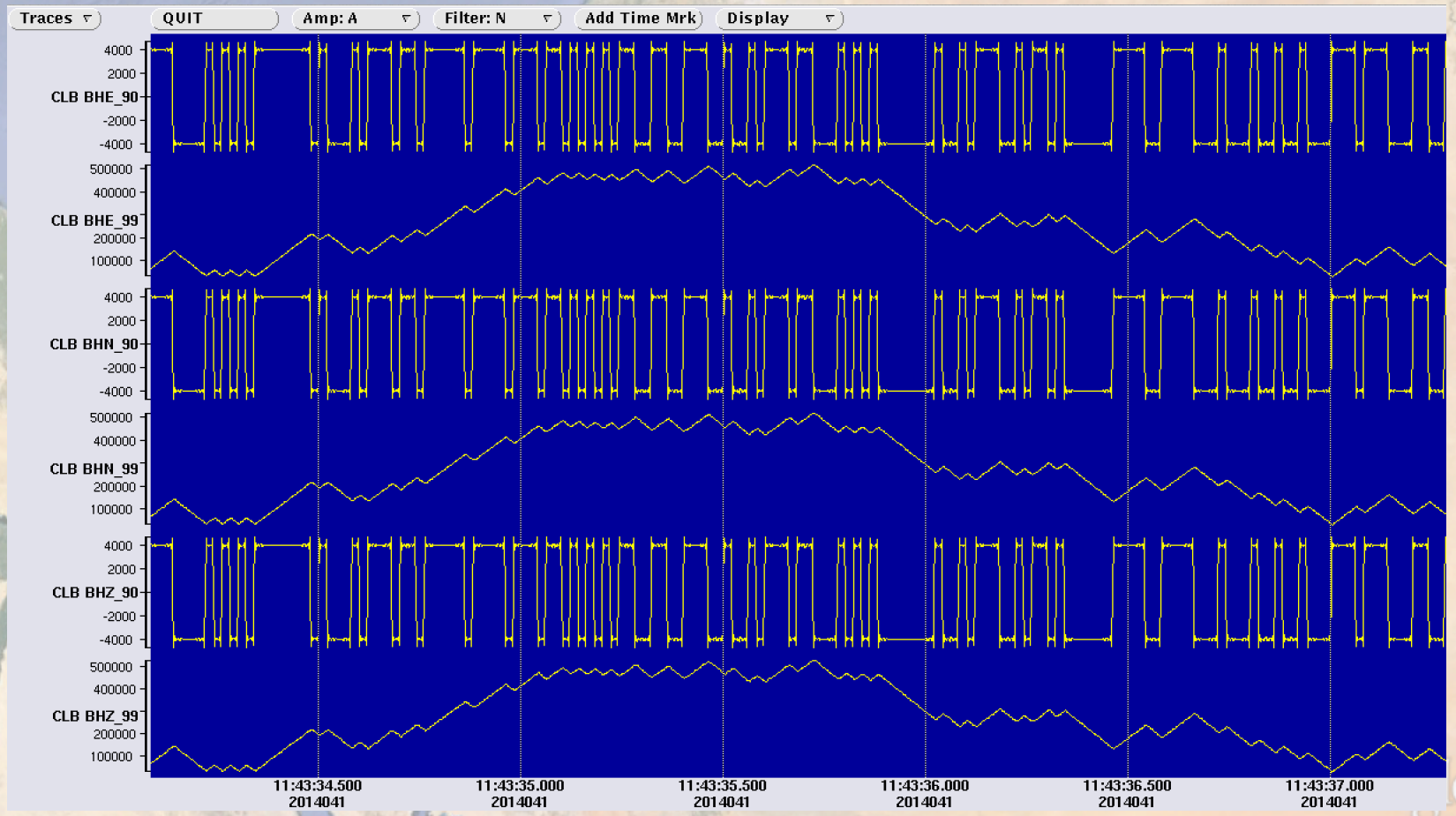
- Moving the portable stations every 6 months along the Dead Sea Fault
- Integrating the seismic observations with geodetic observations done along 5 profiles.

With Dr. Yariv Hamiel



4. Antelope uses in Research in Israel

Calibration of seismic station –



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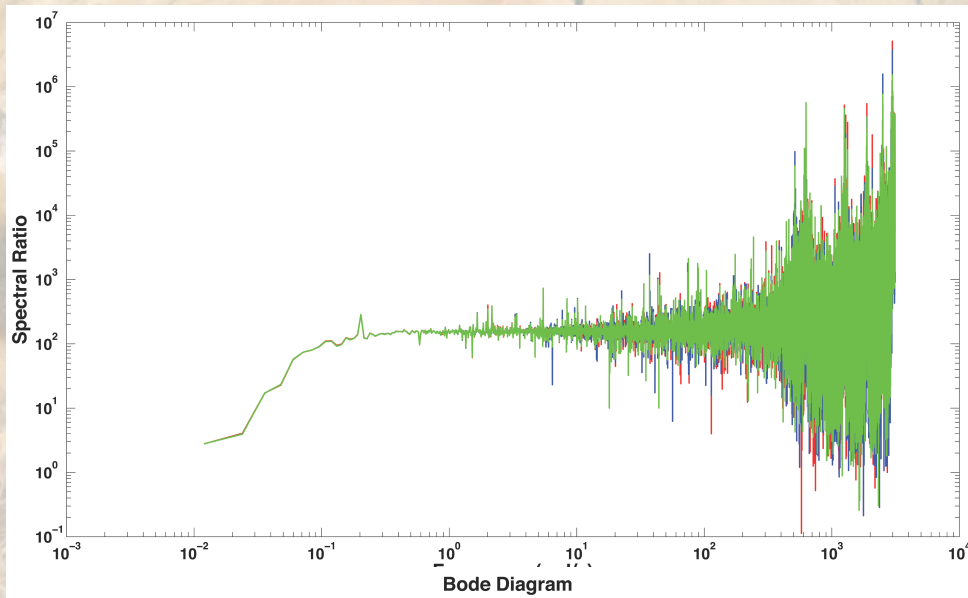

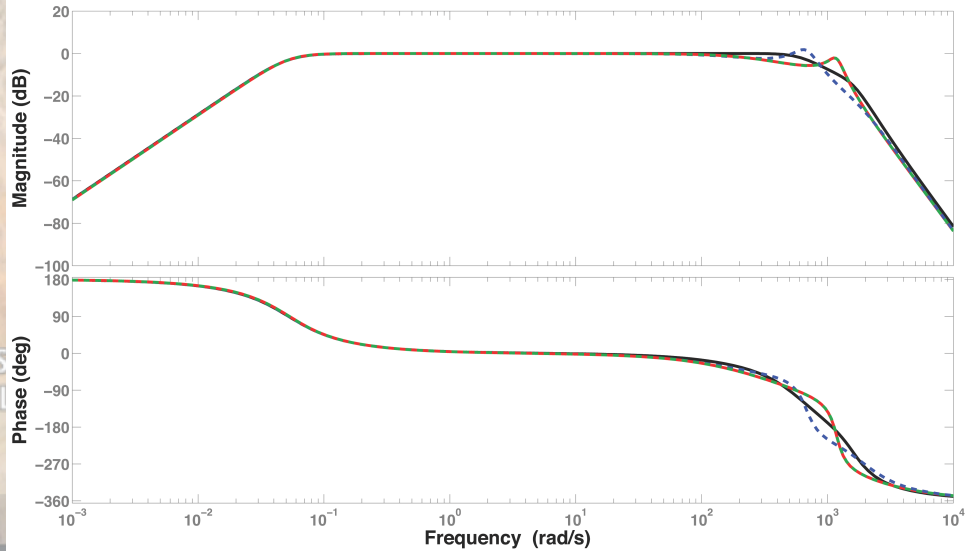

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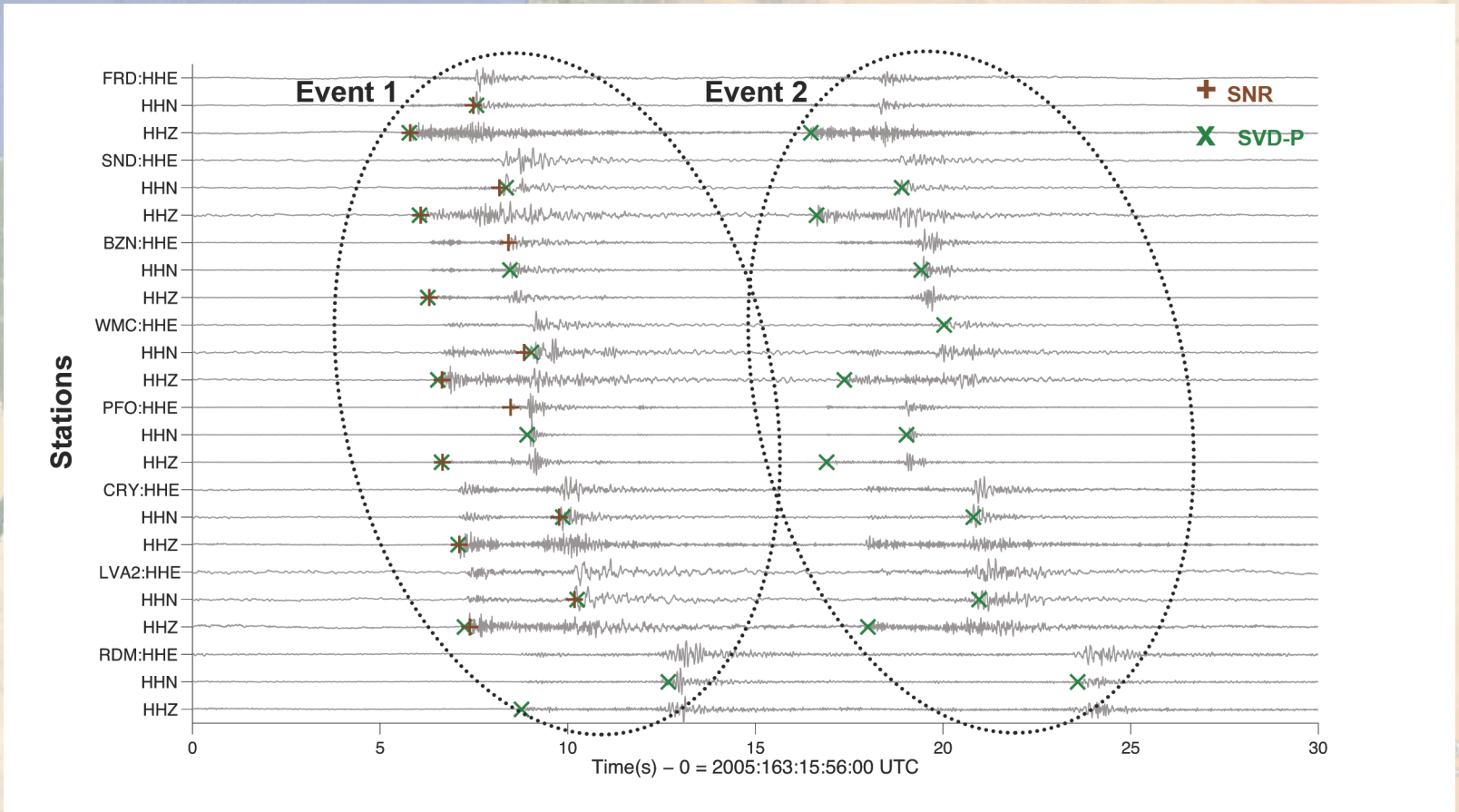
Detection of P and S using real-time SVD algorithm –



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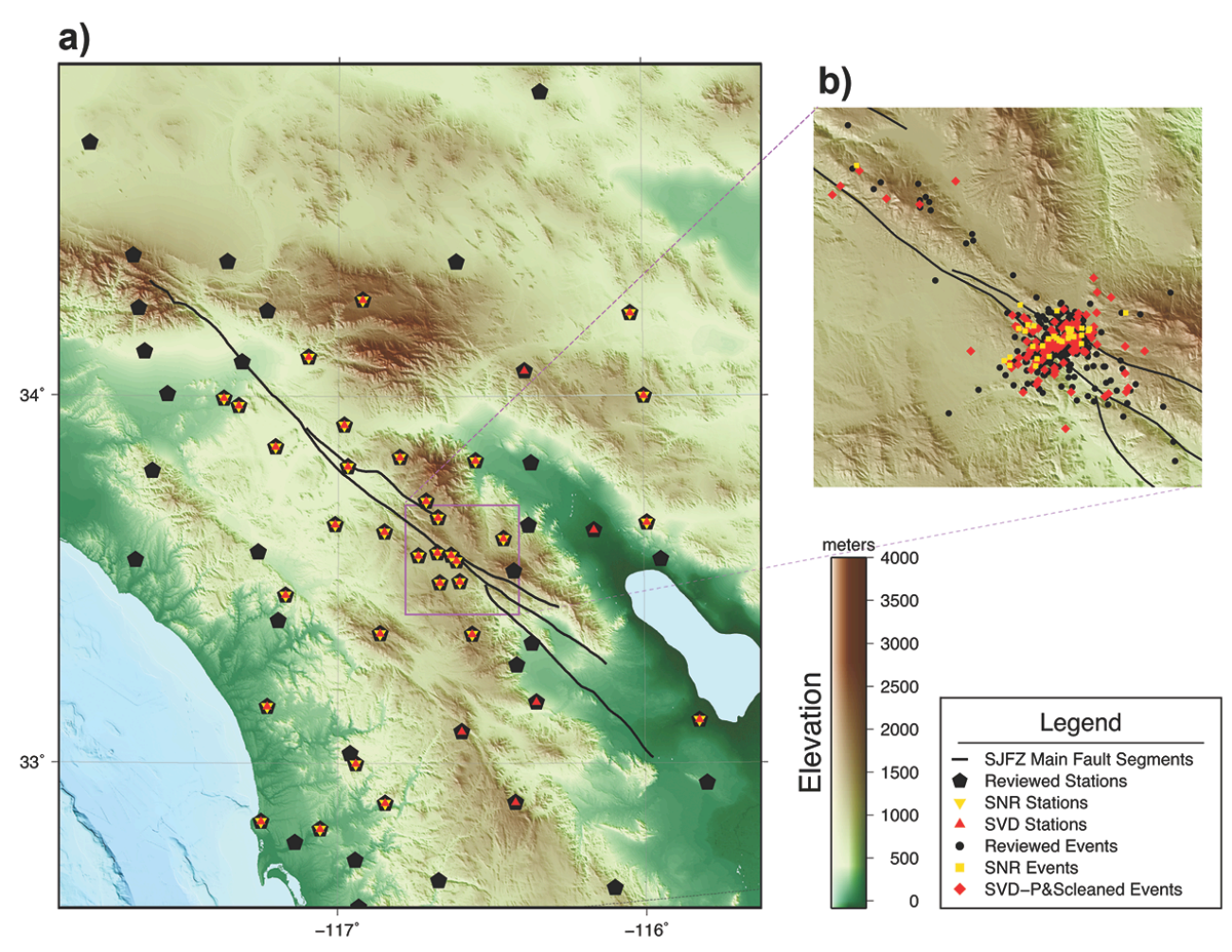

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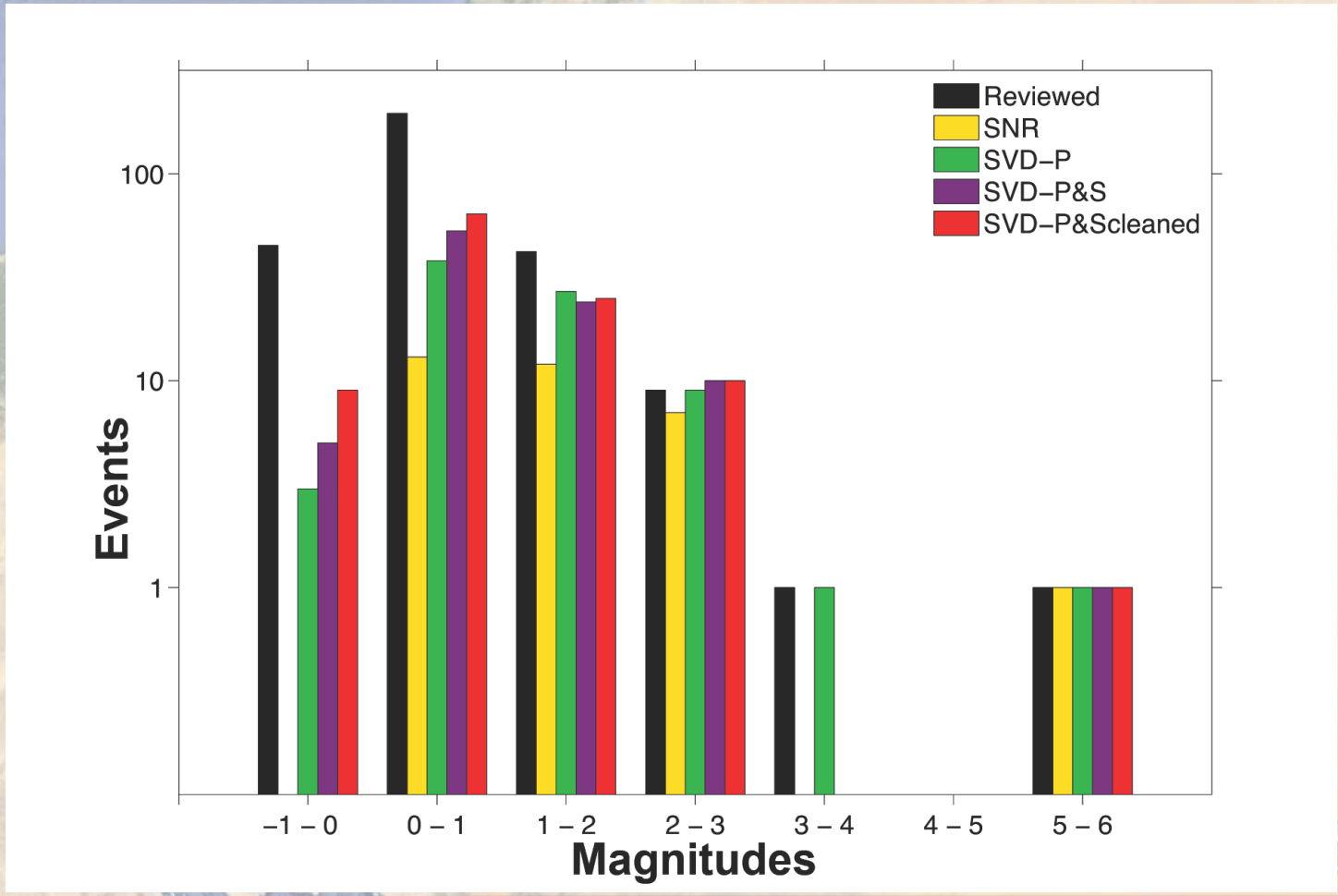
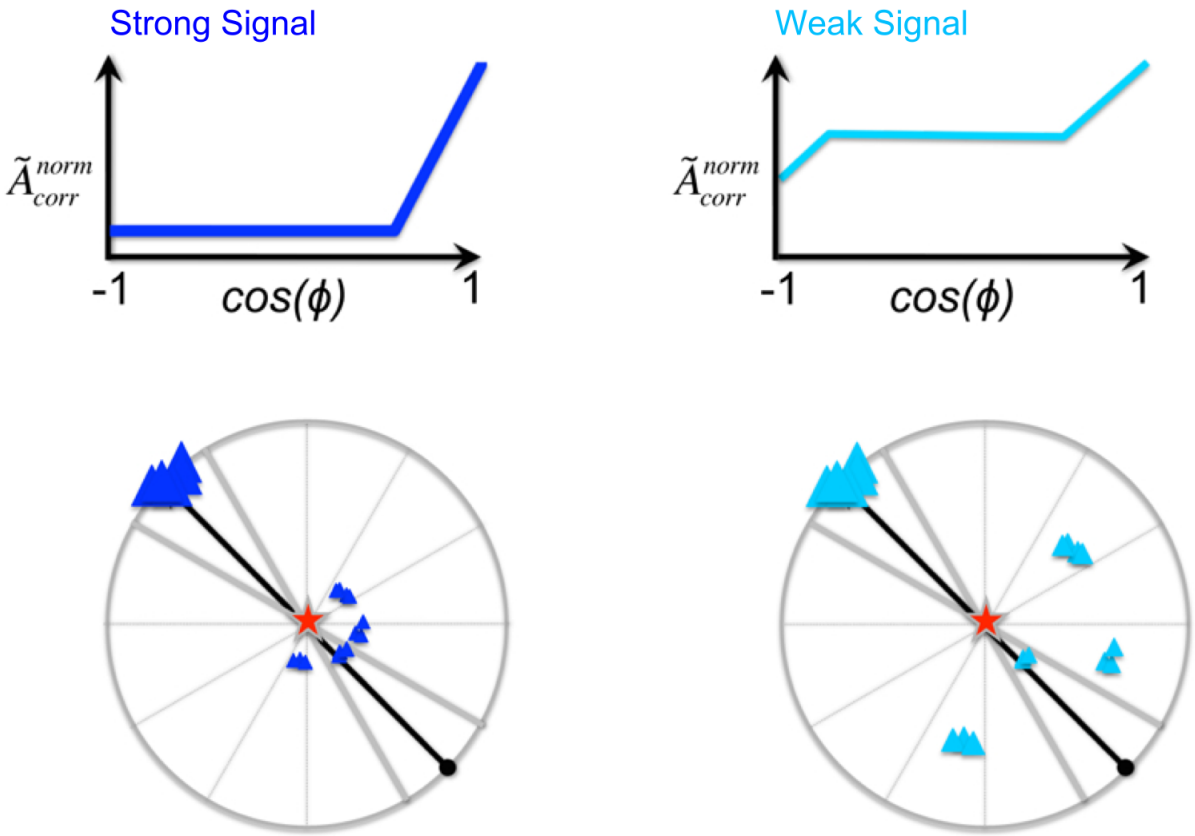


4. Antelope uses in Research in

Directivity analysis of small earthquakes using peak amplitudes –

a) Unilateral Rupture



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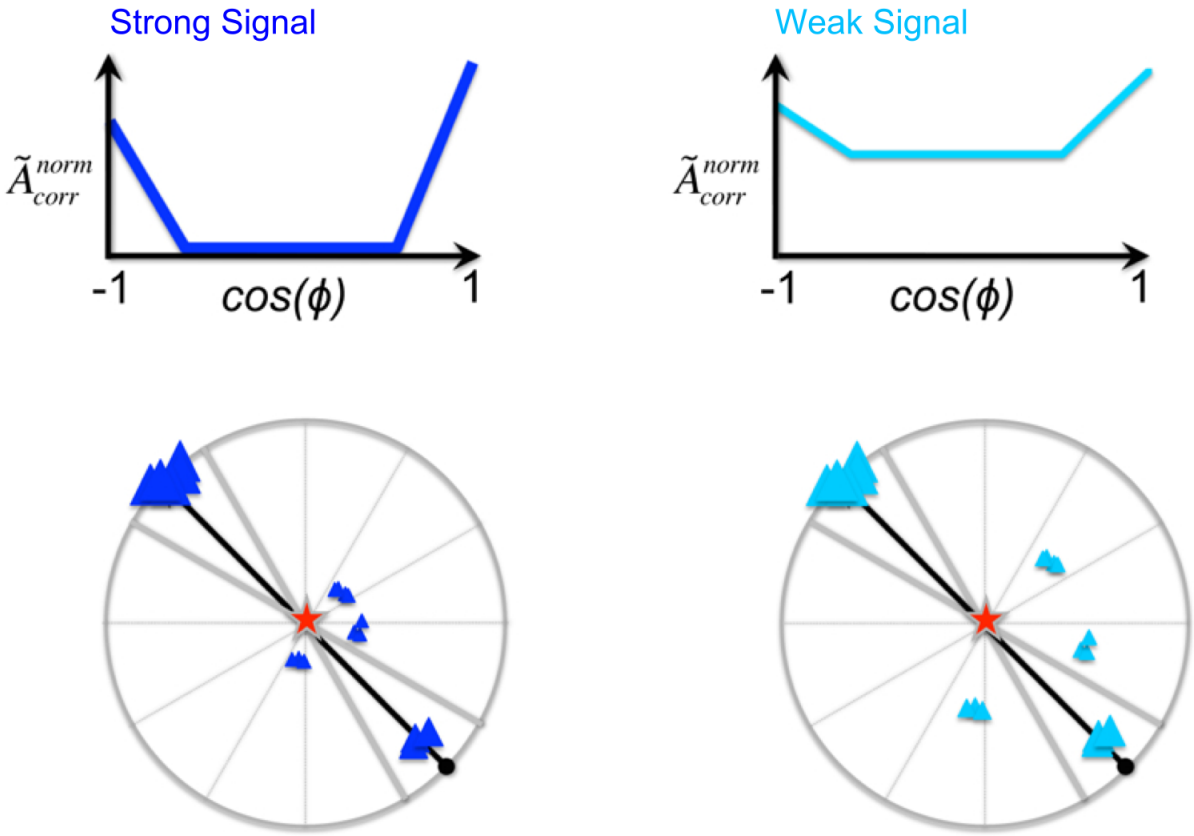
Directivity analysis of small earthquakes using peak amplitudes –

b) Bilateral Rupture



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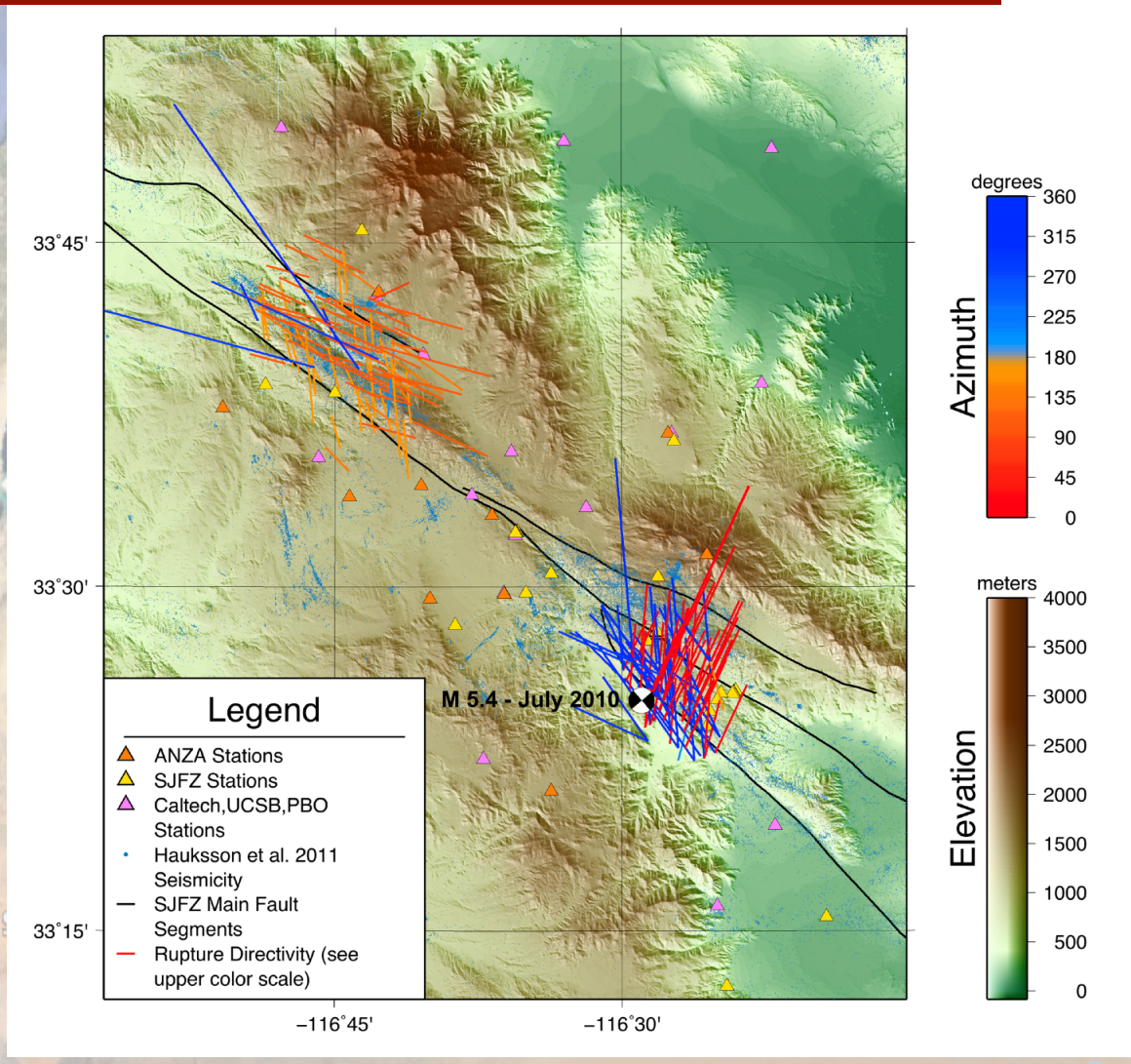

4. Antelope uses in Research in Israel

Possibly will be part of the turnkey solution for the new real-time seismic network ???

Thank you