Pattern of earthquake stress release in Afar and the neighborhood

by
Atalay Ayele
Geophysical Observatory
Addis Ababa University

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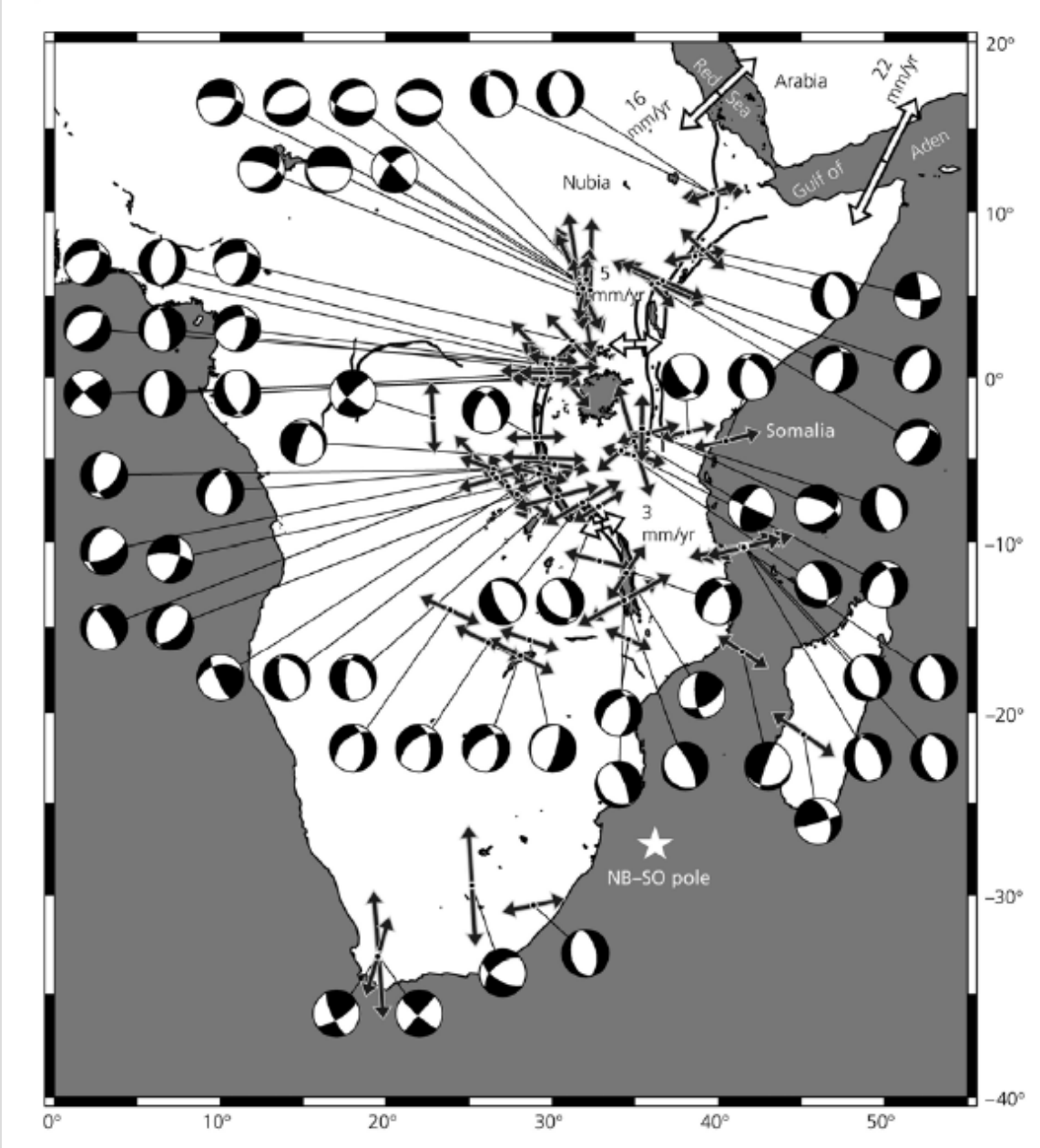
Introduction

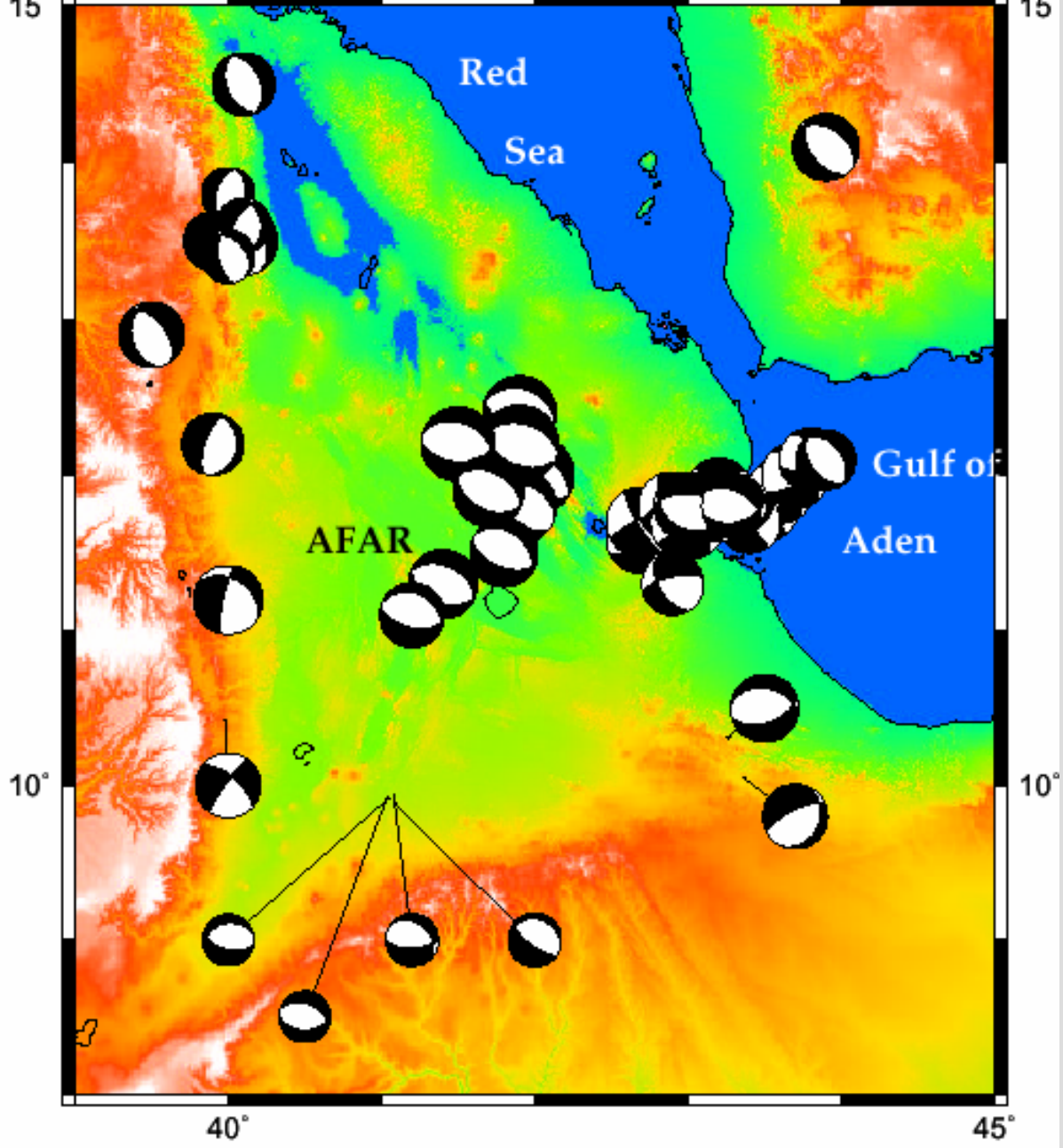
- A review of the recent seismicity in Afar and the main Ethiopian rift
- It is not a break through research result but a classical seismogram observation
- It is motivating to do more rigorous research

The recent major earthquake activity in the Ethiopian rift

- The April-June, 2000 activity near Gewane
- The 2003/2004 seismicity around Melka Sedi/Werar
- The August 2002 activity west of Ert Ale
- The September, 2005 Da'Ore volcano-tectonic crisis



The East African rift system (EARS) provides an excellent example of young continental rifting



The Red Sea and Gulf of Aden rifts are shaking hands in Afar

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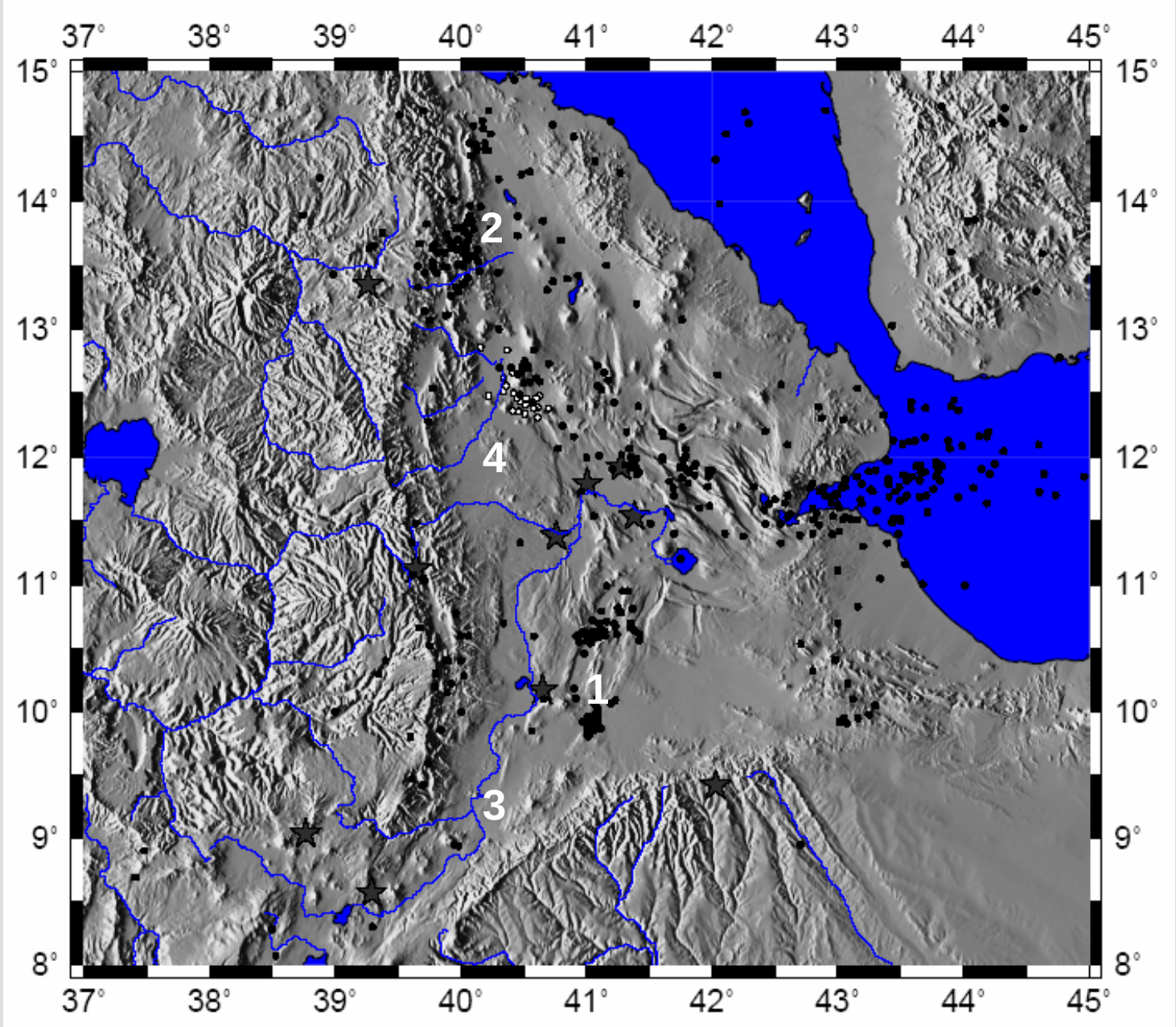
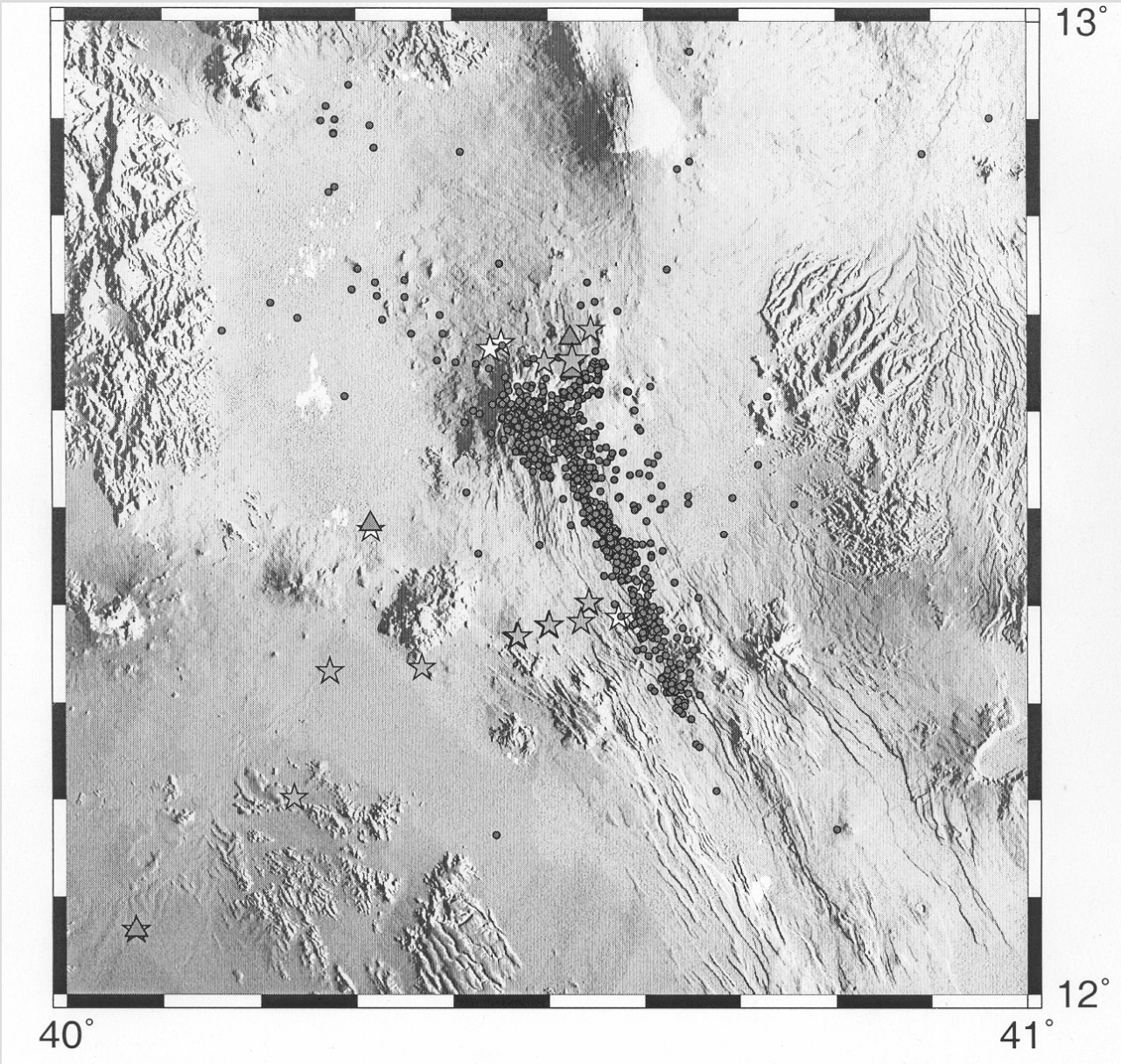


There were Four major swarms in the last six years


Da'Ure/Boina
October 25-28, 2006
wet surface

Fractures in the top of the new Da'Ure (Dabbahu) pumice dome; view looking N. It was from these fractures the boiling noise had been heard the previous week. No sound was heard during the visit on 16 October, 2005.



The January & February, 2006 seismic activity along the Dabbahu rift segment

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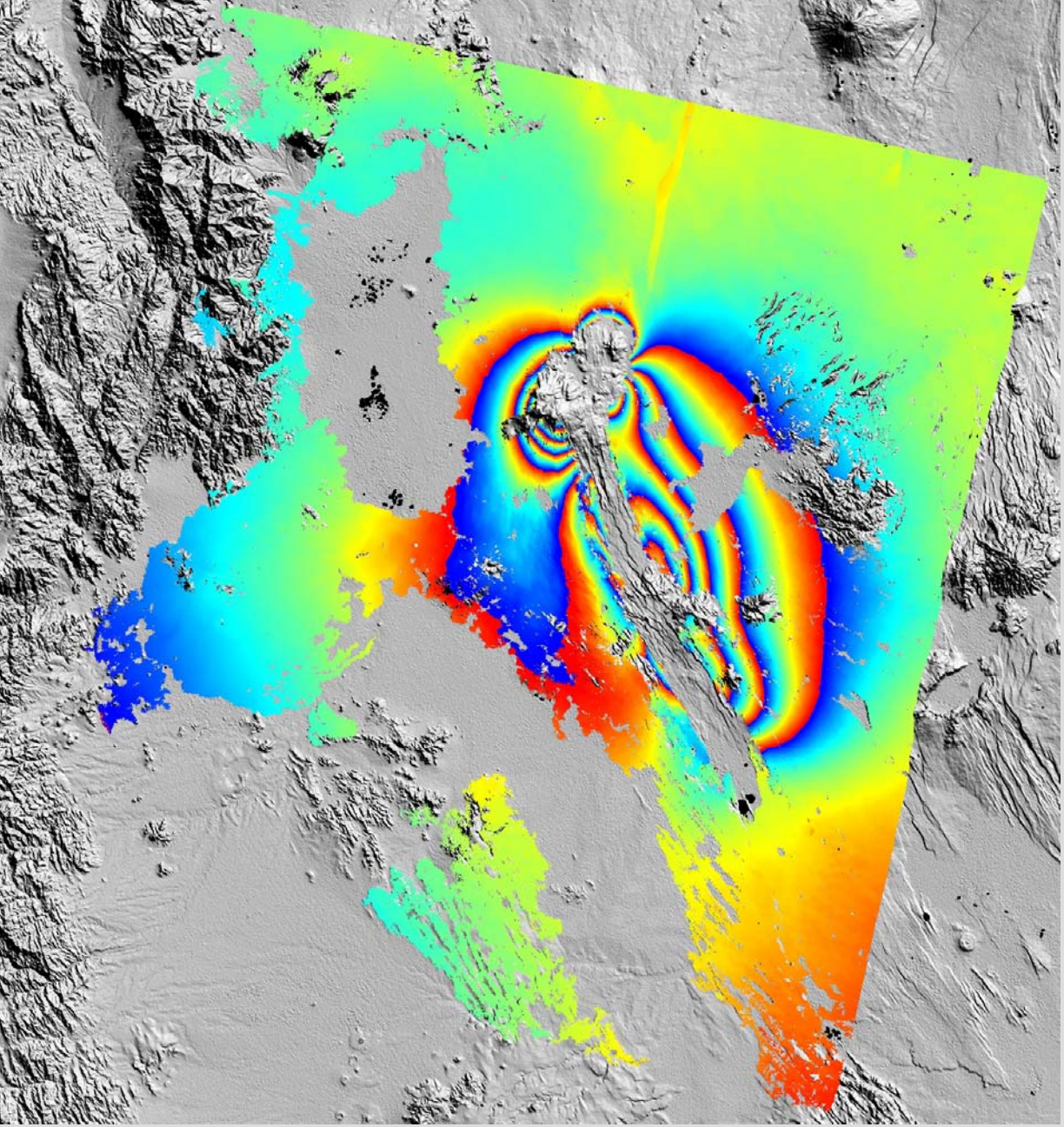

Descending interferogram, May-October, 2005
50 cm fringes!

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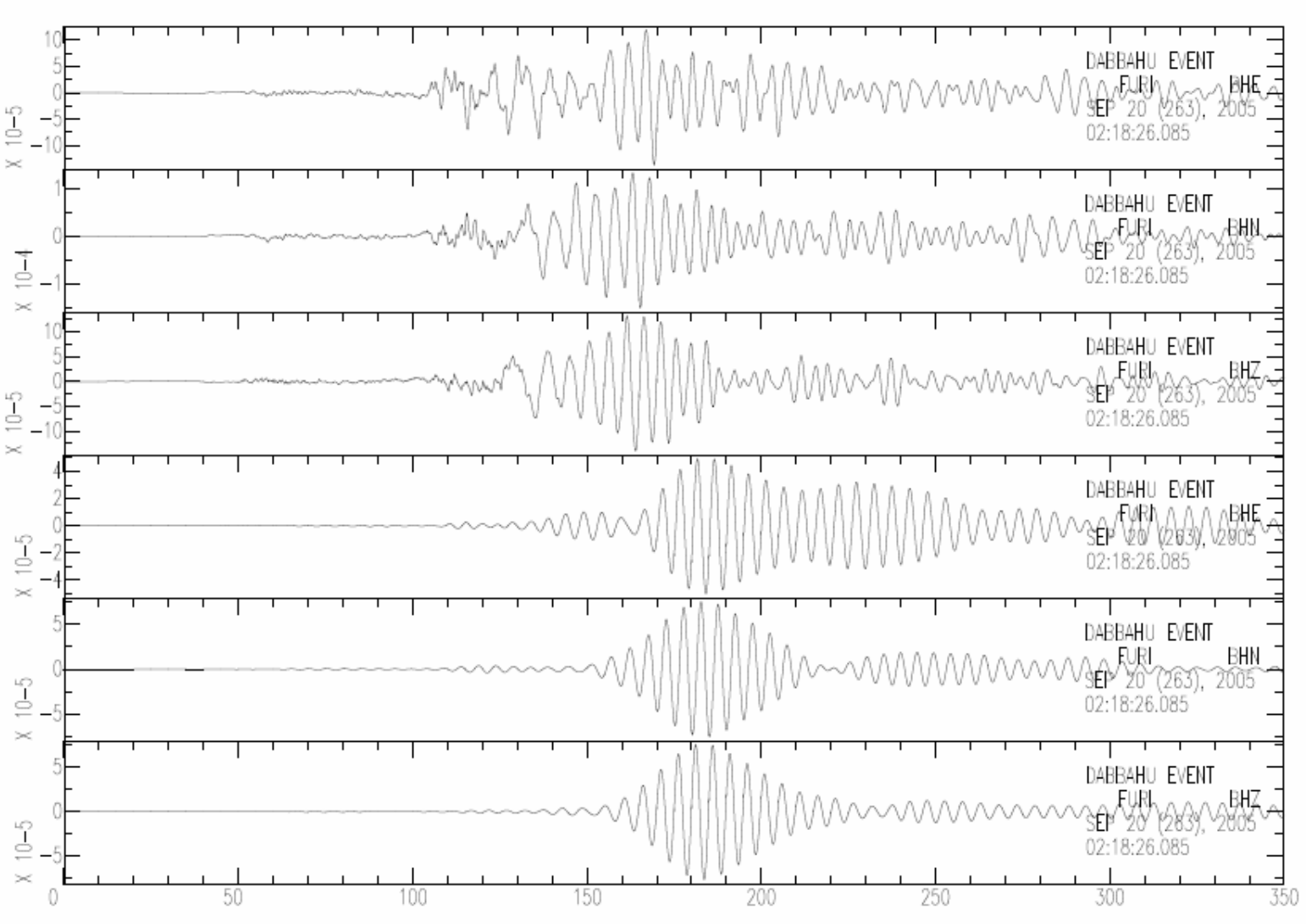

f=0.2HZ volcanic Tremor

It is quite common to see such a hybrid earthquake in most of the major earthquakes that occurred in the Ethiopian rift for the last five years

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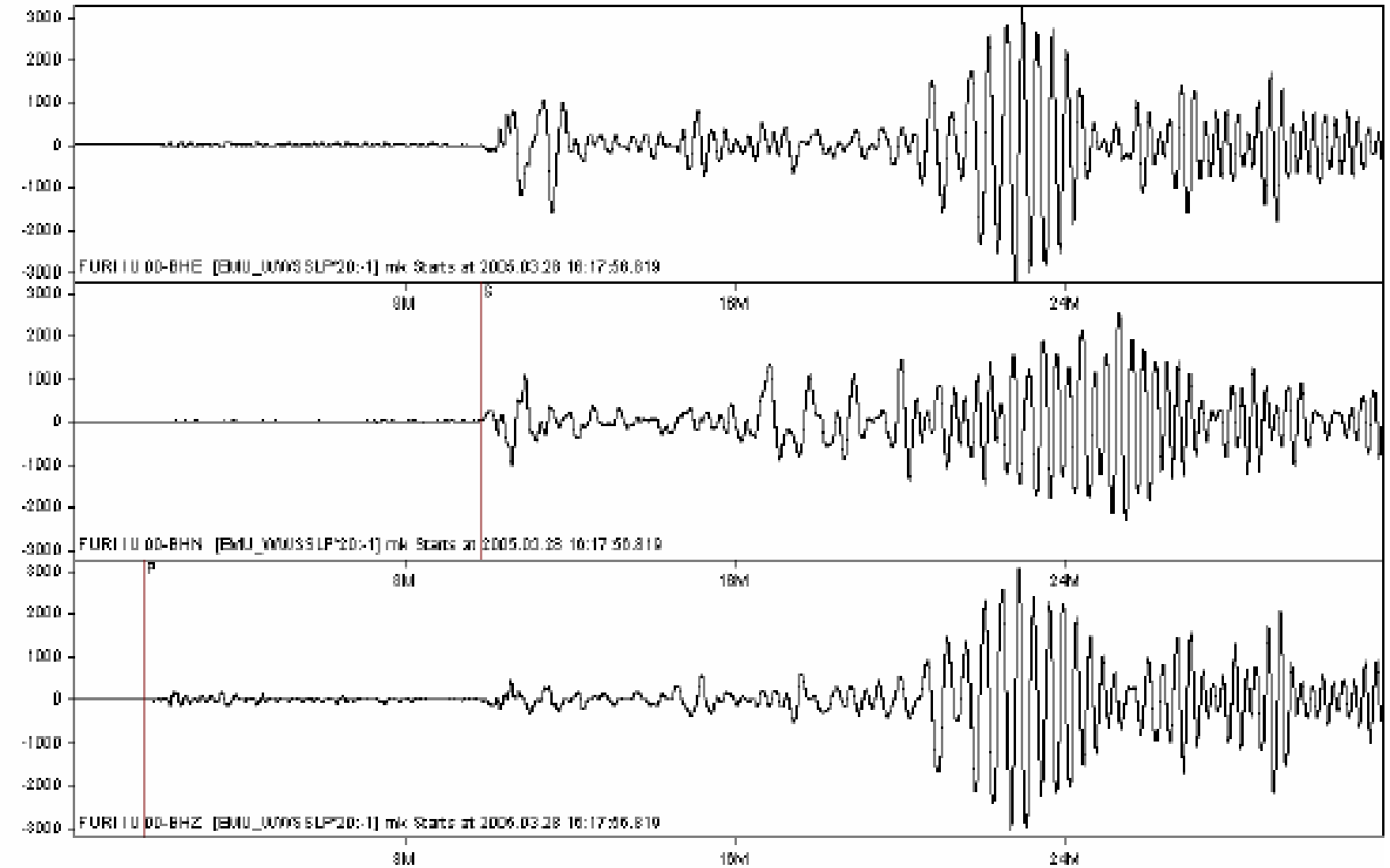
continued …

- **Many volcanoes produce volcanic tremor with consistent sharp peaks, which suggests that one or more resonators have been excited by a volcanic processes**
- **Volcanic tremor can be loosely defined as a quasi-continuous seismic signal produced by an active volcano or geysers at geothermal sources**

The 28 March 2005 Sumatra M*w* 8.6 earthquake as recorded by seismic station FURI in Ethiopia



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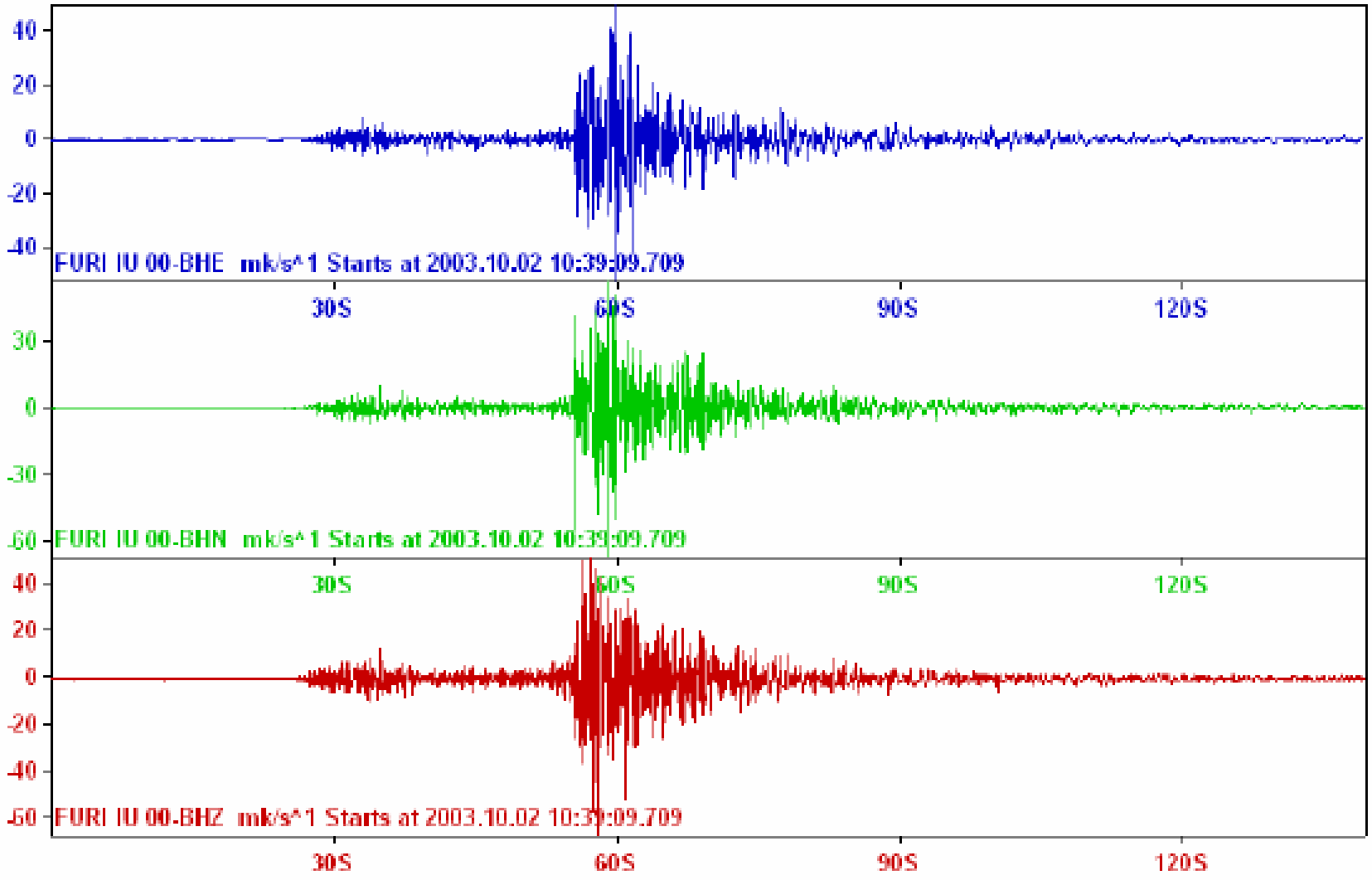
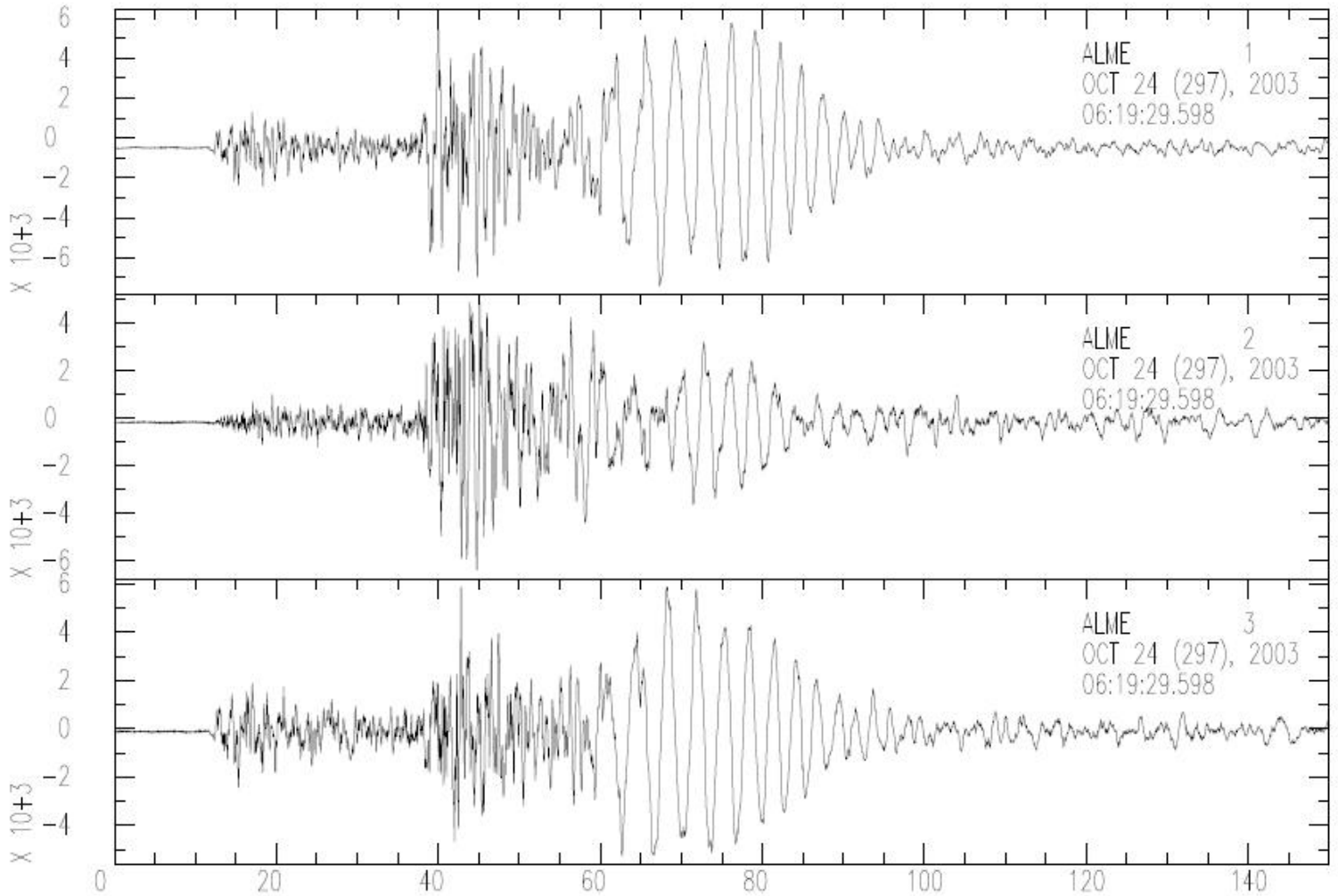
Pure tectonic events commonly observed from the Ankober area



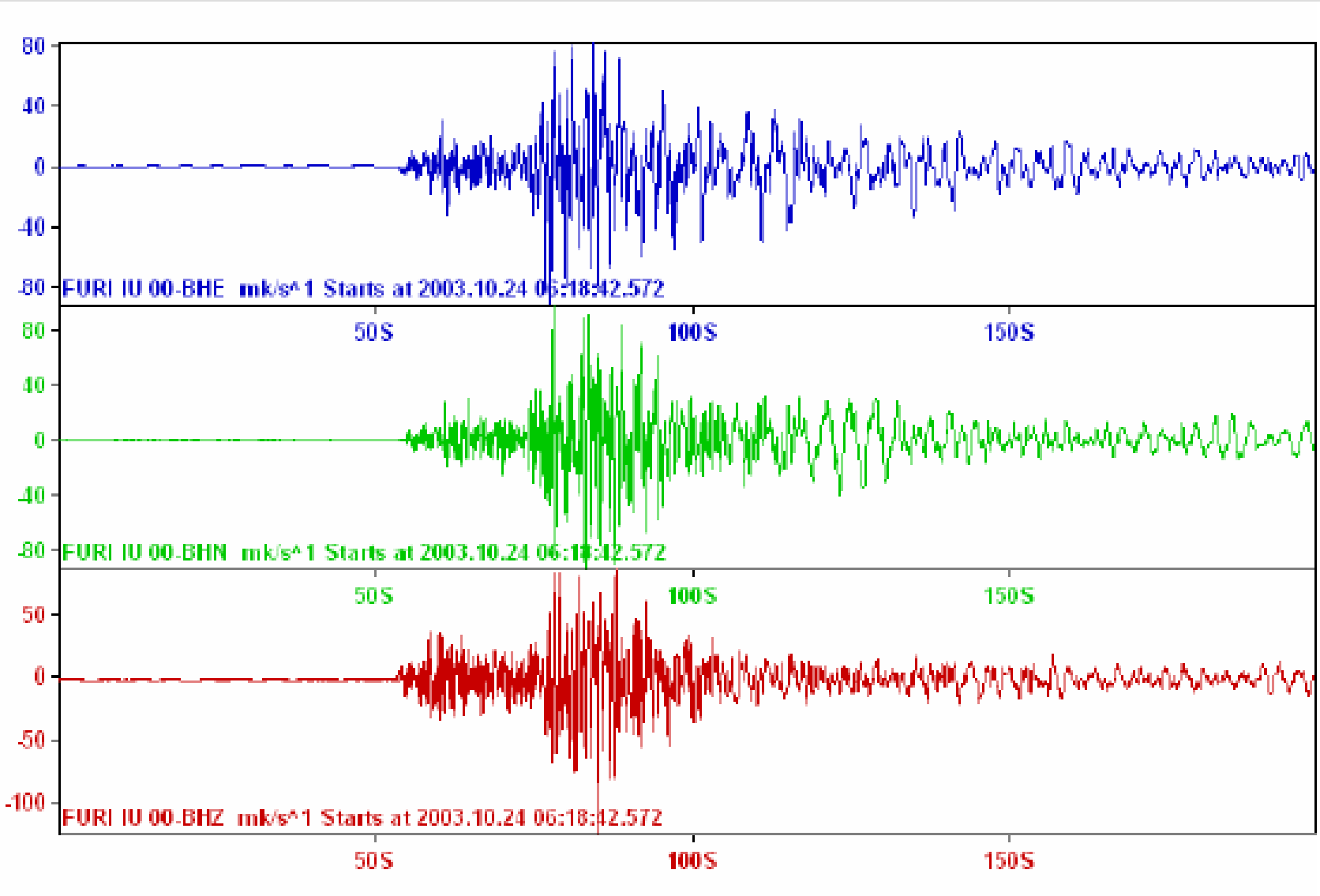


path or source effect?

Delta ~ 200 km

A seismogram record at ALME (Alemaya station) for one of the October 24, 2003 earthquake at Melka Sedi

The record at FURI station for the previous event at delta ~ 166 km



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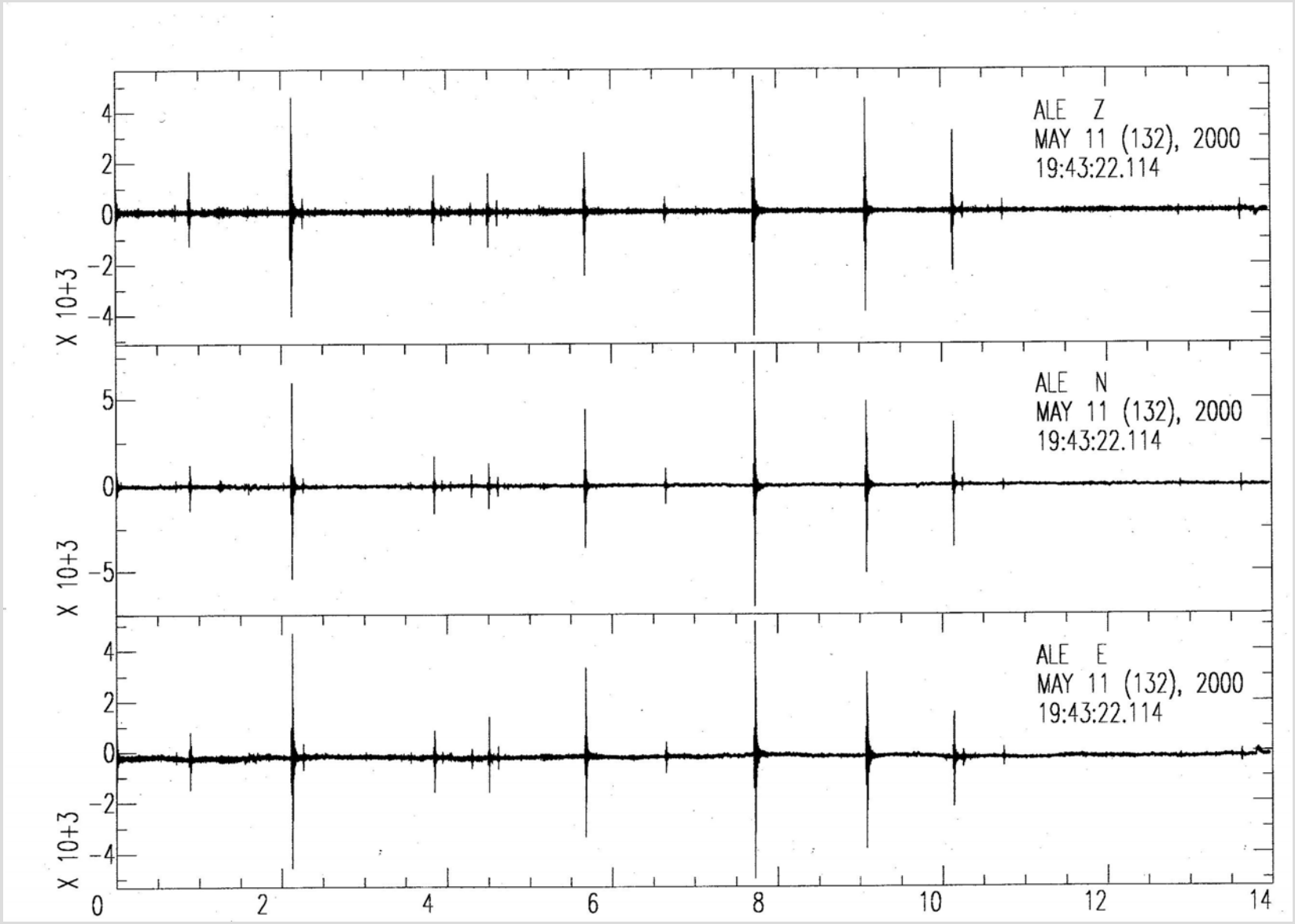

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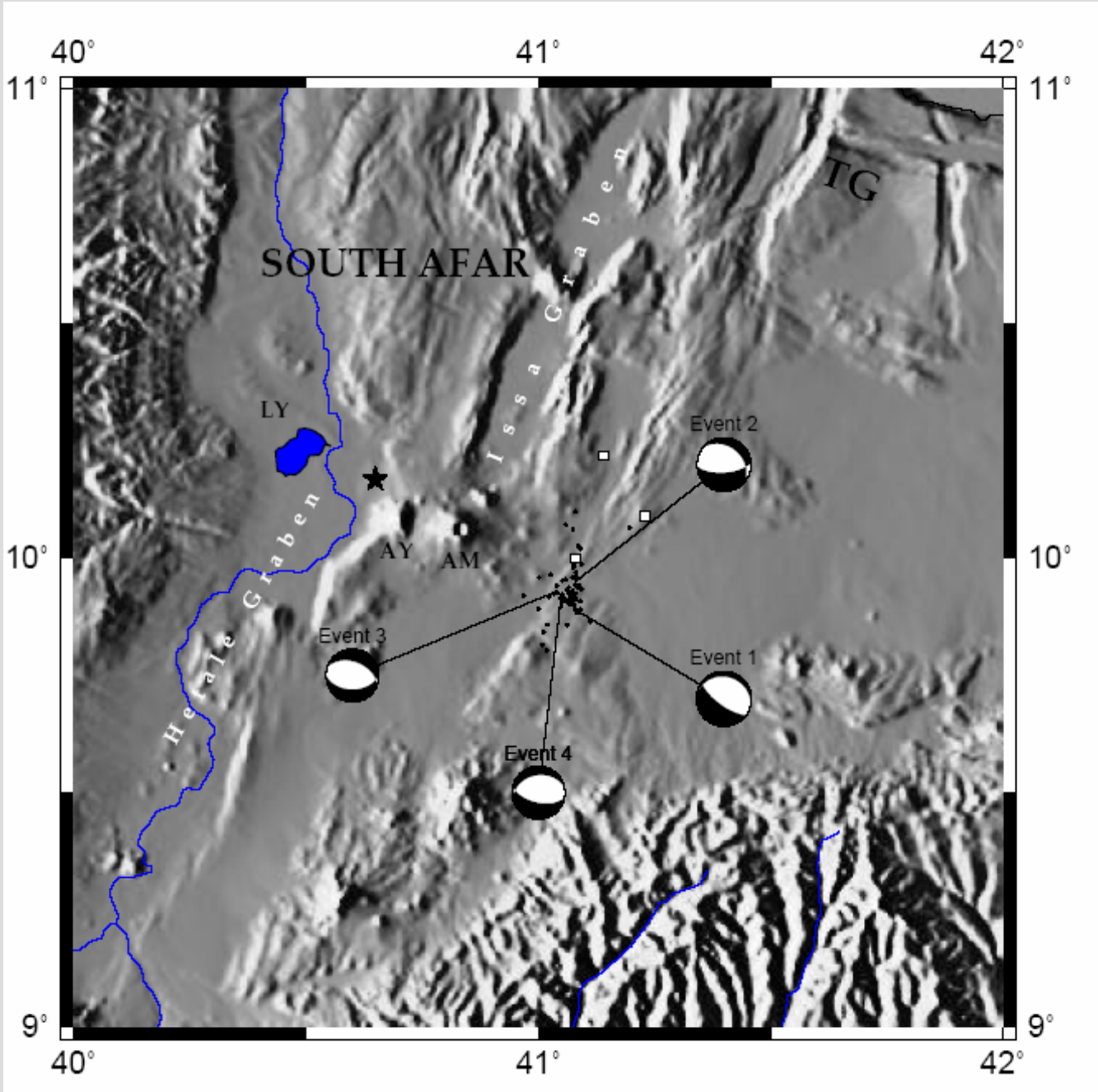
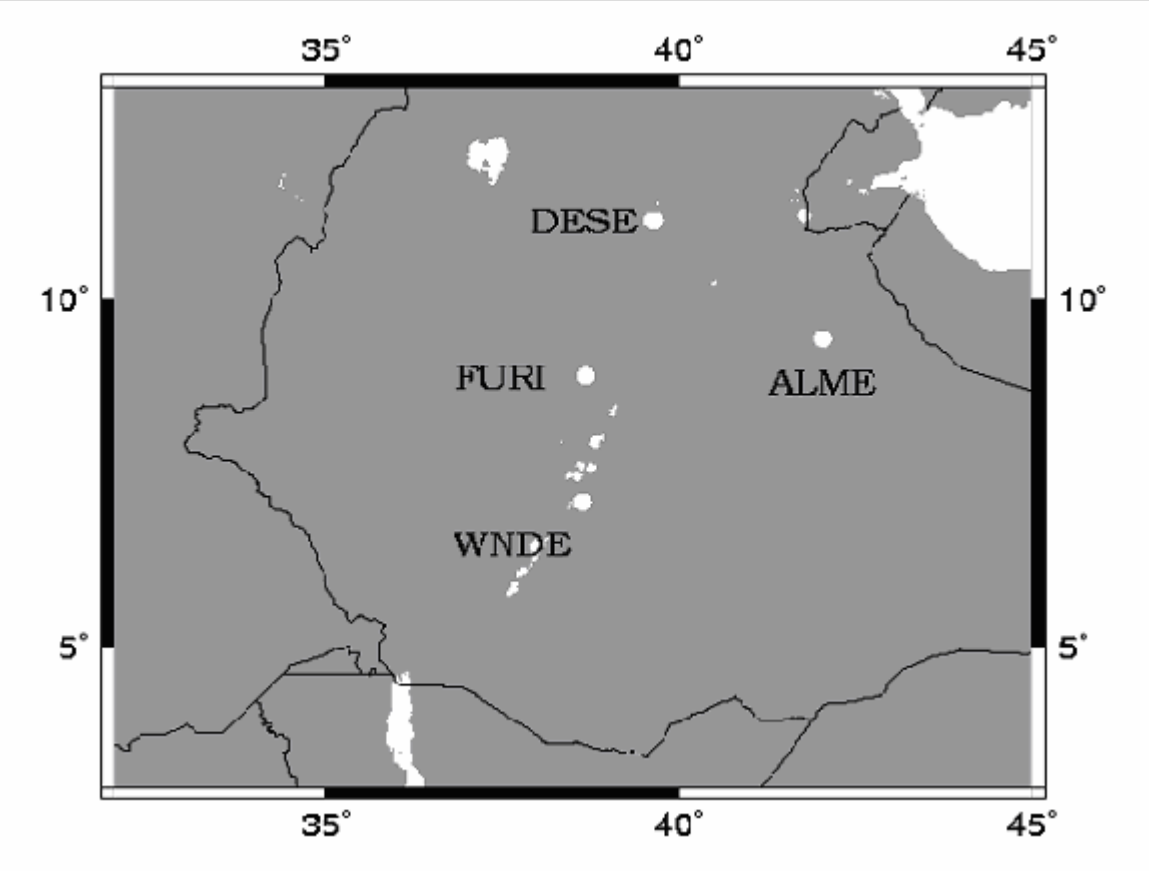


90 m resolution Shuttle Radar Topography Mission (SRTM) data

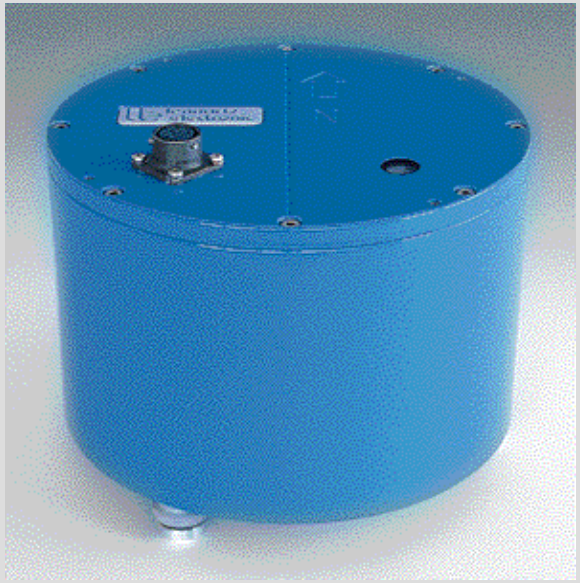
Ethiopian Seismic Station Network



1CMG-3T G. &
3 Le-3d/5s

1 IRIS/USGS station

No support as yet from our government for instrumentation



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conclusions

Seismic data enables us to see deep into the internal part of the earth (an area of interest), what we can't physically see

BUT

Who dares to stretch that far?

The one who has the capacity!

So we have to build that capacity mainly in human resource, instrumentation, research facility and reliable management system & better collaboration with EGS