

New Development in KACST Seismic Monitoring System

مدينة الملك عبدالعزيز للعلوم والتقنية

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بعض محطات الصد الزلزالي في المملكة





منظر عام لإحدى محطات الرصد الزلزالي التابعة ل-
KACST

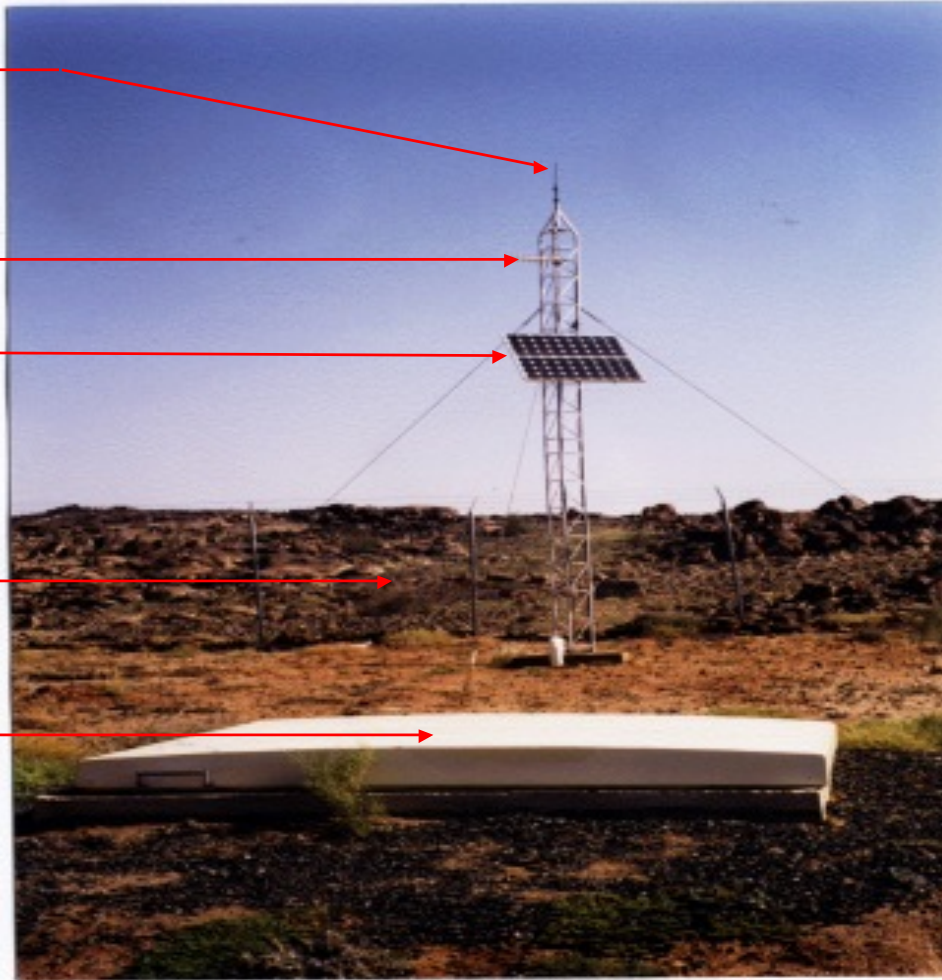
قەولما قىيام

سىمىيەتلىك ئىشلىتىش ۋە GPS

ئىشلىتىش ئورنى

ئورمان قىيامى

قۇرۇلما قىيام



يكن الال انبلا زاج

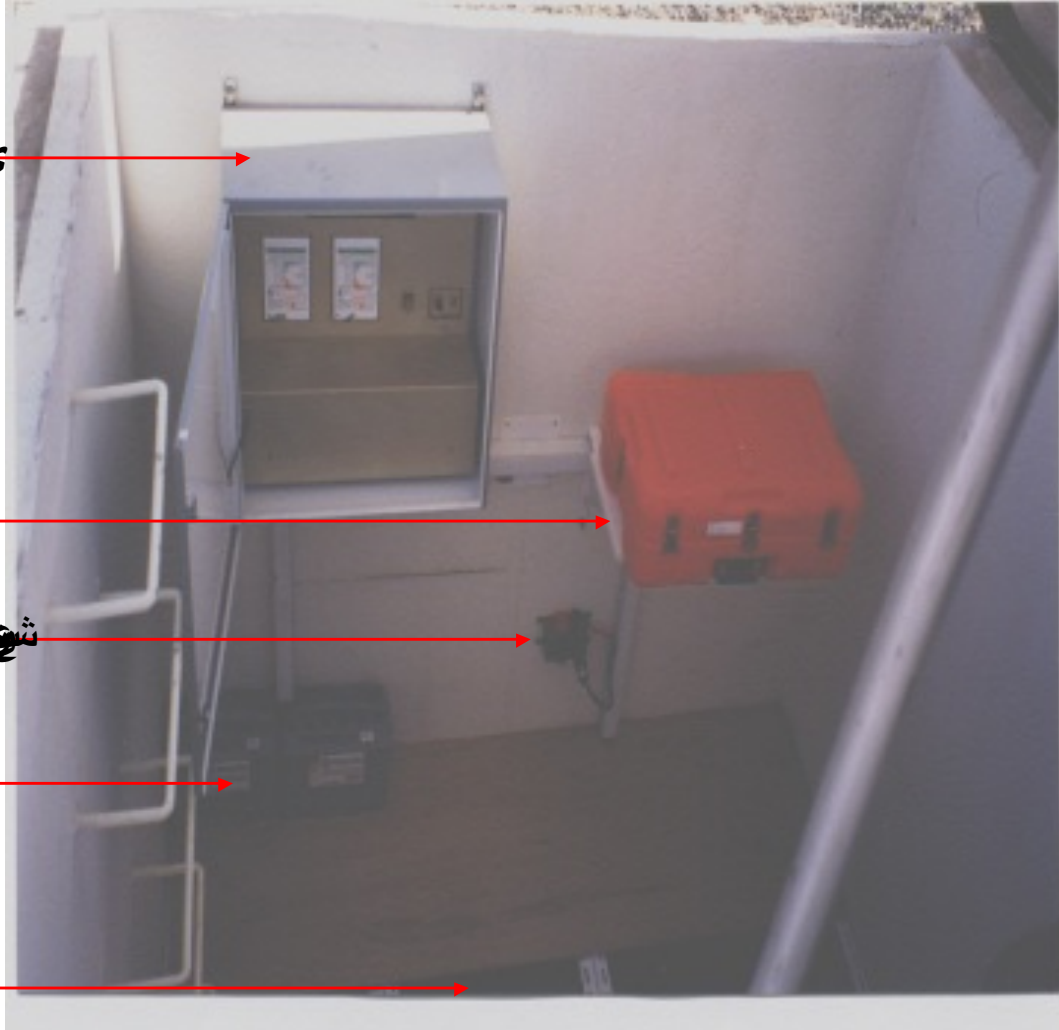
قرنبا (Digitizer)

شها وقرنبا انبلا

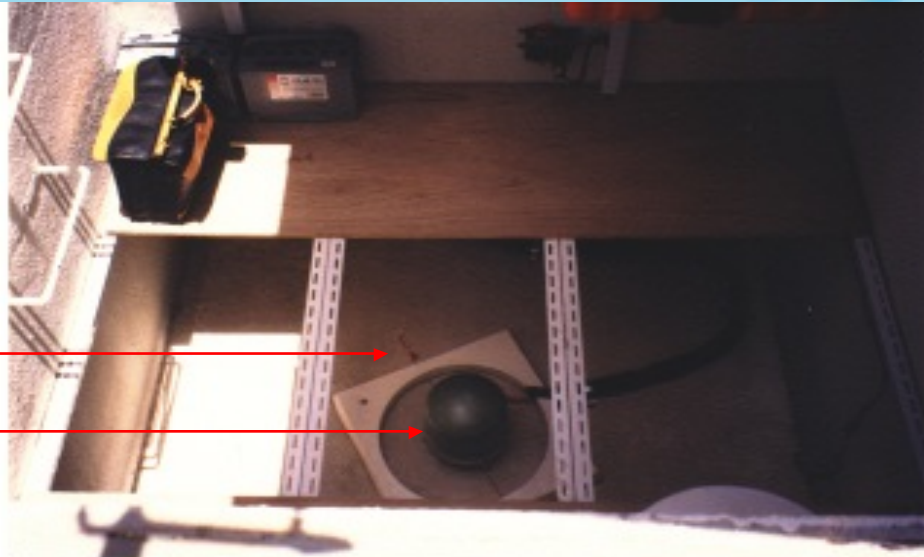
Hostbox

تطلب

شها انبلا



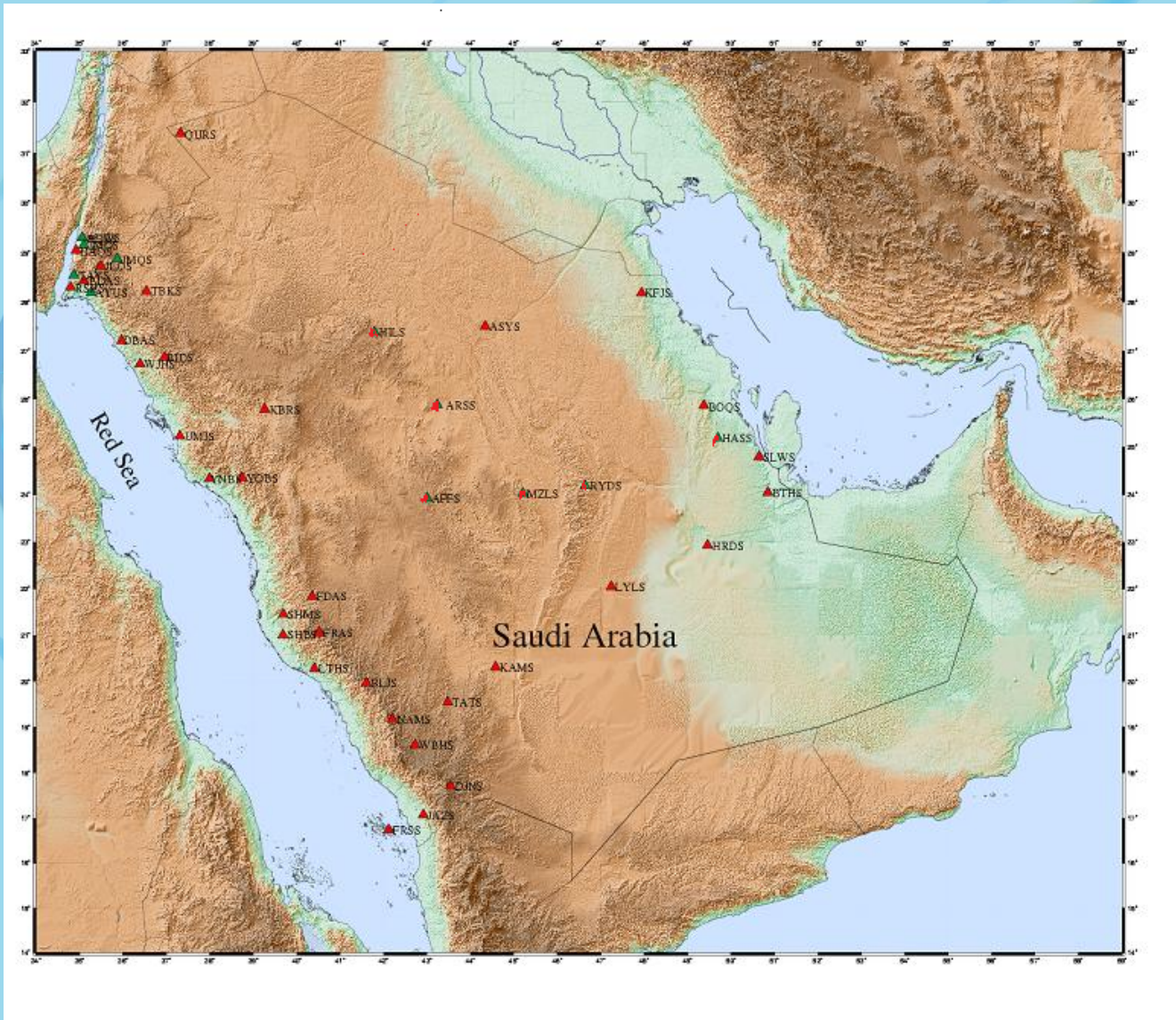
في وضع فيديو
تثبيت في (Sensor)



تثبيت في ان مع ان أ ه ع
Sensors



▲ KACST Stations
▲ SGS Stations



PROGRESS

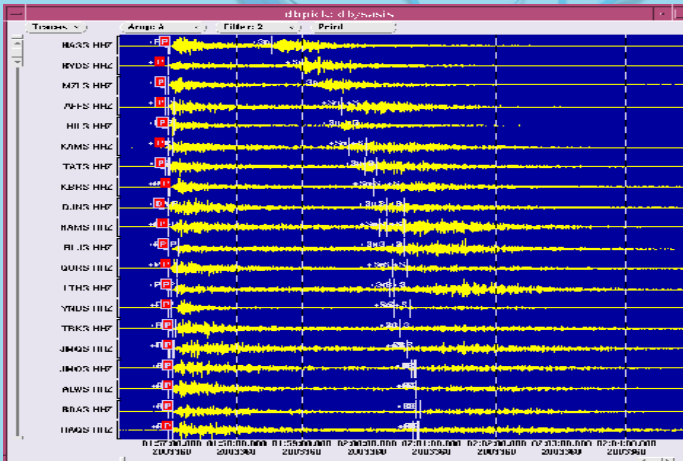


- 45 Broadband 3-component
- Digital/Analog Communication Link
- Upgrade SGS Data to ANTELOPE
- Bulletin
- Auto Mail
- Dead Sea Earthquake
- Explosion Monitoring

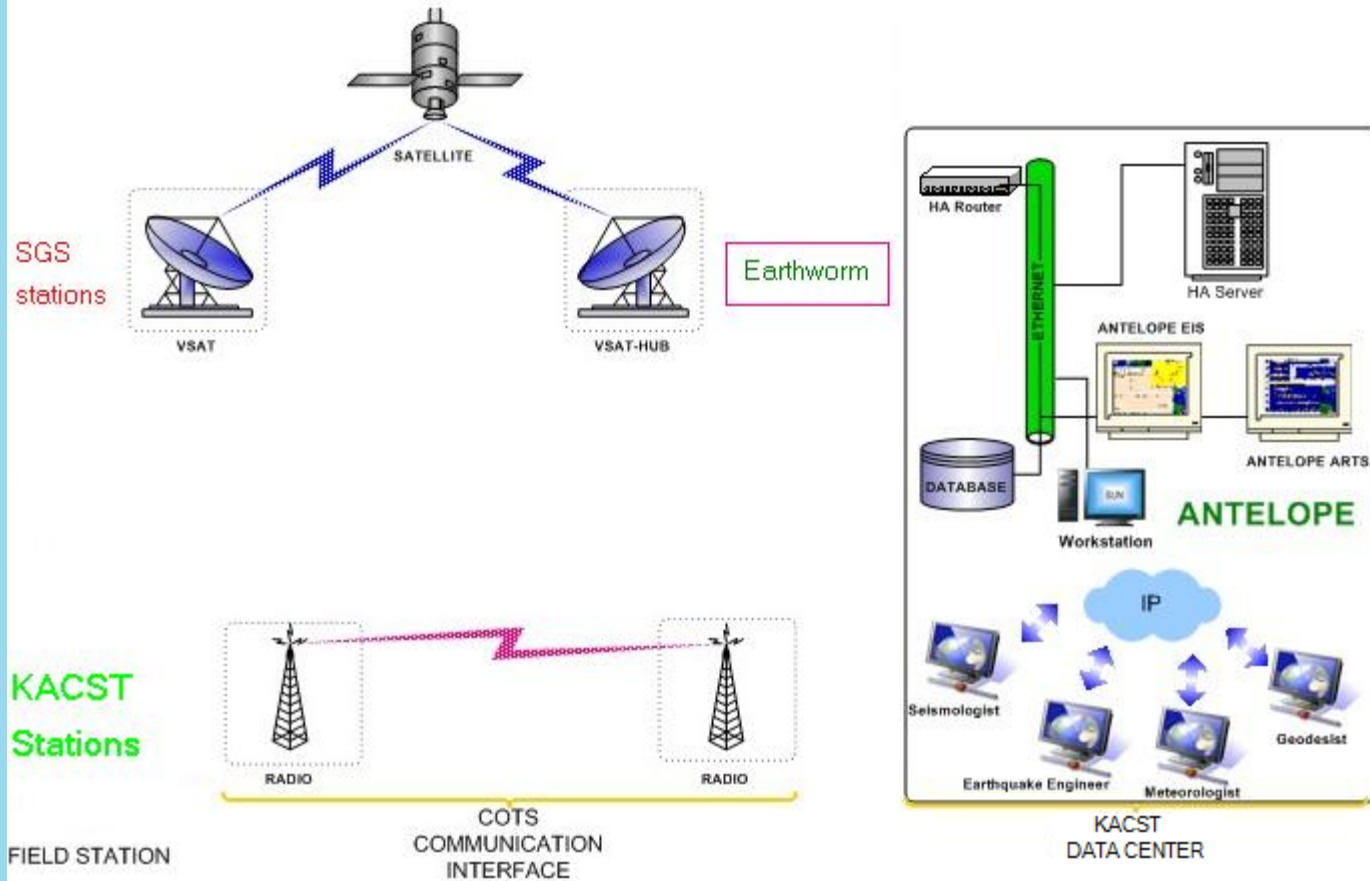
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معهد بحوث الفلك والجيوفيزياء

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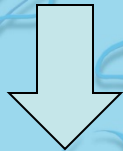


KACST System Overview



Upgrade SGS Data to ANTELOPE

SGS
NAQS



PC WORKSTATION
WINDOWS
EARTHWORM
NAQS2EW



SUN WORKSTATION
ANTELOPE
EW2ORB

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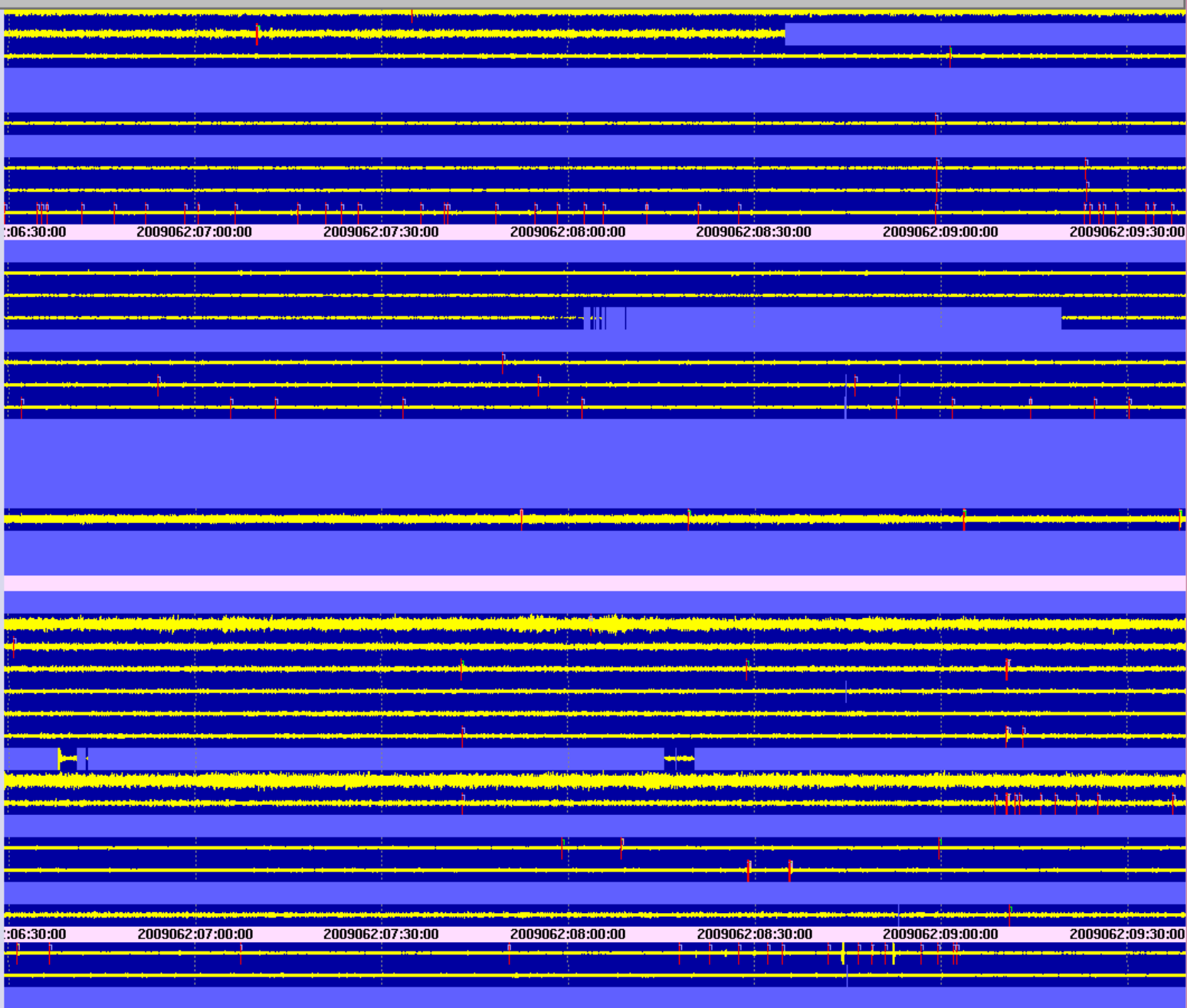
File View Amp Time

- II_KIV_BHZ_00
- IU_GNI_BHZ_00
- sa_ALWS_HHZ
- sa_JMOS_HHZ
- sa_TAYS_HHZ
- SG_BDAS_VHZ
- sa_AYUS_HHZ
- SG_JLOS_BHZ
- SG_DBAS_VHZ
- SG_RSHS_BHZ

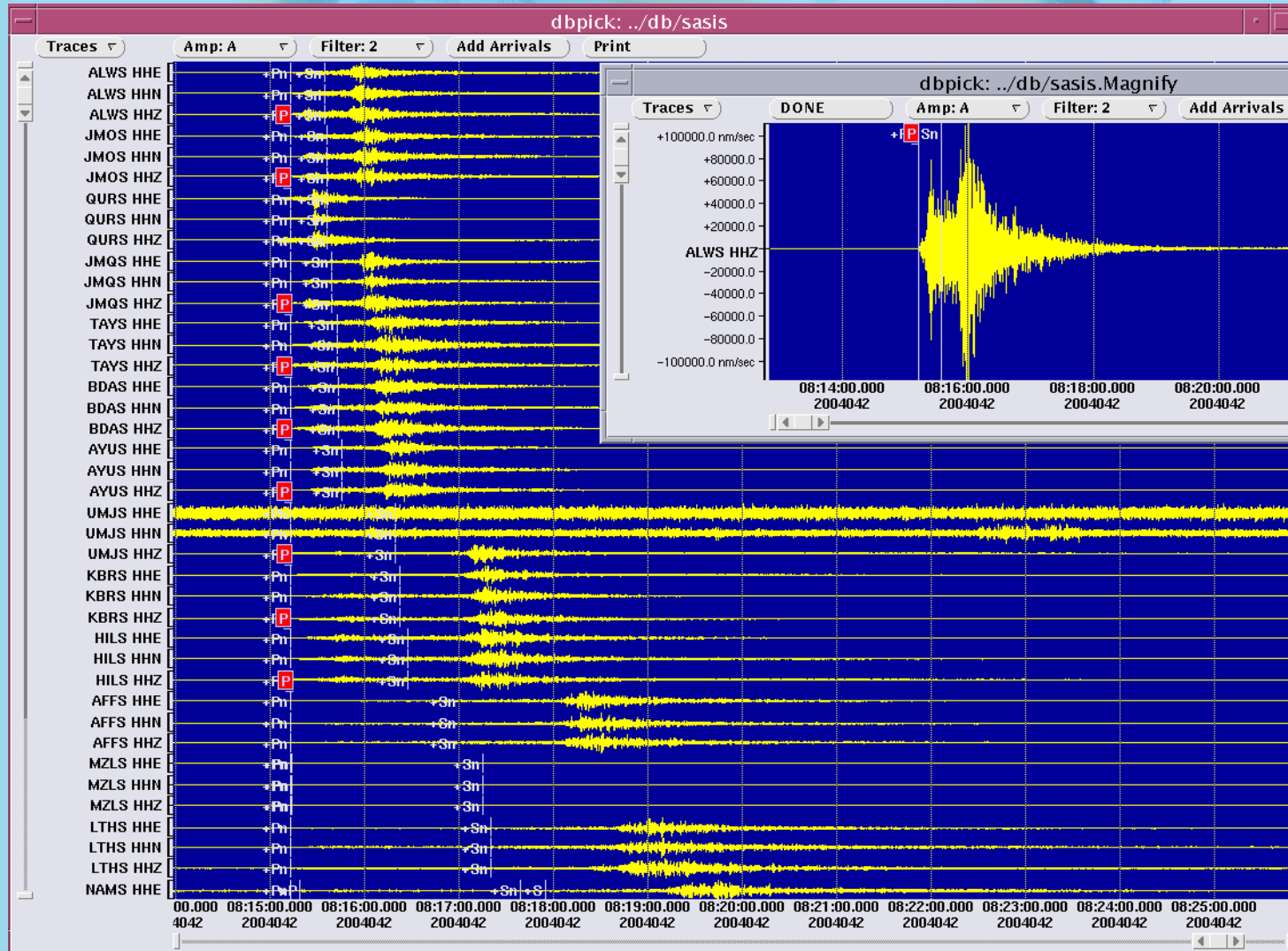
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- SG_TBKS_VHZ
- SG_BIDS_VHZ
- SG_WJHS_BHZ
- SG_UMJS_VHZ
- SG_YOBS_BHZ
- SG_YNBS_VHZ
- SG_KBRS_BHZ
- sa_HILS_HHZ
- sa_AFFS_HHZ
- sa_Arss_HHZ
- sa_MZLS_HHZ
- sa_RYDS_HHZ
- sa_HASS_HHZ
- SG_HRDS_BHZ

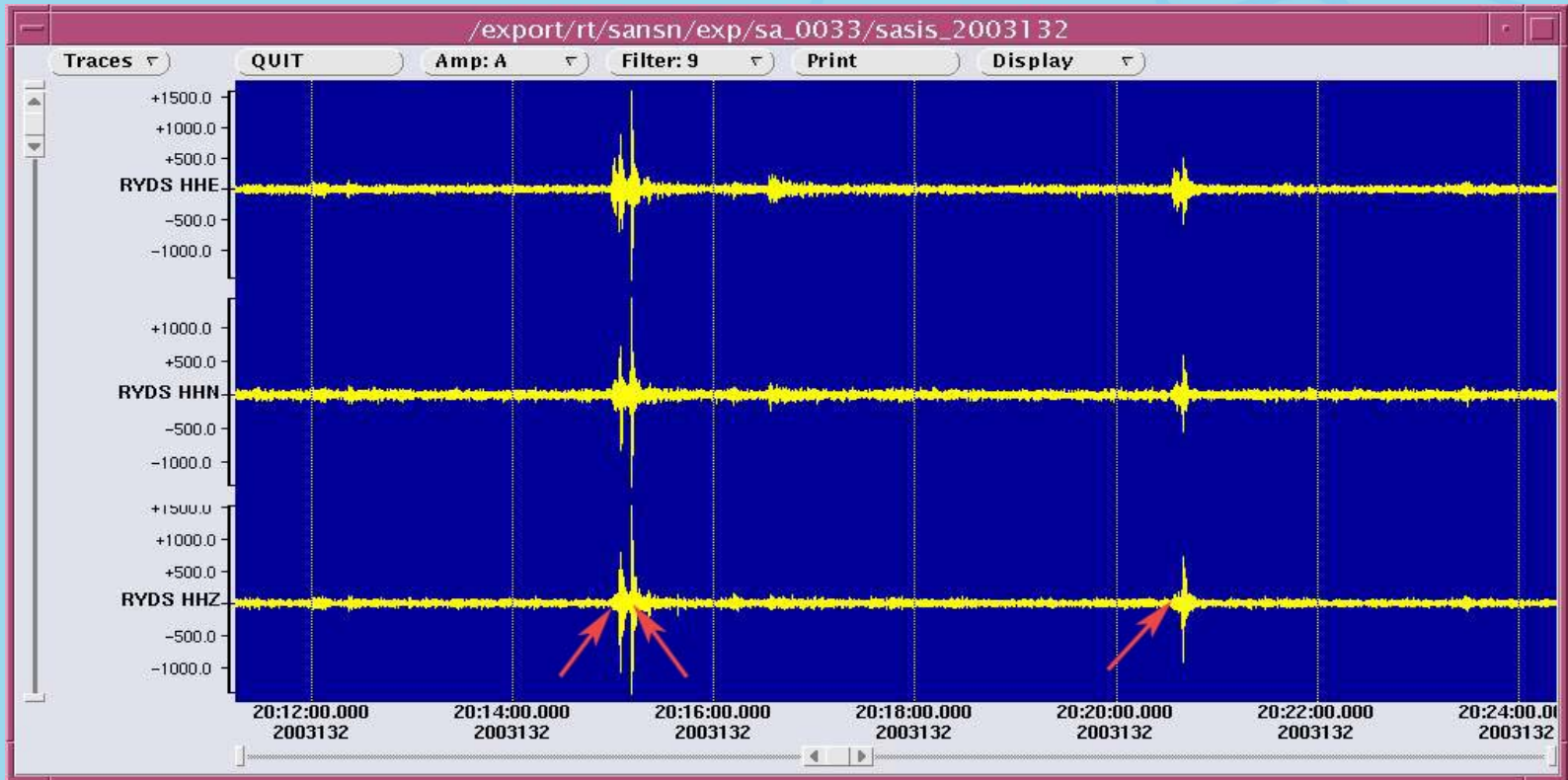
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- SG_KFJS_BHZ
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- SG_ASYS_BHZ
- SG_BTHS_BHZ
- SG_FRAS_BHZ
- SG_LYLS_BHZ
- SG_SLWS_BHZ
- SG_SHBS_BHZ
- sa_TATS_HHZ
- SG_BLJS_VHZ
- SG_NAMS_VHZ
- SG_WBHS_BHZ
- SG_LTHS_VHZ

- SG_DJNS_VHZ
- SG_JAZS_BHZ
- SG_FRSS_VHZ

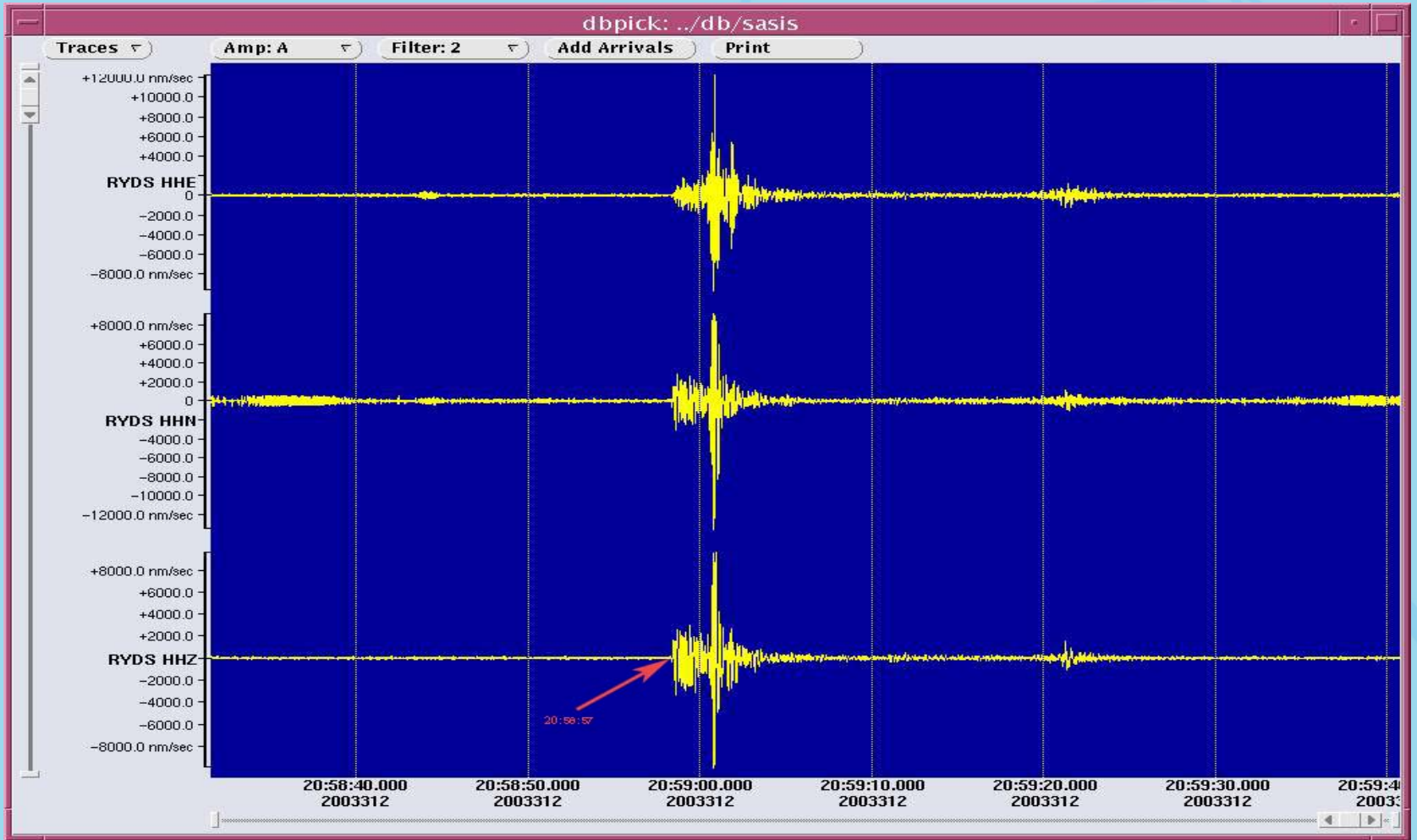


Waveform of Dead Sea Earthquake

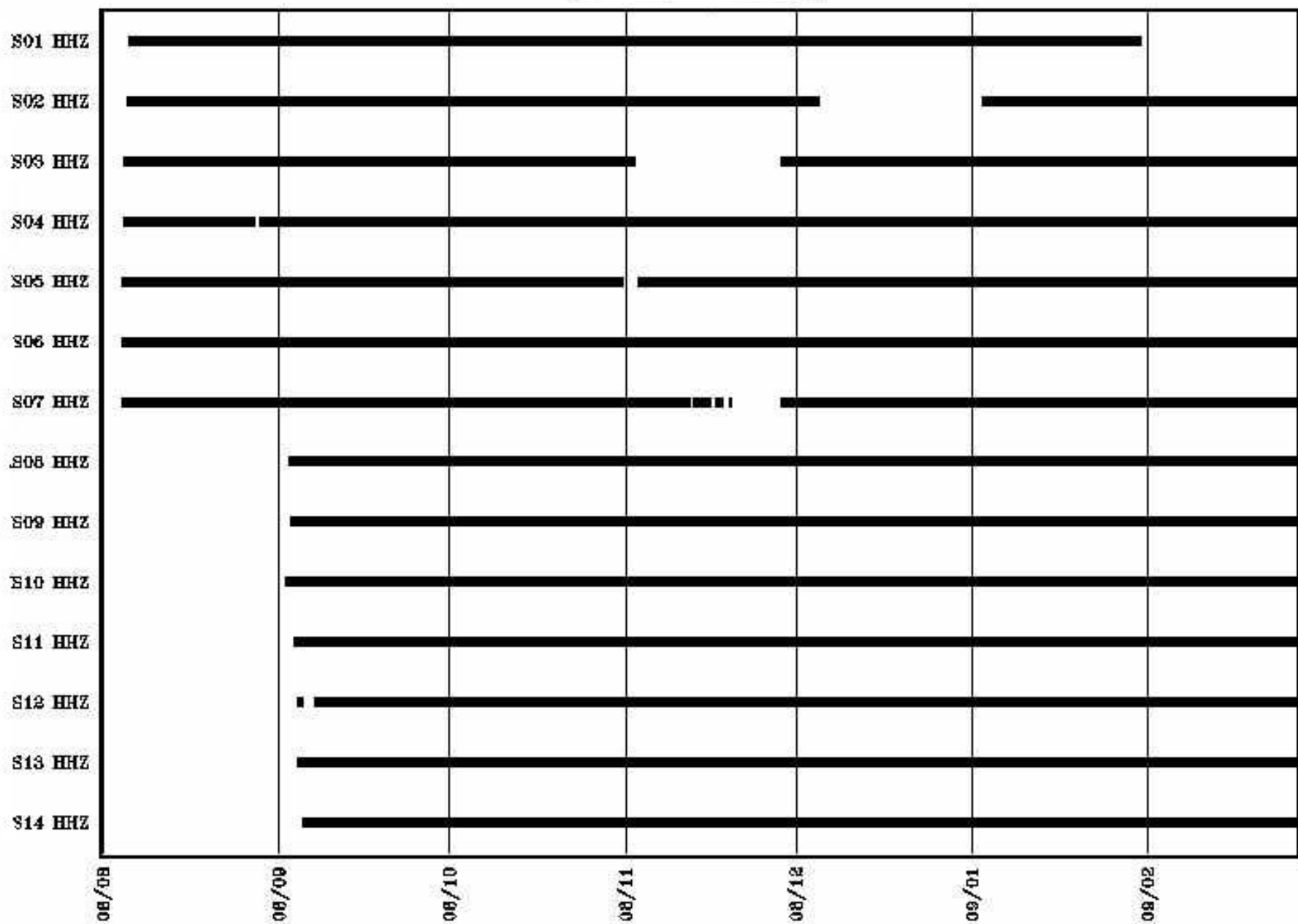




تسجيل يوضح التفجيرات يوم الاثنين الموافق 2003/5/12

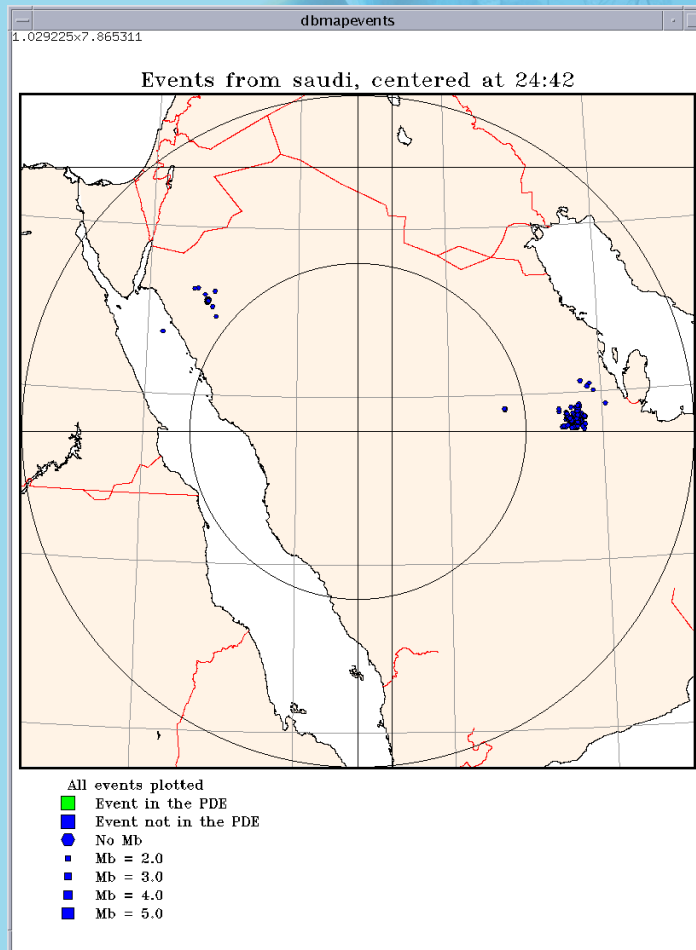


تسجيل لحادثة تفجير مجمع المحيا غرب الرياض الموافق 2003/11/8



Projects

Haql, Haradh, Tabok, Riyadh



- 4 SUN WORKSTATION

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- 11 Q330

معهد بحوث الذكاء الاصطناعي والروبوتات فيزياء

- 6 Q330HR

- 26 BALER 14

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Riyadh Project(site effect)

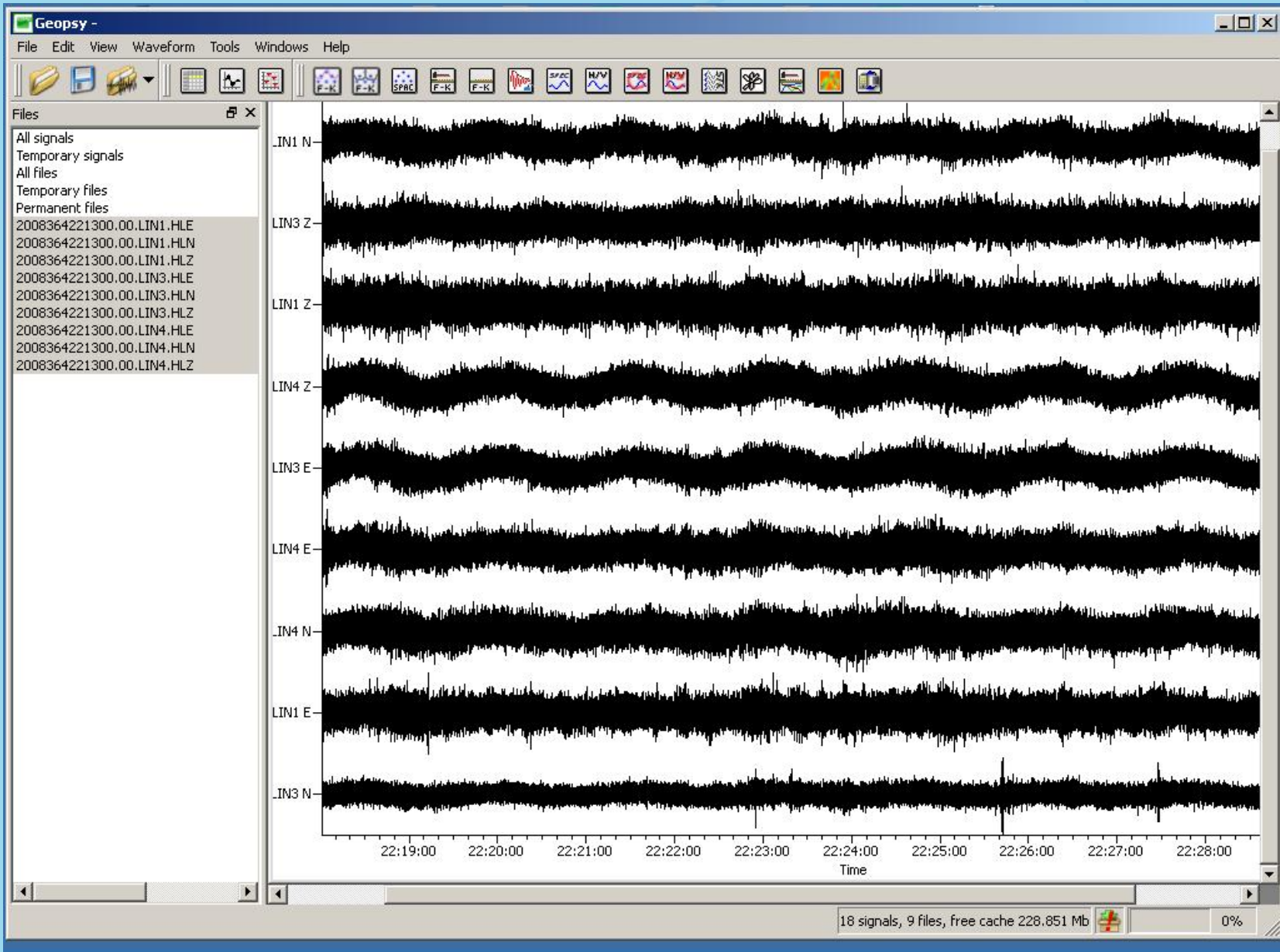


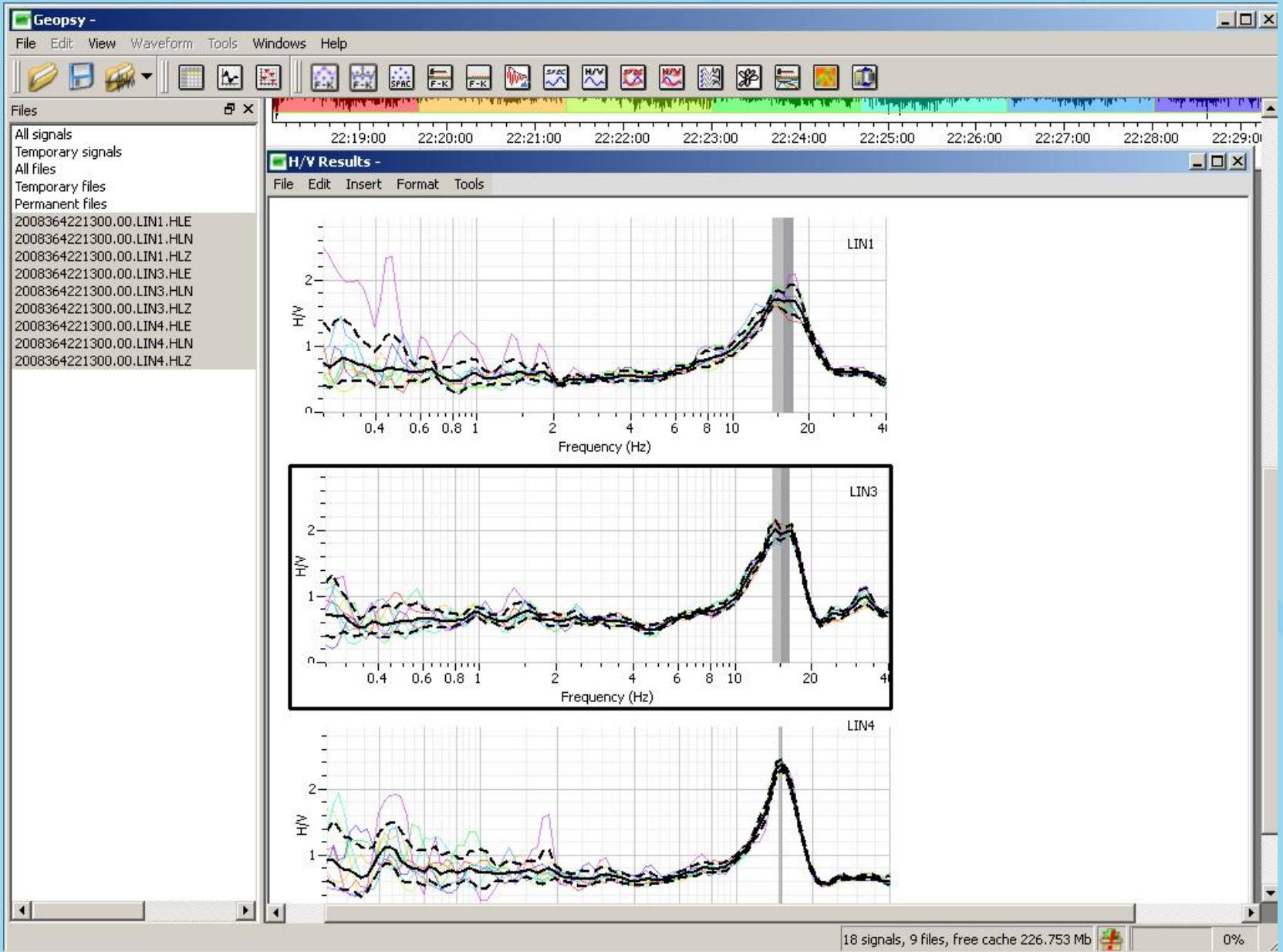












Traces ▾

Amp: A ▾

File: 2.0-15.0 F

Add Arrivals

Add Time Mrk

+3500.0 nm/sec
+3000.0
+2500.0
+2000.0
+1500.0
+1000.0
+500.0
STAI HHZ
-1000.0
-1500.0
-2000.0
-2500.0
-3000.0
-3500.0 nm/sec

+Pg **P**

+Sg **S**

+60.0 cts
+50.0
+40.0
+30.0
+20.0
STAI HLE
-10.0
-20.0
-30.0
-40.0
-50.0 cts

+Pg

+Sg

+80.0 cts
+70.0
+60.0
+50.0
+40.0
+30.0
+20.0
STAI HLN
0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0 cts

+Pg

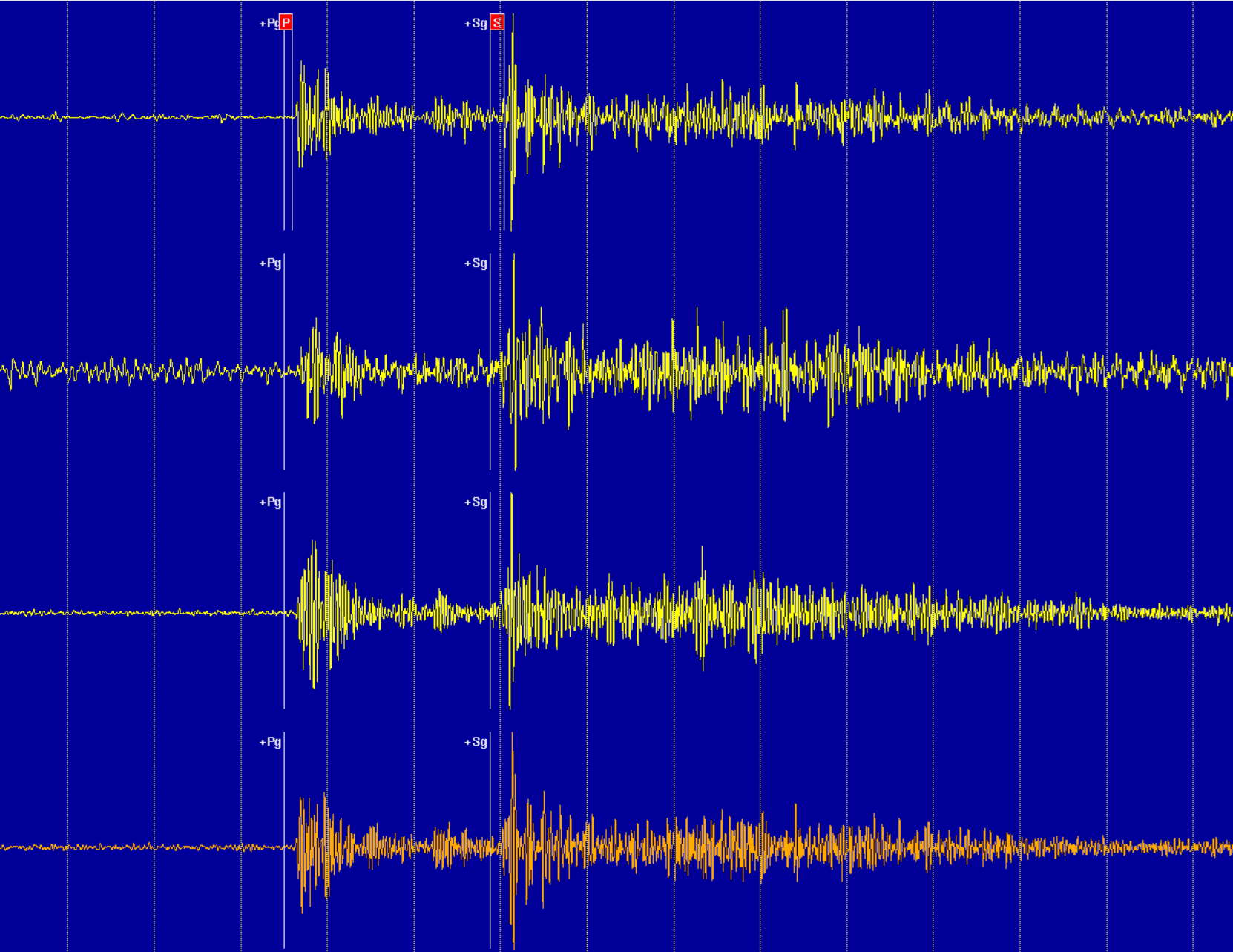
+Sg

+60.0 cts
+50.0
+40.0
+30.0
+20.0
STAI HLZ
-10.0
-20.0
-30.0
-40.0
-50.0 cts

+Pg

+Sg

19:51:56.000 19:52:00.000 19:52:02.000 19:52:04.000 19:52:06.000 19:52:08.000 19:52:10.000 19:52:12.000 19:52:14.000 19:52:16.000 19:52:18.000 19:52:20.000 19:52:22.000 19:52:24.000
2008304 2008304 2008304 2008304 2008304 2008304 2008304 2008304 2008304 2008304 2008304 2008304 2008304 2008304



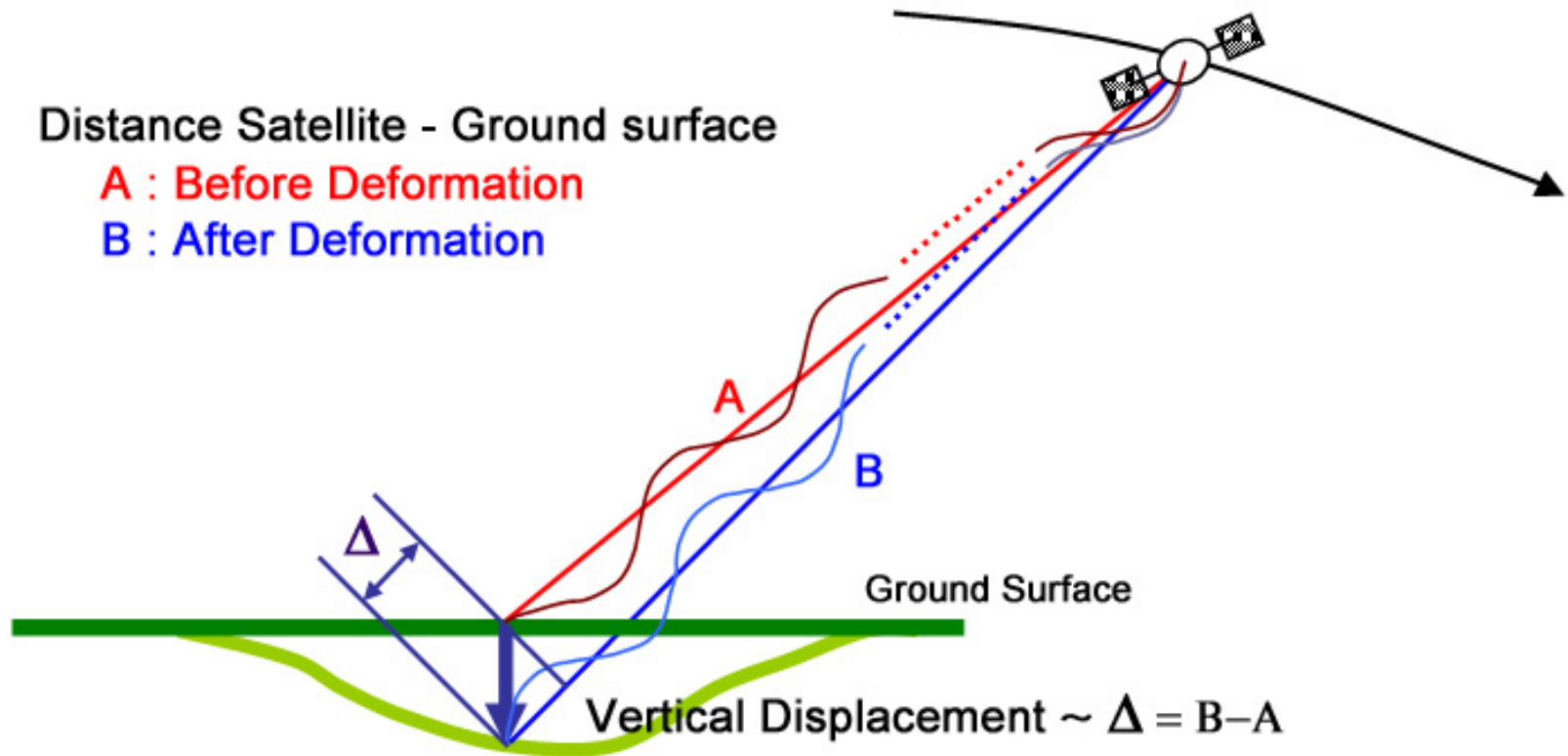
Possible Scenarios

- The change setting of stress magnitude by oil extraction or water injection (Pennington et al 1986)
- The second case is fault triggering by change in regional stress state.
- Induced faulting associated with fluid withdrawal.

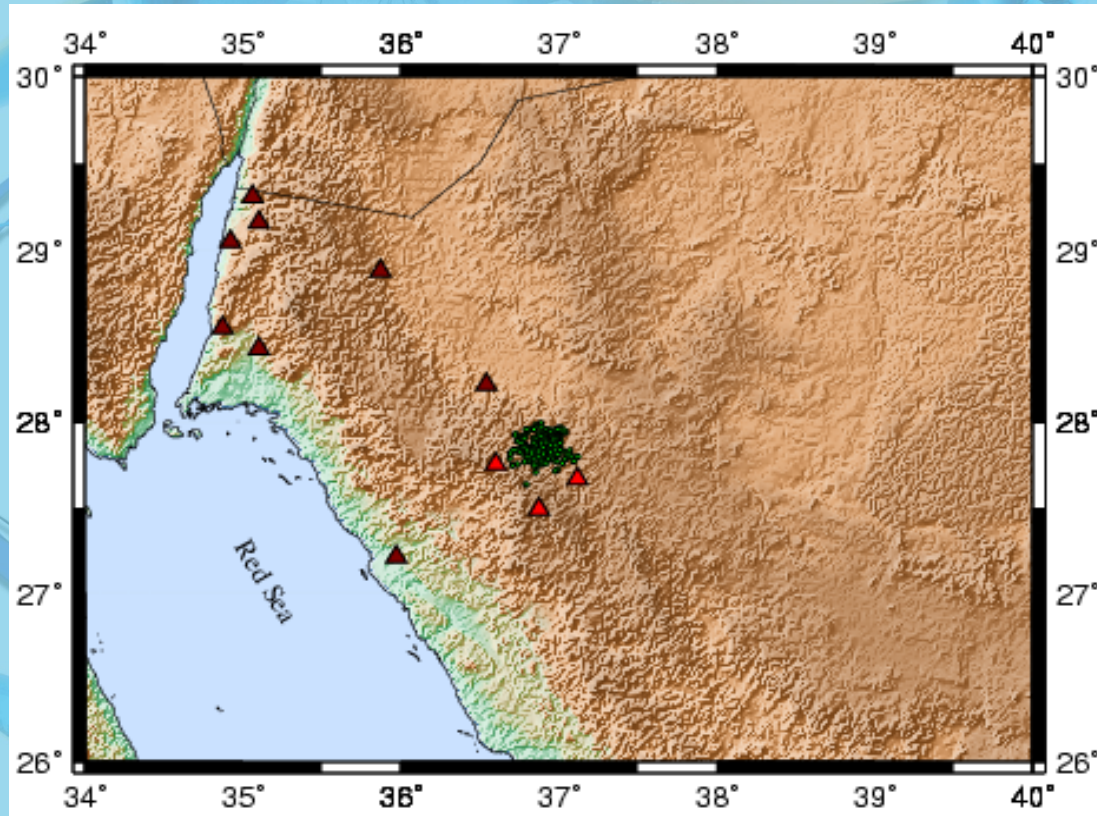
Distance Satellite - Ground surface

A : Before Deformation

B : After Deformation

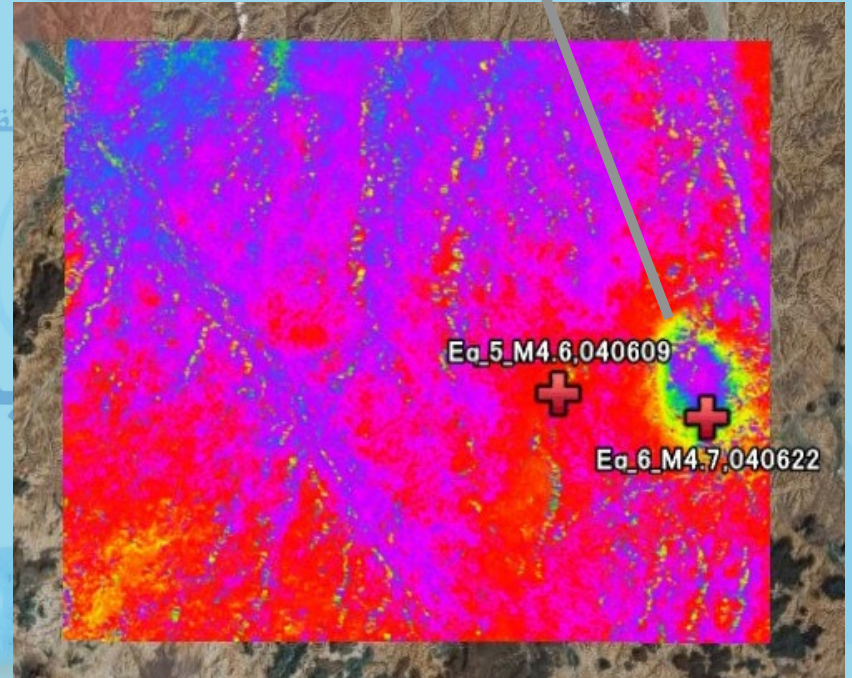


Seismicity Near Tabouk



Preliminary Results

Tabouk City ~ 70 km



20 km

Earthquake M4.6 2004.6.09

Earthquake M4.7 2004.6.22

Additional steps

- Dense coverage seismic network to monitor passive seismicity in Haradh
- Detailed correlation of seismicity in space and time with the production of oil.
- observation of any subsidence using Differential Synthetic Aperture Radar interferometry (InSAR) measurement.
- Joining GPS data.

In summary

- The national seismic network completed but expanding
- The western & eastern region are well covered now
- Internet connection to get real time data
- We are now focusing on the passive seismicity too

Thank you.

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