Recent Improvements on the Broadband Seismic Network of Iran (Implementing tuned Seiscomp3 and Automatic Online Moment Tensor Inversion)

By:
Saeed SoltaniMoghadam, Gholam Javan Doloei

Outline

Topics:

1- Why Iran needs a seismological network?

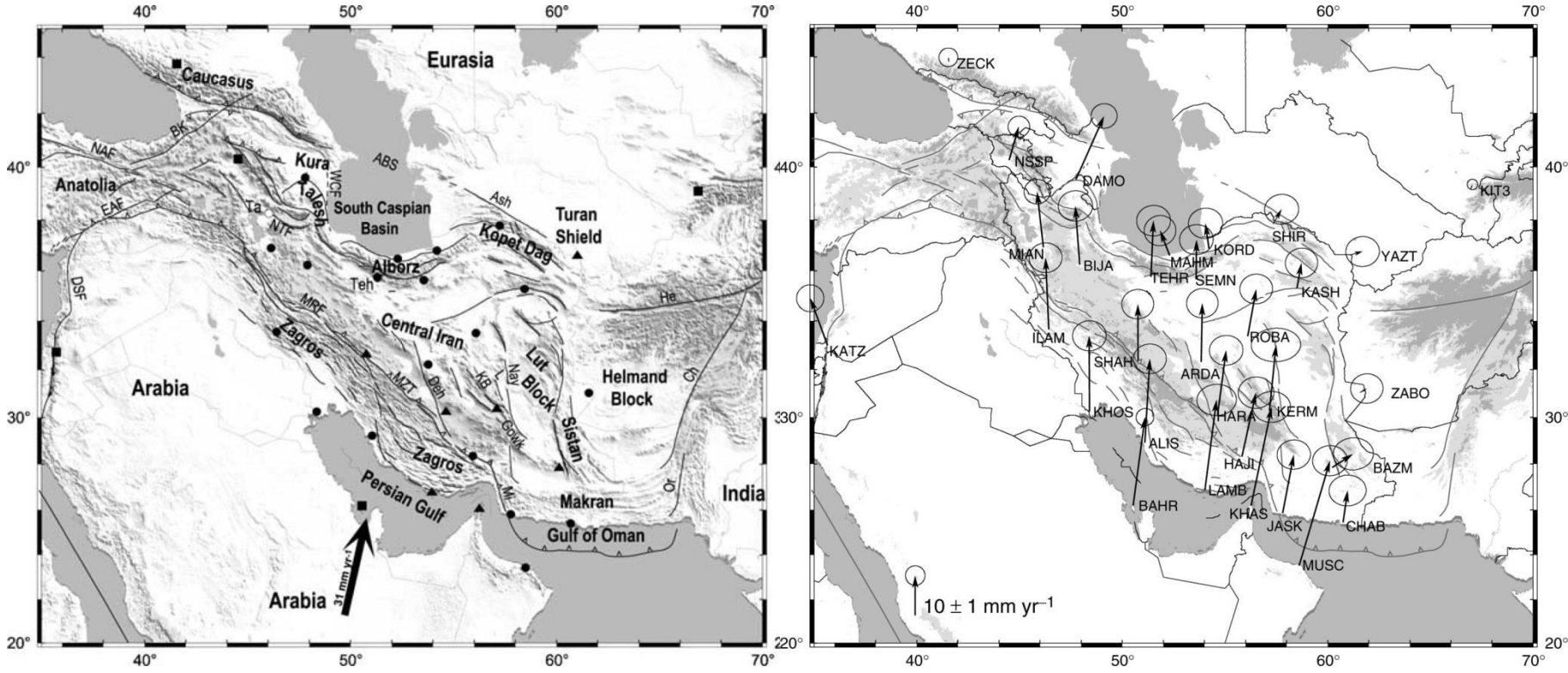
2- A quick review on Iran National Seismic Network (INSN).

3- Implementing tuned Seiscomp3 in INSN.

4- Automatic Online Moment Tensor Inversion program.

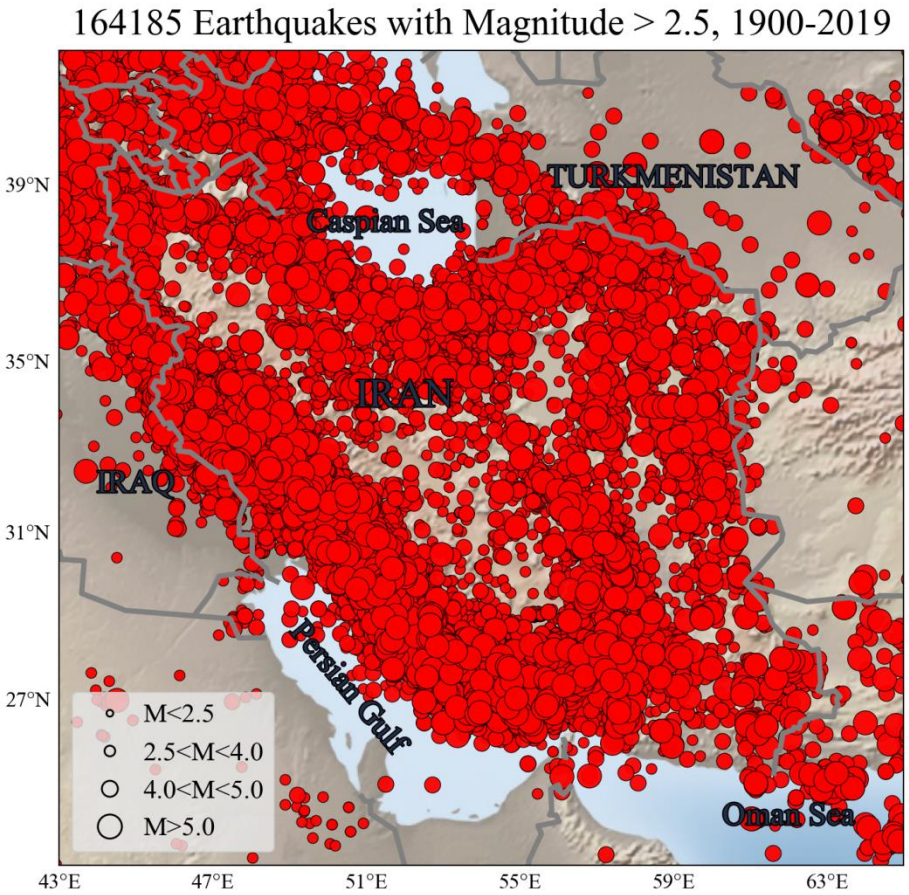
5- Conclusions.

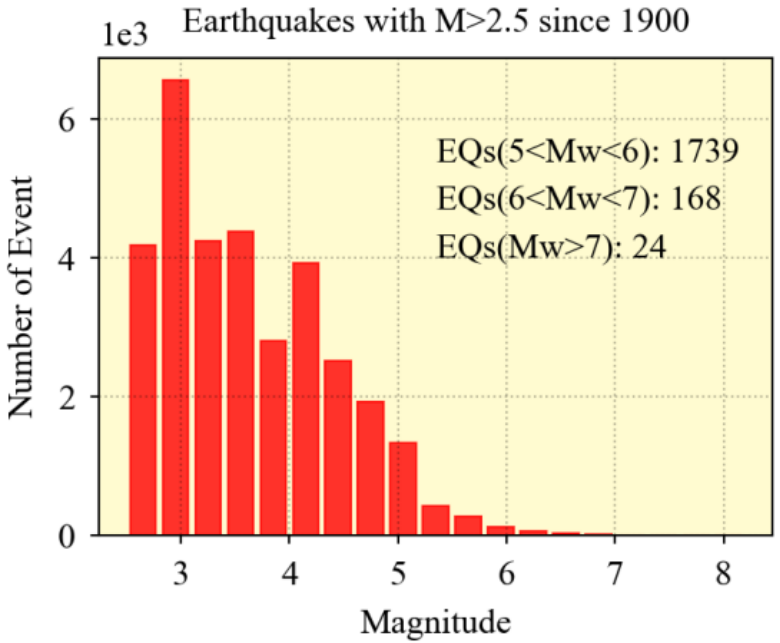
Why Iran Needs a Seismological Network?



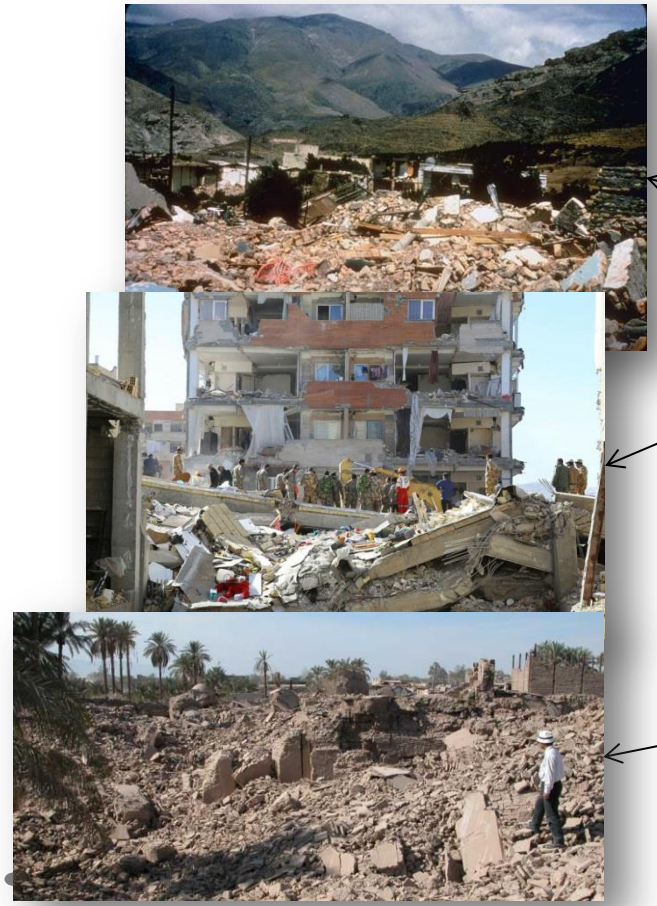
Present-day crustal deformation and plate kinematics in the Middle East constrained by GPS measurements in Iran (Vernant et al. 2004)

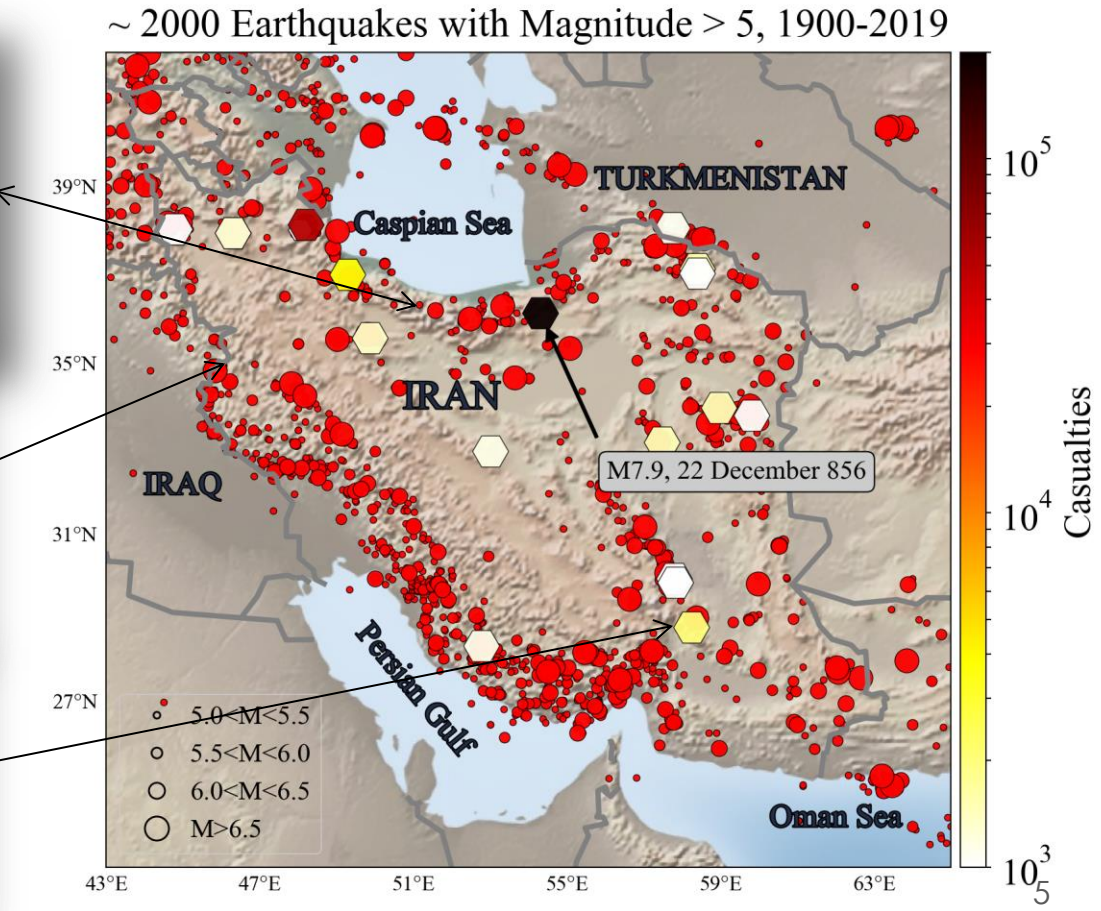
Why Iran Needs a Seismological Network?



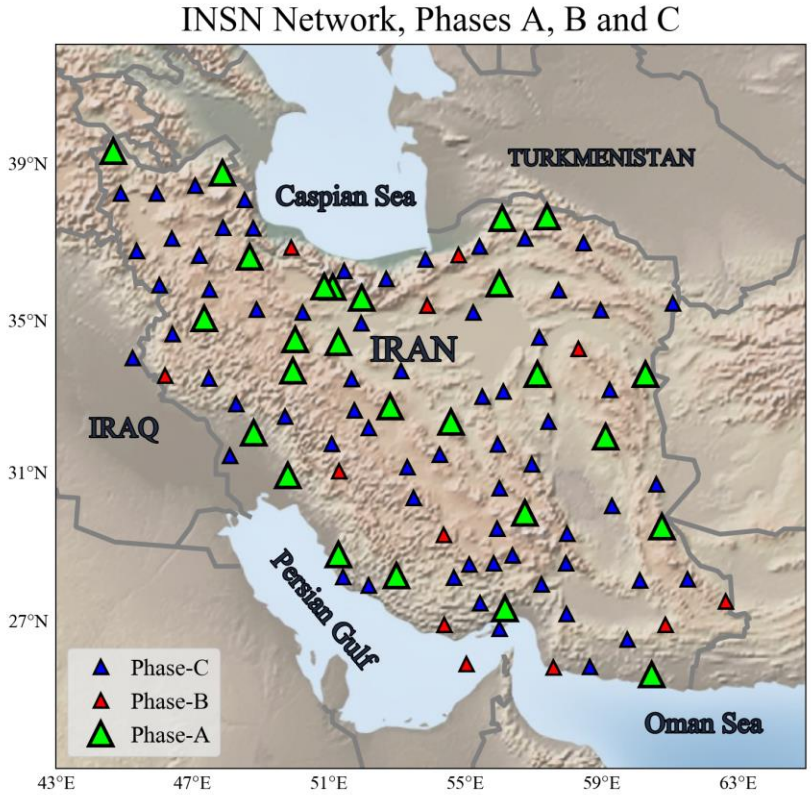


Why Iran Needs a Seismological Network?

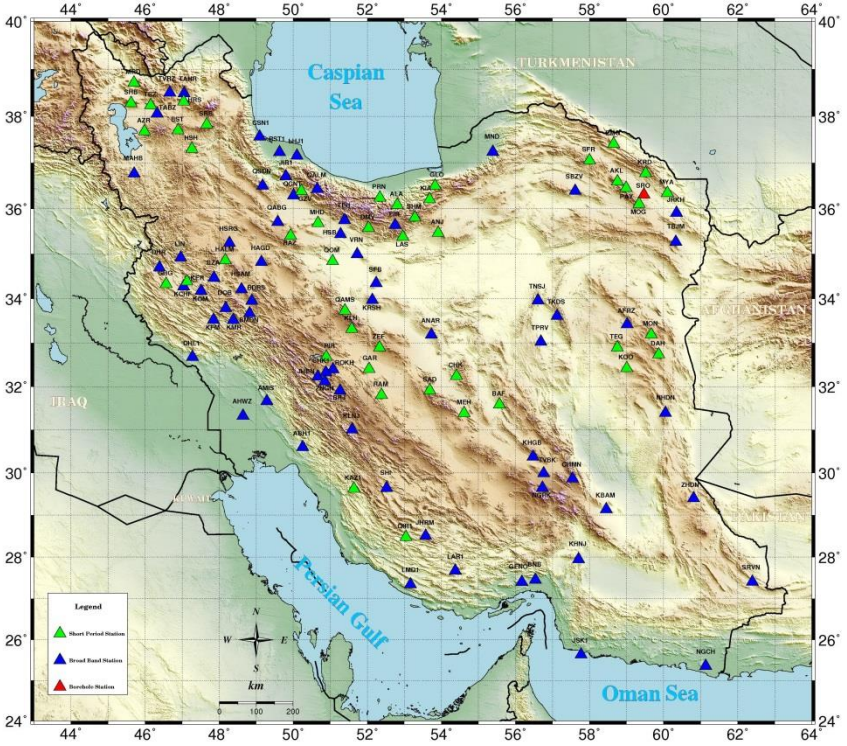




Two Networks, Two Goals!

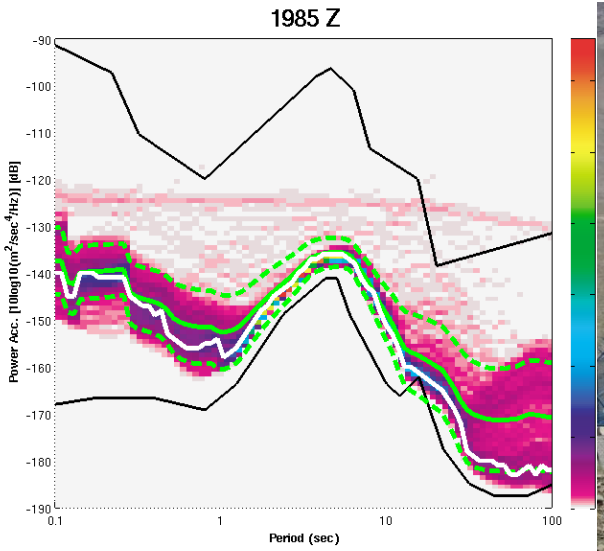


INSN

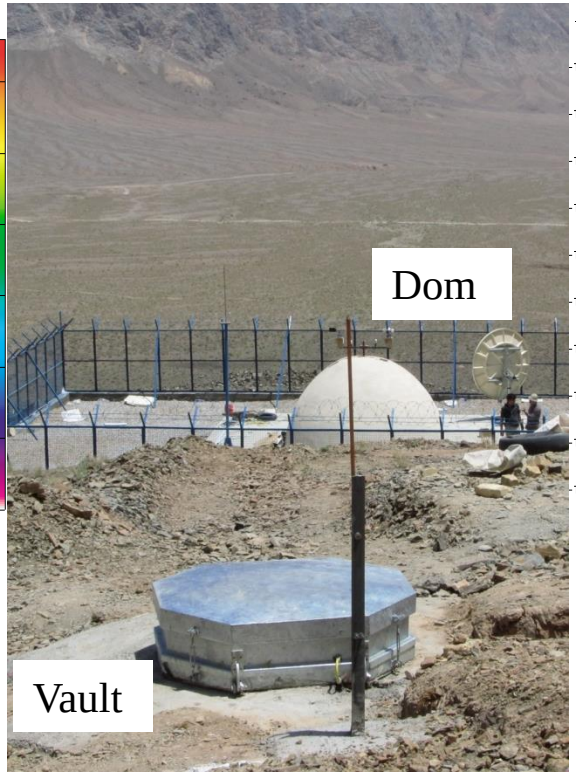


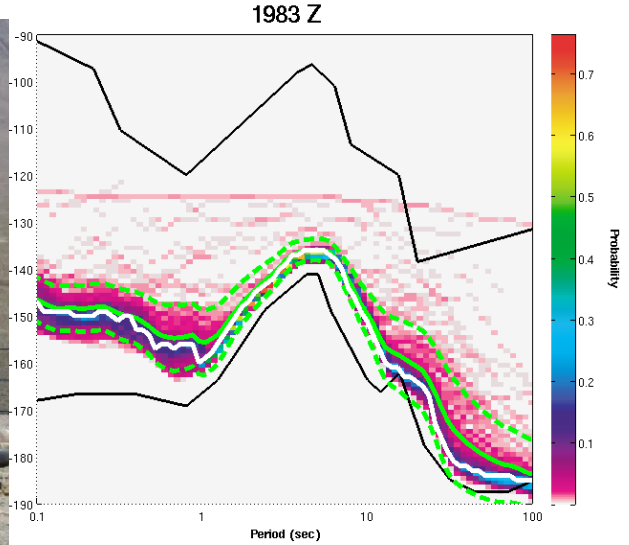
Iran Seismological Center (IRSC)

Site selection, preparation and installation of seismic station



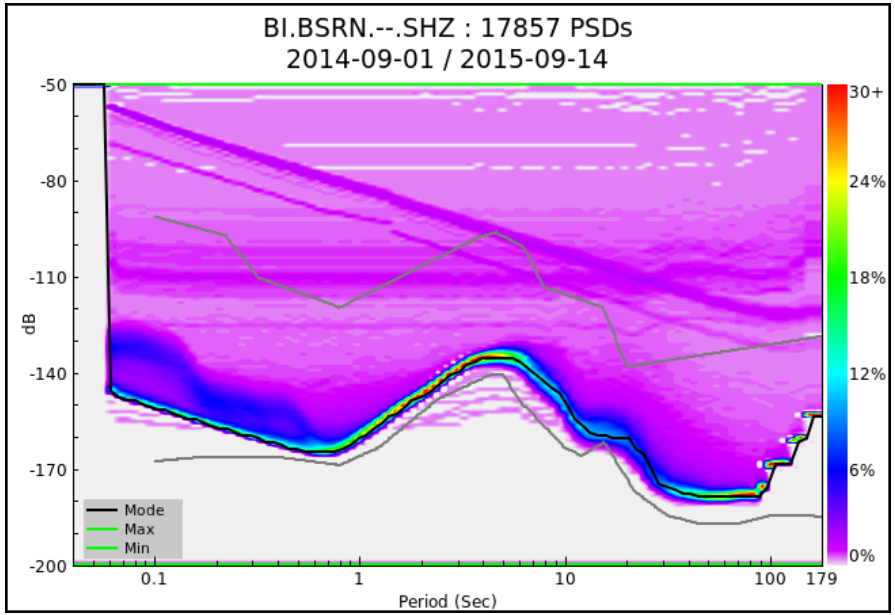
Inside Dom



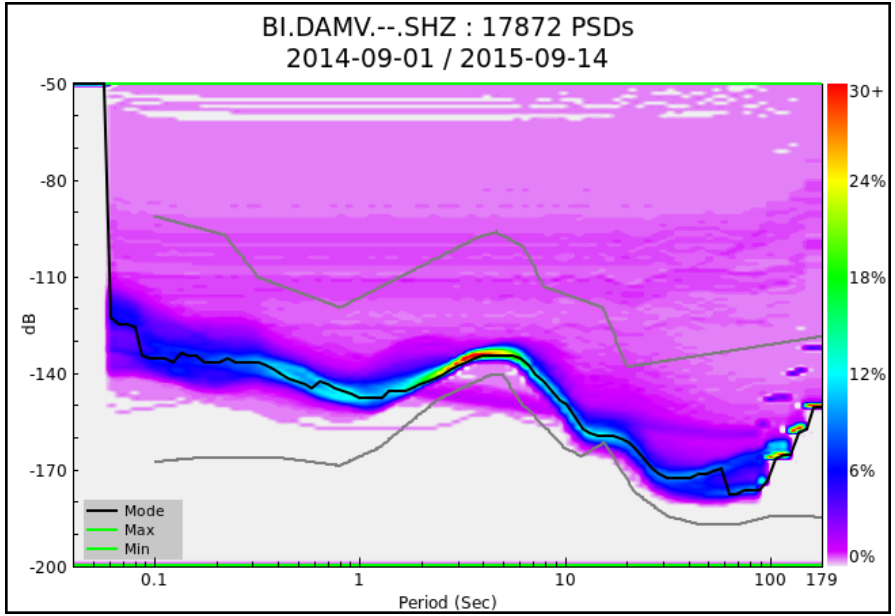


Inside Vault

PPSD a noise measurement for site quality control checks



Basiran station (Central Iran)

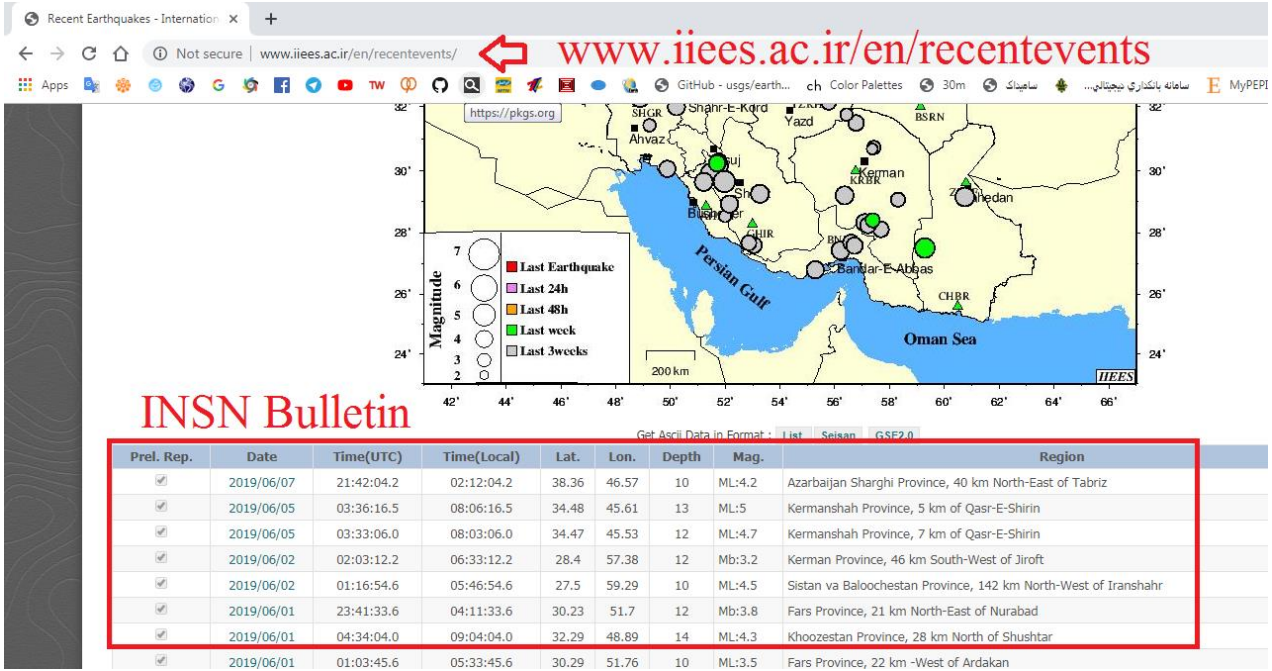


Damavand station (Northern and Central Iran).

INSN Bulletin

1- Bulletin of Earthquakes Information;

2- Earthquake Catalogue;

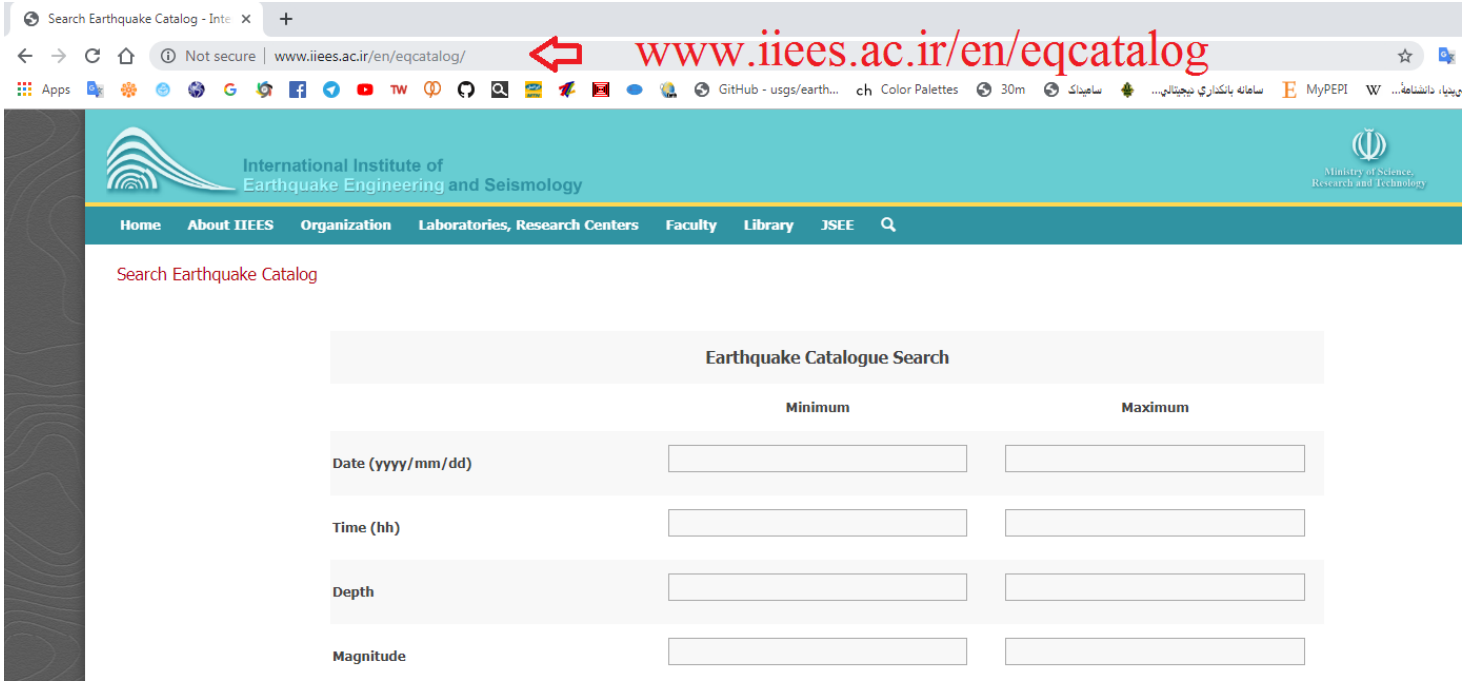


Prel. Rep.	Date	Time(UTC)	Time(Local)	Lat.	Lon.	Depth	Mag.	Region
☑	2019/06/07	21:42:04.2	02:12:04.2	38.36	46.57	10	ML:4.2	Azarbaijan Sharghi Province, 40 km North-East of Tabriz
☑	2019/06/05	03:36:16.5	08:06:16.5	34.48	45.61	13	ML:5	Kermanshah Province, 5 km of Qasr-E-Shirin
☑	2019/06/05	03:33:06.0	08:03:06.0	34.47	45.53	12	ML:4.7	Kermanshah Province, 7 km of Qasr-E-Shirin
☑	2019/06/02	02:03:12.2	06:33:12.2	28.4	57.38	12	Mb:3.2	Kerman Province, 46 km South-West of Jiroft
☑	2019/06/02	01:16:54.6	05:46:54.6	27.5	59.29	10	ML:4.5	Sistan va Baloochestan Province, 142 km North-West of Iranshahr
☑	2019/06/01	23:41:33.6	04:11:33.6	30.23	51.7	12	Mb:3.8	Fars Province, 21 km North-East of Nurabad
☑	2019/06/01	04:34:04.0	09:04:04.0	32.29	48.89	14	ML:4.3	Khoozestan Province, 28 km North of Shushtar
☑	2019/06/01	01:03:45.6	05:33:45.6	30.29	51.76	10	ML:3.5	Fars Province, 22 km -West of Ardakan

INSN Bulletin

1- Bulletin of Earthquakes Information;

2- Earthquake Catalogue (Formats: Plain Text, NORDIC, GSE2);



Rapid Assessment of Iran Seismic Event (RAISE)

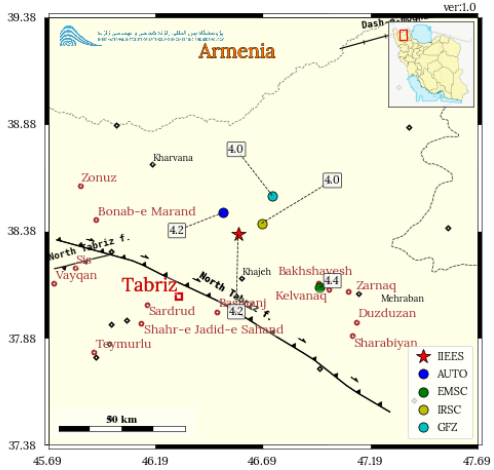
Additional Information

Not secure | www.iiees.ac.ir/raise/p01906_emg0205/page2_en.html ⇦ www.iiees.ac.ir/en/raise

International Institute of Earthquake Engineering and Seismology

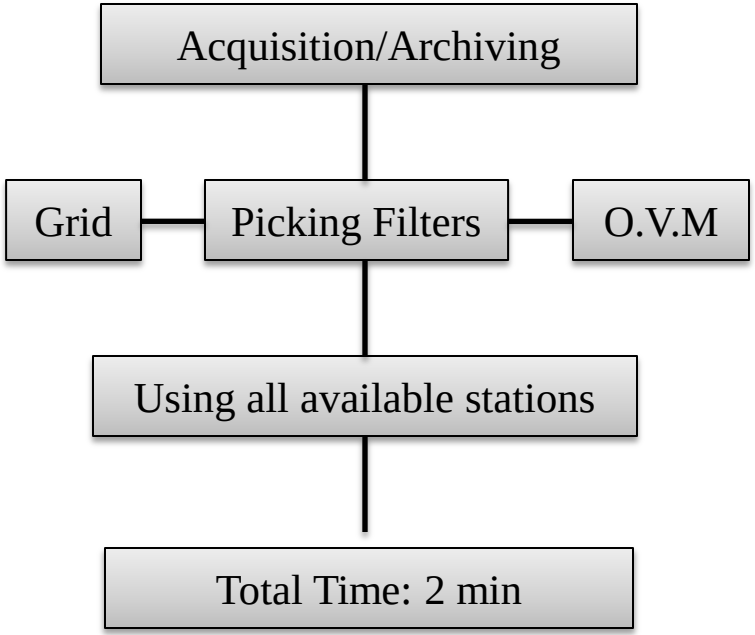
Fa Previous Page

Origin Time (UTC): 2019-06-07 21:42:04
Region: Varzaghan , East Azarbaijan Province
Magnitude: 4.2
Latitude: 38.36
Longitude: 46.57
Depth: 10.0
Process: manual

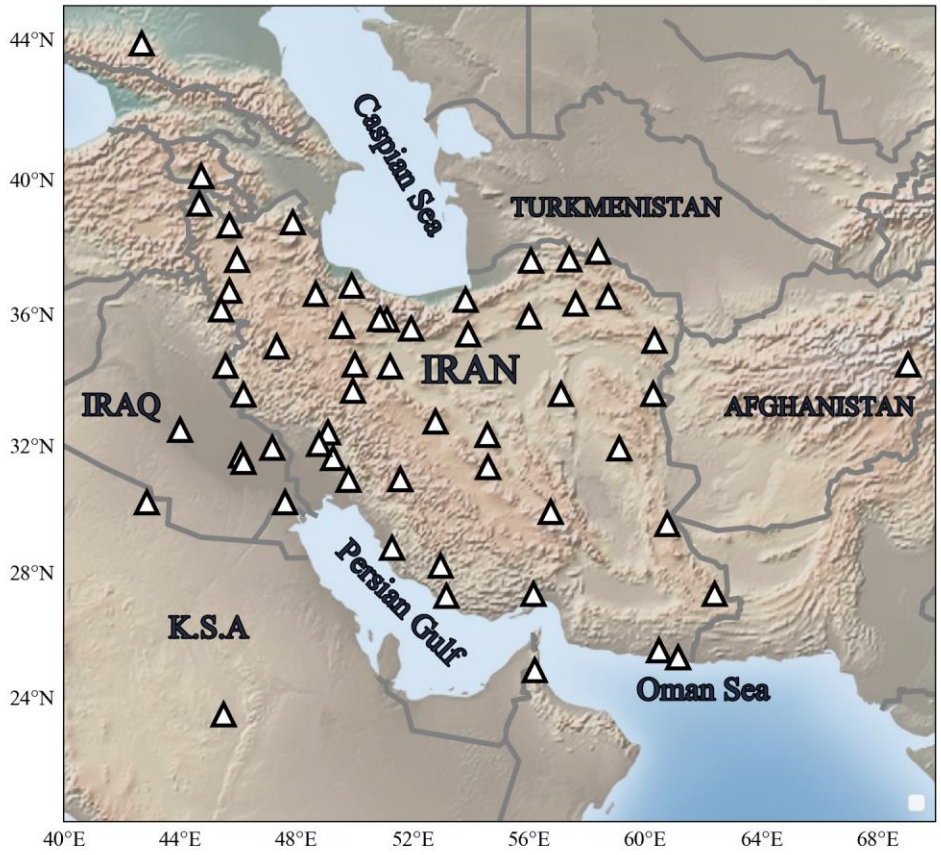


Affected Population | Historical Events | Seismicity Map | Shake Map | Focal Mechanism

Seiscomp3. since 2016



66 Seismic Stations In-Used Via Seiscomp3



Sending Email and SMS

New Event

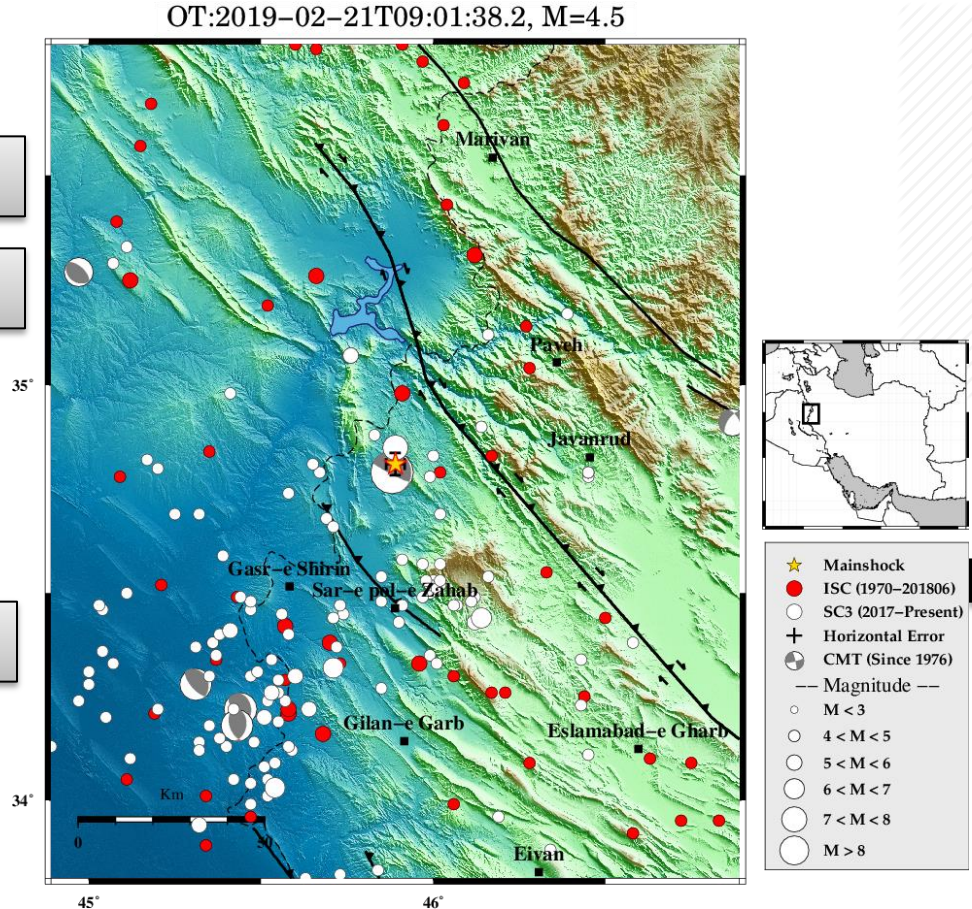
Preparing GMT map

Preparing SMS Text

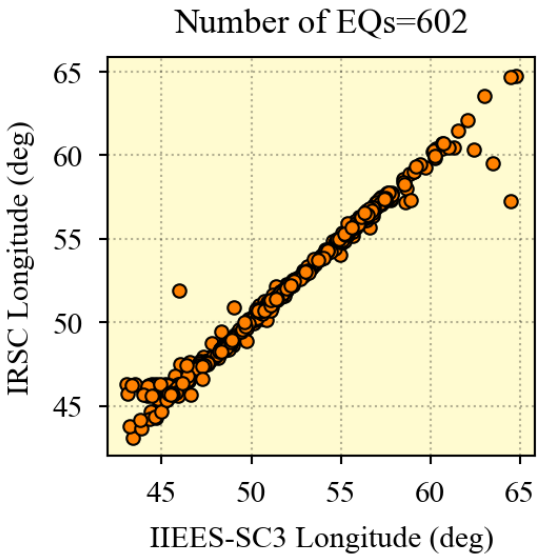
Sending 55 Emails

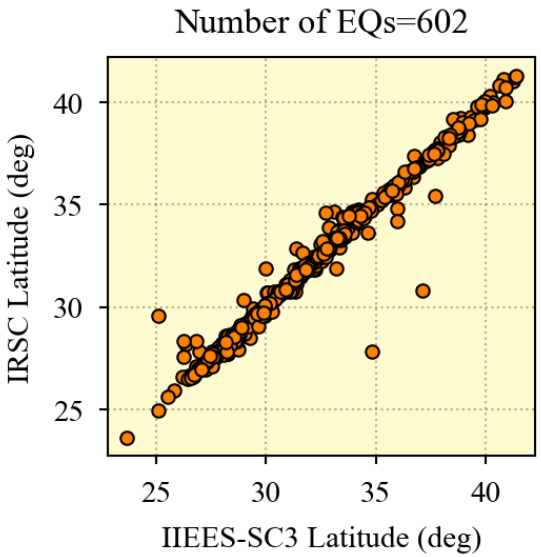
Sending 55 SMS

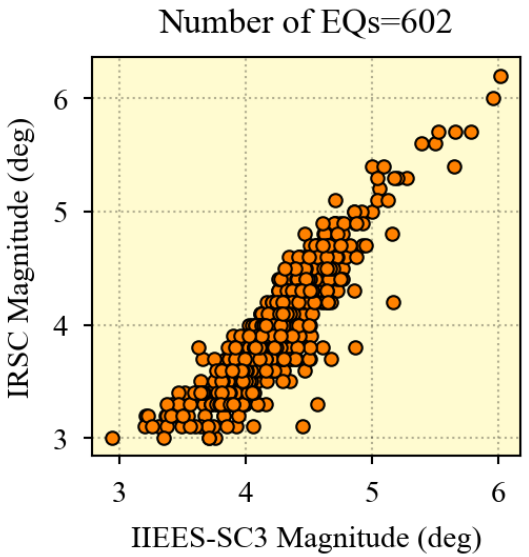
Total Time: 10 min



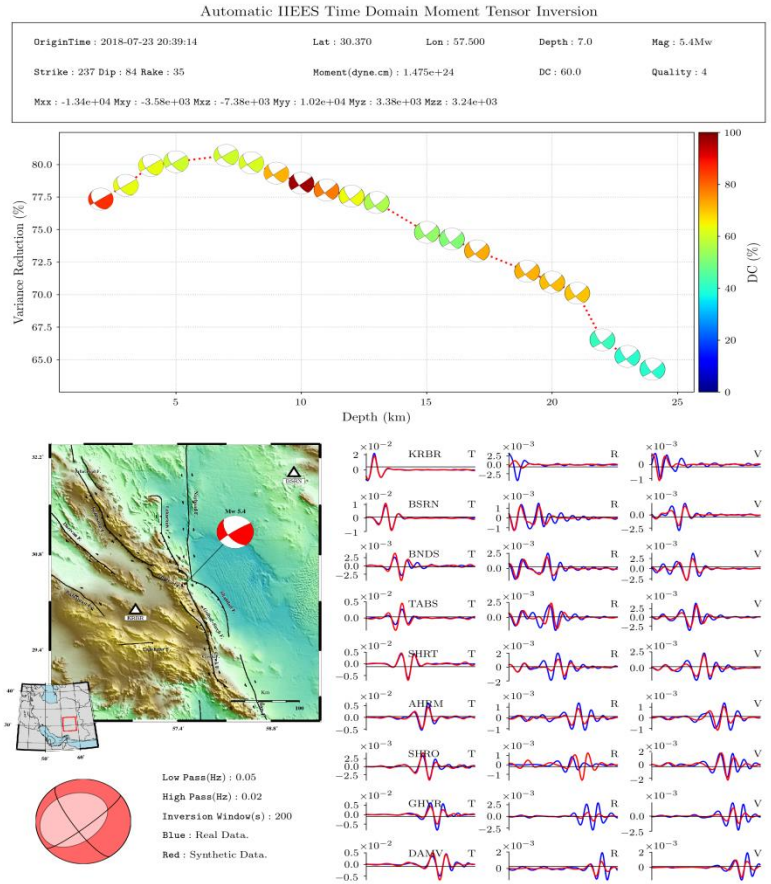
Seiscomp3 Performance

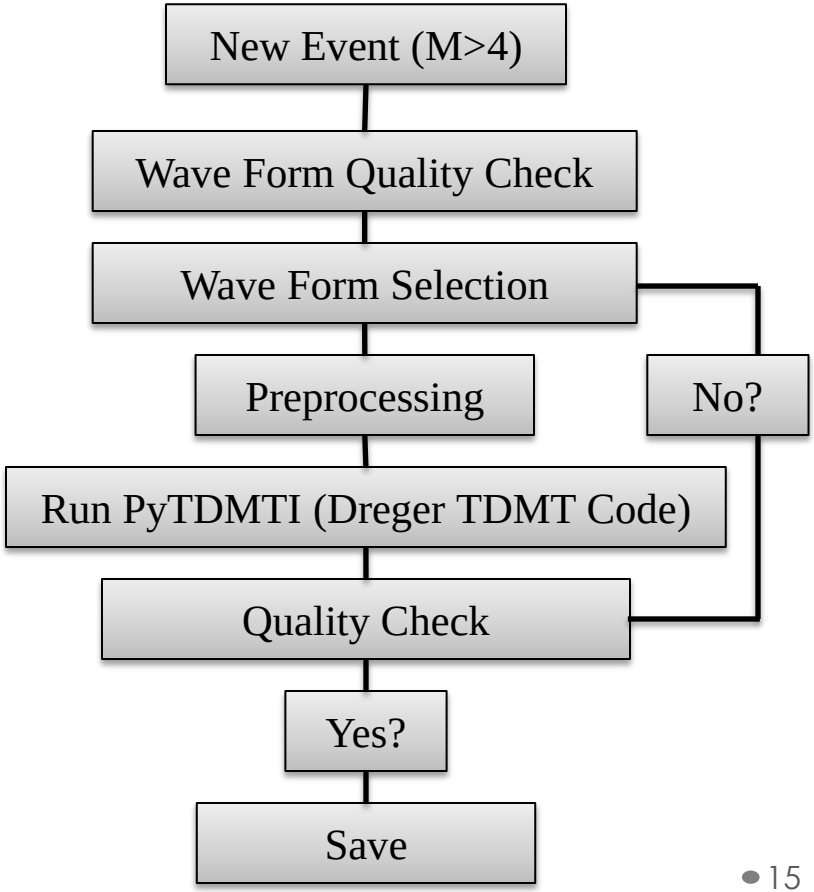




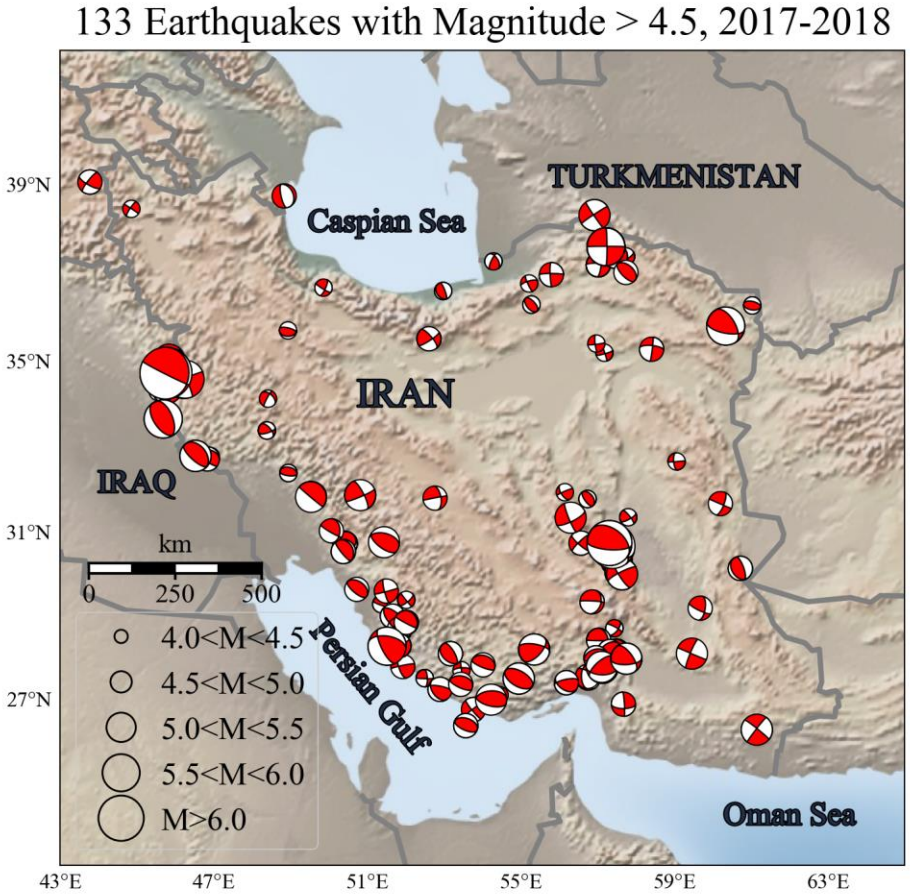


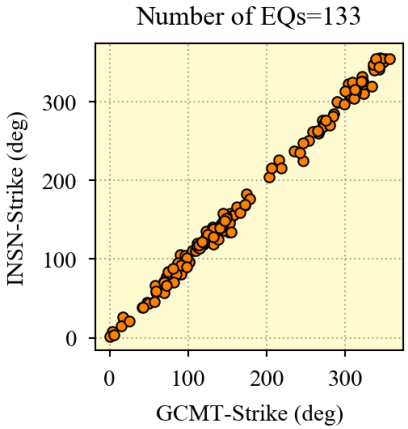
Automatic Online Moment Tensor Solution

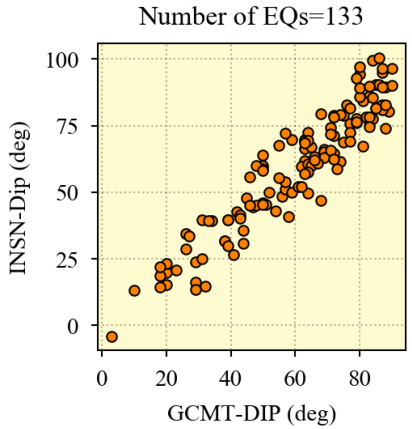


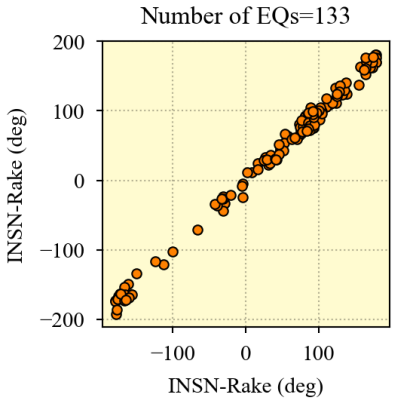


Automatic Online Moment Tensor Solution

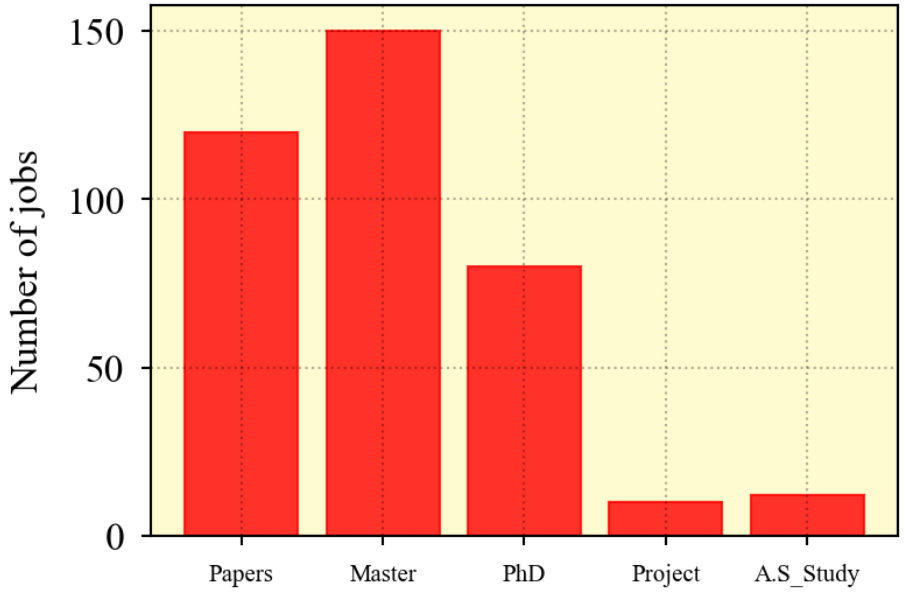


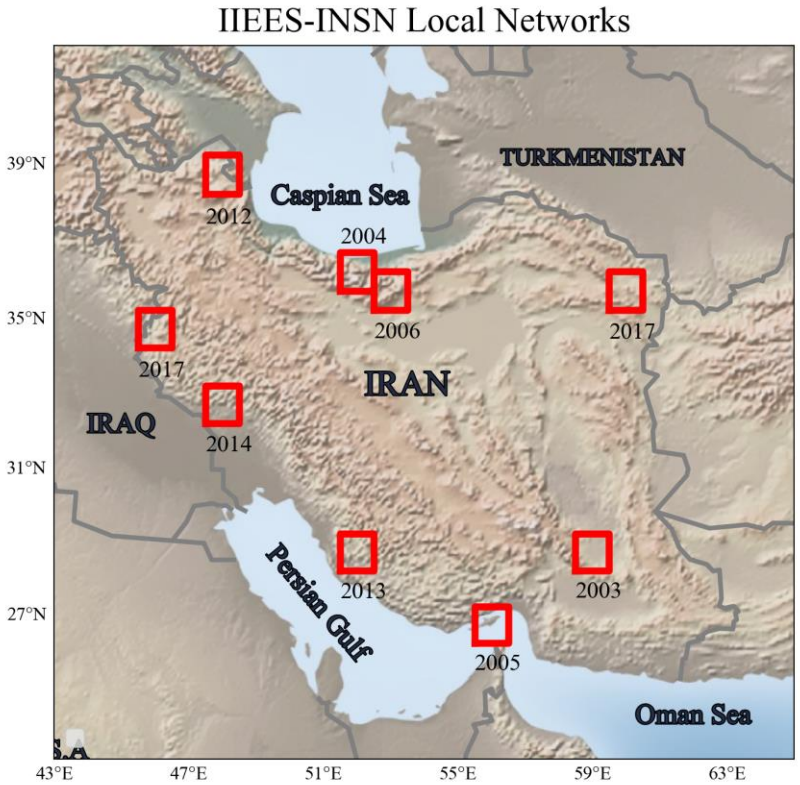






Scientific research and projects





Conclusions

- Total number of active seismic station in INSN is reached 29. We hope the phase-B will be reached on 2025 (Total 54).

- RAISE is very light version of our website for getting information more quickly and informative than before.

- Using Seiscomp3, all earthquakes with M>4.5 are processing automatically using 29 INSN stations and extra 37 stations belongs to other networks. This yields **reduction in uncertainties** for earthquake location parameters.

- Automatic Online Moment Tensor Inversion are developing and helps to better understanding of major earthquake source parameters.

Thanks for your Attention!