

3-d modeling of the Tehran alluvial deposits: impact on seismic risk assessment

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Tehran, the capital of Iran, is located in a region of very high seismicity due to the existence of several very large active faults. Also, the city is built on a very thick alluvial deposit coming from the Alborz Mountains Range, giving the possibility to amplify the seismic waves.

Haghshenas (2005) suggested that such amplification is caused by the existence of thick alluvial deposits associated to a large impedance contrast at large depth and the presence of strong lateral discontinuities leading to multidimensional site effects.

The present project is proposed to answer two main questions:

What is the real geometry of the Tehran basin?

What are the physical/geotechnical properties of the Tehran basin?

In order to better understand and predict effects of geometrical and mechanical properties of the Tehran basin on surface ground motions, we developed a 3D shear-wave velocity model of Teheran's basin by integrating all available geophysical, seismological and geological data. Finally this model will be used for computational 3D simulation of seismic motion.

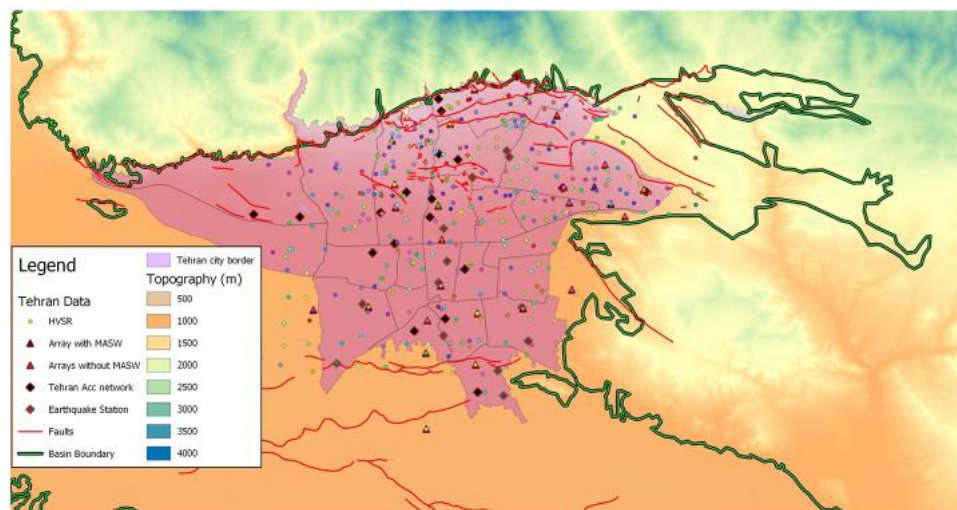


Fig 1. Data collected during the project (2015 – 2020)

Conferences:

- Soltani S., Haghshenas E., Guillier B., Cornou C (2019) 3-d modeling of the Tehran alluvial deposits using Active and Passive measurements: Preliminary results of Tehran experiments. Trans-disciplinary Research on Iranian Geology, Geodynamics, Earthquakes and Resources, Zanjan, Iran
- Soltani S., Haghshenas E., Guillier B., Cornou C (2019) The necessity of 2D/3D site effect studies in big cities of Iran: Preliminary results of Tehran experiment. SEE 8, Tehran, Iran
- Soltani S., Haghshenas E., Javan Doloei Gh (2019) The efficiency of using 3 component Array-Based ellipticity methods for site Characterization
- Soltani S., Guillier B., Cornou C., Haghshenas E (2021) Building a 3 dimensional shear wave velocity structure of Tehran basin using Geophysical and Geological methods. 6th IASPEI / IAEE International Symposium: Effects of Surface Geology on Seismic Motion, March 15-17, 2021- Kyoto, Japan. Accepted...