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THE NORTH ZAGROS CRUSTAL STRUCTURE FROM TELESEISMIC REFLECTED P PHASE

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Continental crust in Iran has undergone different style of deformations during geological time. The gradual collision of India, Africa, and Arabia with the Eurasian plate caused the Alpine–Himalayan orogeny. The Zagros fold and thrust belt is located at middle of the Alpine–Himalayan mountain belt. It is one of the youngest and most active areas among collision zones in the Earth. Finding thickness of sediments and resolving geometry of near surface features employing teleseismic data is major goal of this study. The data were recorded by 39 seismic stations belonging to Zagros03 temporary seismic array (Paul et al., 2010) located between Ilam and Qom (Figure 1). The stations were installed by the International Institute of Earthquake Engineering and Seismology (IIEES) in Iran and the INSU–CNRS Research Center in France. The array length is ~400 km with average inter-station distance ~12 km. It crossed different tectonic areas including the Zagros Mountains, Sanandaj-Sirjan zone, Urumieh-Dokhtar magmatic arc and Central Iran. Here, we used 15 teleseismic earthquakes with magnitude greater than 5.1 and epicentral distance between 25˚ and 75˚. To identify the geometry of subsurface structures, source time function was removed by Autocorrelation Averaging method of Li and Nabelek (1999). The results reveal a velocity discontinuity at depth ~2-3 km below Zagros (marked by black line in Figure 2) extending steeply down to ~6 km below the Sanandaj-Sirjan zone. Another interesting discontinuity starts at depth of ~8 km below Zagros reaching depth of ~15 km below the Sanandaj-Sirjan zone (marked by black line in Figure 2). We interpret later boundary as the interface between sedimentary layer and crystalline basement beneath the Zagros Mountain.

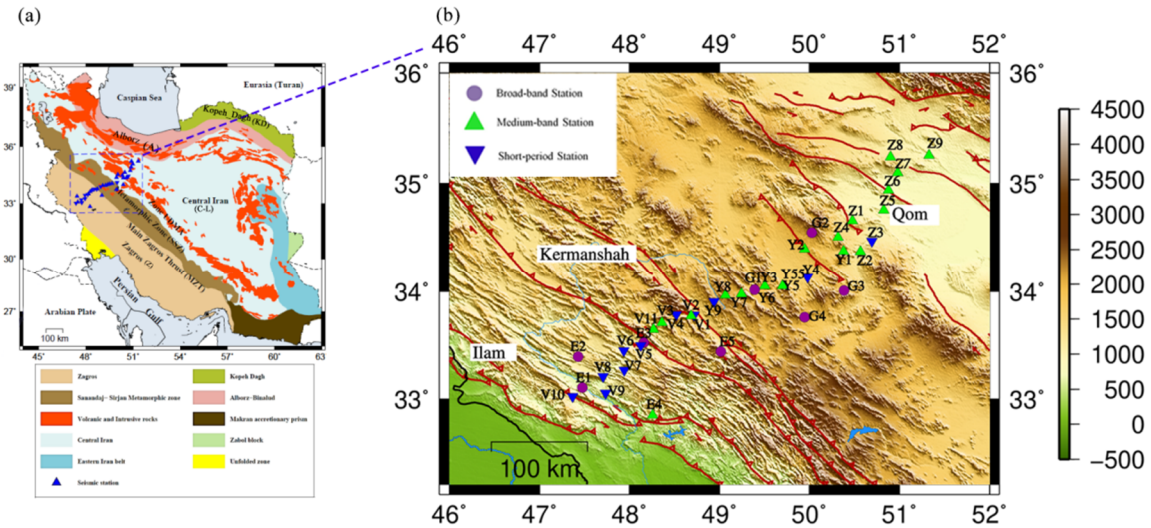

Figure 1. The main structural units of Iran: Zagros (Z), Sanandaj-Sirjan (SSZ), Alborz (A), Makran (M), Kopeh-dagh (KD), Central Iran and Lut Block (C-L). (b) Position of seismic stations.

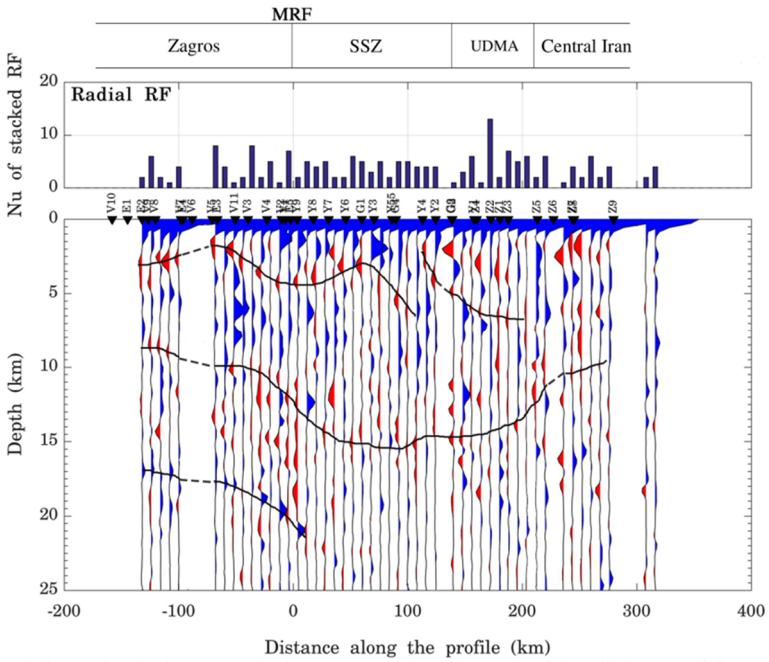

Figure 2. The boundary of discontinuity between the basement and sediment and the thickness of the sediments along the profile.

REFERENCES

Li, X.Q. and Nábělek, J.L. (1999). Deconvolution of teleseismic body waves for enhancing structure beneath a seismometer array. *Bulletin of the Seismological Society of America*, *89*(1), 190-201.

Paul, A., Hatzfeld, D., Kaviani, A., Tatar, M., and Péquegnat, C. (2010). Seismic imaging of the lithospheric structure of the Zagros mountain belt (Iran). *Geological Society, London, Special Publications*, *330*(1), 5-18.