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# Imaging Subsurface Structure of Central Zagros Zone/Iran Using Ambient Noise Tomography

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The Central Zagros zone, of west Iran & east Iraq, is surrounded by many active faults (including Main Zagros Reversed Fault, Main Recent Fault, High Zagros Fault, Zagros Fold, & Thrust Belt).

Recent studies show that cross-correlation of a long-term ambient seismic noise data recorded in station-pair, includes important information regarding empirical Green's functions (EGFs) between stations. Hence, ambient seismic noise carries valuable information of the wave propagation path (which can be extracted). The 2D model of surface waves (Rayleigh & Love) velocities for the studied area is obtained by seismic ambient noise tomography (ANT) method. Throughout this research, we use continuous records of all three vertical, radial, and tangential components (obtained by rotation) recorded by IRSC (Iranian Seismological Center) and IIEES (International Institute of Earthquake Engineering) networks for this area of interest. The IRSC & IIEES networks are equipped by SS-1 kinematics and Guralp CMG-3T sensors respectively. Data of 20 stations were used for 12 months from 2014/Nov. to 2015/Nov.

The performed data processing is similar to the one, put into words in detail by Bensen et al. (2007) including the processed daily base data. Mean, trend, and instrument response were removed and the data were decimated to 5 sps (sample per second) to reduce the amount of storage space and computational time required. We then applied merge to handle data gaps. One-bit time-domain normalization was also applied to suppress the influence of instrument irregularities and earthquake signals followed by spectral (frequency-domain) normalization between 0.05-0.2 Hz (period 5-20 sec). After cross-correlation (processing step), we perform rms stacking (new approach of stacking) to stack many cross-correlation functions based on the highest energy in a time interval which we accordingly anticipate to receive Rayleigh & Love waves fundamental modes. To evaluate quality of the stacking process stability quantitatively, we calculate signal-to-noise ratio (SNR), defined as a ratio of the peak amplitude within a time window to the root-mean-square of noise trailing the signal arrival window (Bensen et al., 2007), for each cross-correlation. The cross-correlated time-series is equivalent to the Green's functions between pairs of receivers. We then apply multiple phase-matched filter method of Herrmann (2005) to measure the correct group velocity dispersion of the interferometric surface waves. Eventually, we apply fast marching surface wave tomography (FMST), the iterative nonlinear inversion package developed by Rawlinson, 2005, to extract the velocity model of shallow structure in Central Zagros zone /Iran.