3D structure beneath Iranian plateau and Zagros using adjoint tomography

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Introduction

In this study, we are going to show the results from adjoint noise tomography beneath Iranian plateau and Zagros. Continental collision along the Zagros suture resulted from the long- lasting convergence of the Arabian plate toward Eurasia (Fig. 1),and has provided the essential force raising the Zagros Mountains and uplifting the Iranian plateau.

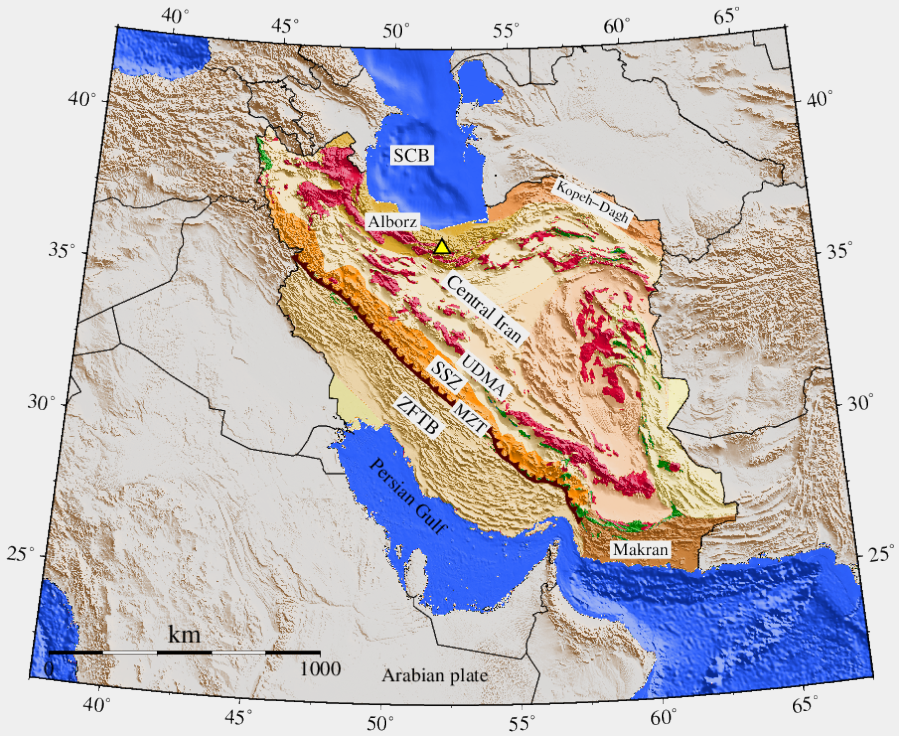

Figure 1: study area: Iraninan plateau and Zagros, the Zagros features (MZF and UDMA are shown by name)

Data and stations

In this study we use the events with mag of 4.5-6.8 and also the CC of the stations in Fig.2. In Fig.3 the ray paths of the events are depicted.

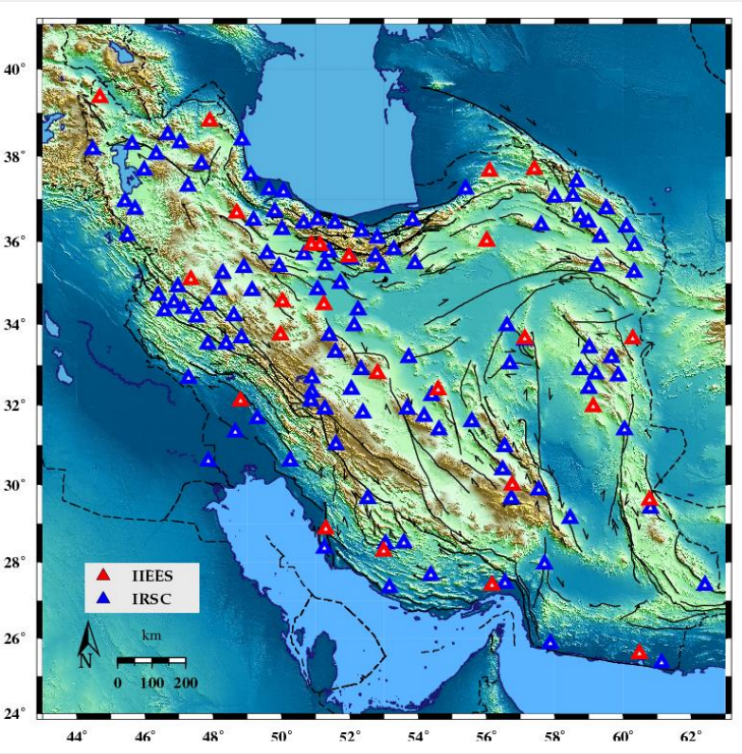

Figure 2: Broad band stations of IIEES and IRSC

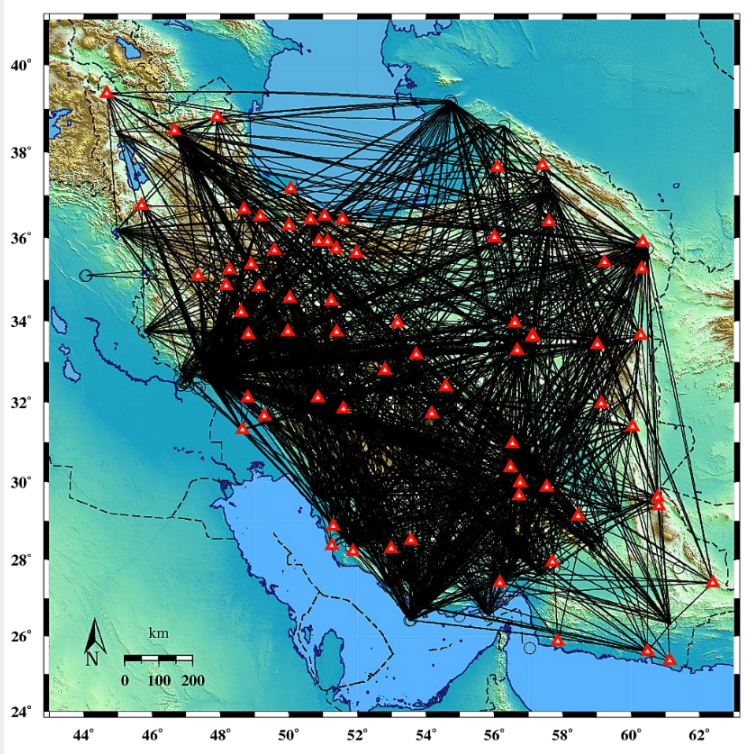

Figure 3: Events with magnitude of 4.5-6.8

Velocity models

As the initial velocity model we are going to start with S-velocity model (A.Kaviani et al, 2019) for the noise tomography (Fig.4) and then we will use the resulted model as an initial model for the EQ tomography.

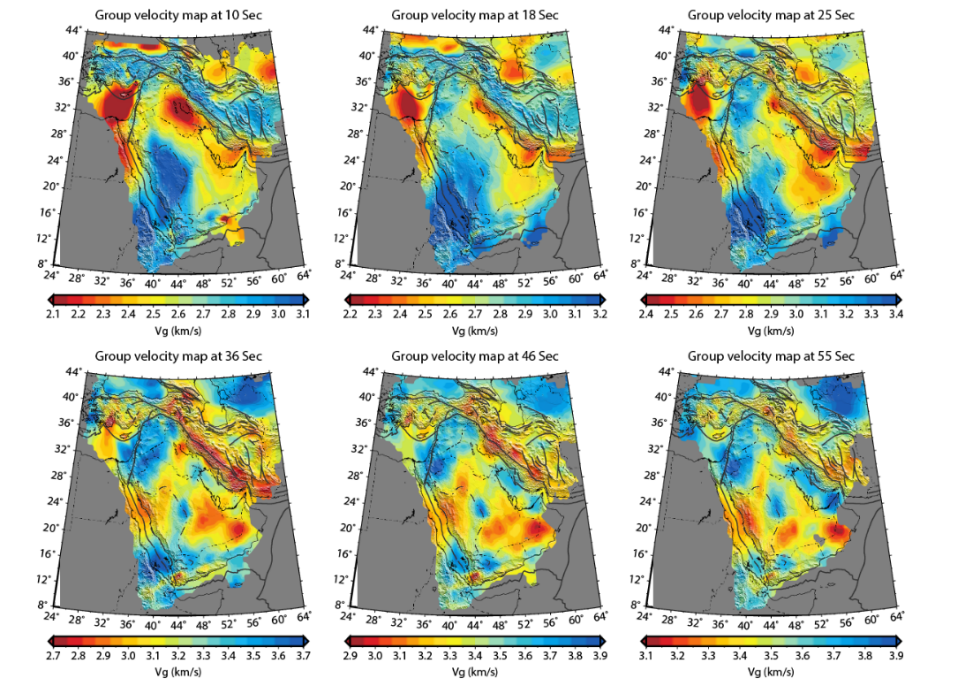

Figure 4: Examples of group-velocity maps obtained using only two-station dispersion curves obtained from Ambient-noise cross-correlation.(A.Kaviani et al 2019)

Forward simulations- SEM

Here we can see some forward results via SPECFEM3D program for 2 EQs, FIN (above) and Qeshm (below) which have accured at 2016-02-28 and 2005-11-27 in southern part of Iran, respectively.

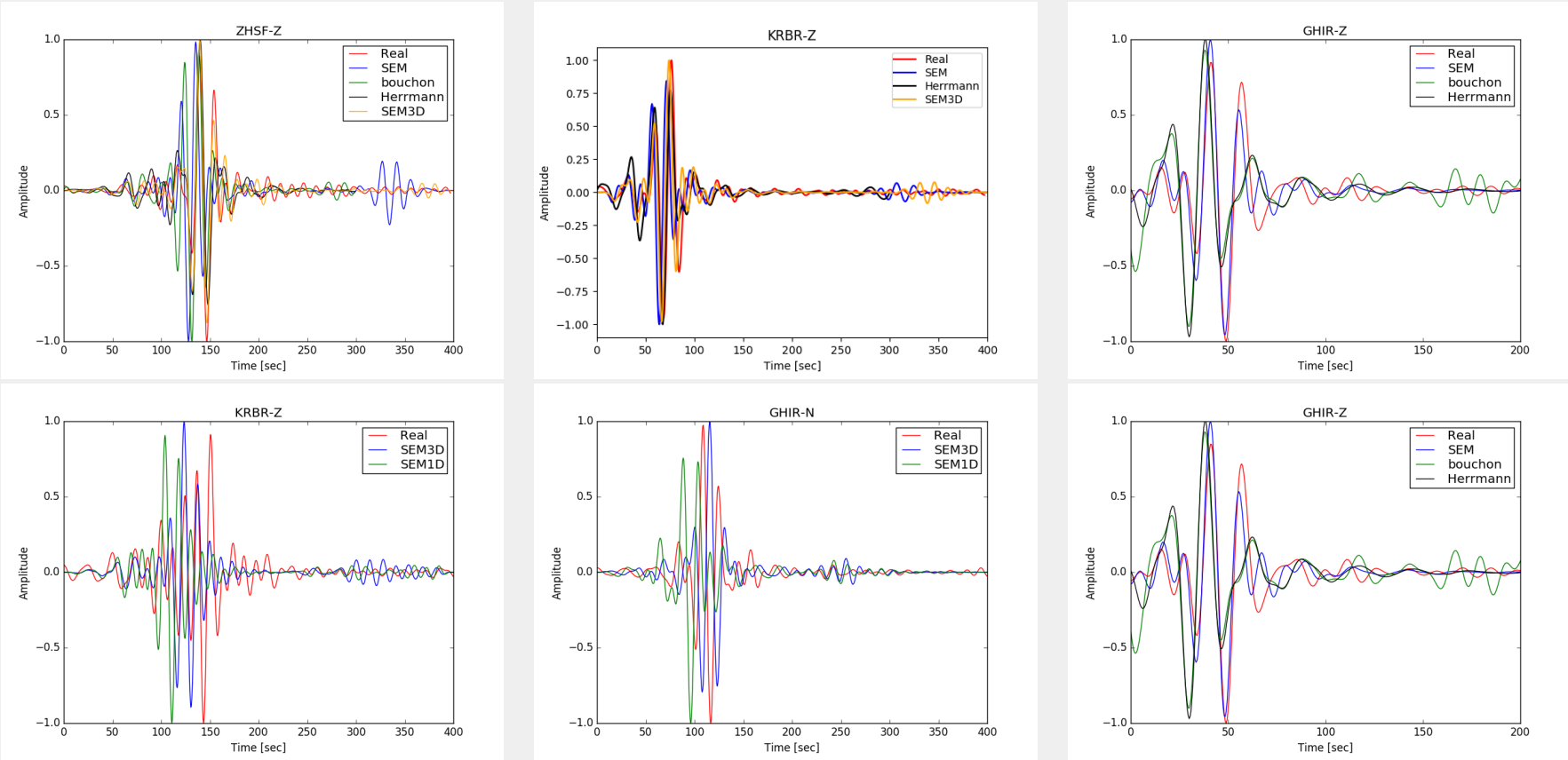

Figure 5: Real waves vs Synthetic waves

Inversion

For setting the parameters we designed a test checkerboard model (Fig.6, left) and start with a uniform model (vp:5500), here is the result with 50 randomly ditributed events and 81 stations on surface, after 6 iterations (Fig.6, right)

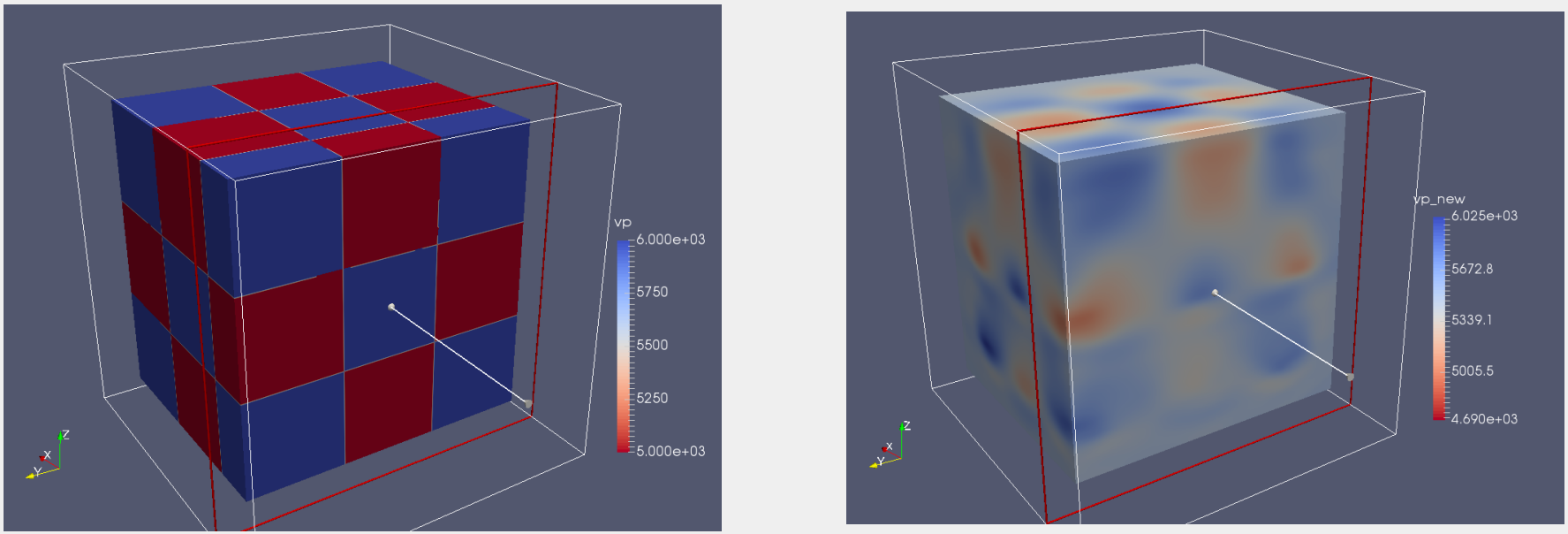

Figure 6: True and resolved velocity models

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