SEISMIC ANISOTROPY AND SHEAR WAVE SPLITTING IN WESTERN ALBORZ AND ADJACENT REGIONS

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ABSTRACT

We have determined the shear wave splitting parameters using data from a temporary network of 21 broadband stations in the western Alborz region in northern Iran. Core refracted phases SKS and SKKS were used from over 1000 teleseismic waveforms to measure fast polarization directions and delay times in the stations. Events in the epicentral distance range of 90 to 130 degrees were used. The minimum energy and the rotation correlation methods were used to measure the splitting parameters. The average fast-axis azimuth and delay time obtained from the rotation correlation method are 22 ± 4º and 1.5 ± 0.2 sec, respectively. For the minimum energy method these values are 21 ± 5º and 1.5 ± 0.1 sec, respectively. The general trend of the fast axes is NE-SW. We suggest that the different fast axes directions in the north of the Alborz Mountains may indicate that the lithospheric structure in the Geelan region may be different from that in the Alborz region. The fast axes make a sharp angle with the trend of the mountain ranges; the Alborz, the Tarom and the Soltanieh Mountains. These directions are sub parallel to the motion of Iran with respect to Eurasia in the no-net-rotation frame of reference. In this respect, these results are in accord with previous results obtained in north western Iran (Arvin, 2013) and in eastern Turkey (Sandvol et al., 2003). The shear wave splitting results are interpreted as indicating the mantle flow in the asthenosphere beneath Iran.

INTRODUCTION

Measurements of seismic anisotropy constitute a very important tool for examining patterns of flow and mineral properties in the Earth's mantle. We can examine the splitting of SKS and SKKS phases and