

QUALITY FACTOR OF S-WAVE IN NW IRAN

Tayebeh HEYDARI

Institute for Advanced Studies in Basic Sciences (IASBS)Zanjan, Iran
heydari@iasbs.ac.ir

Farhad SOBOUTI

Institute for Advanced Studies in Basic Sciences (IASBS)Zanjan, Iran
farhads@iasbs.ac.ir

Khalil MOTAGHI

Institute for Advanced Studies in Basic Sciences (IASBS)Zanjan, Iran
kmotaghi@iasbs.ac.ir

Keywords: Quality Factor, Shear Wave, Spectral Amplitude, Attenuation, NW Iran

ABSTRACT

In this paper, we estimated shear wave quality factor in NW Iran using data recorded at IRSC stations in the period 1996 - 2006. We used the spectral amplitude ratio method in the frequency range of 1.5-15.5 Hz, to calculate Q_d . We obtained a power law relation of the form $Q_d = 94 \pm 3f^{0.6 \pm 0.1}$ for NW Iran.

INTRODUCTION

Estimation of seismic risk in a region requires an understanding of the attenuation of strong ground motion. Seismic waves attenuate as a result of the different processes such as scattering due to heterogeneities, intrinsic absorption due to anelasticities and geometrical spreading in the earth. Northwest Iran is an active tectonic region and affected by intensive magmatism and volcanism in the Mesozoic and the Cenozoic. Various seismological and petrological studies have inferred elevated temperatures in the crust and the mantle, and a relatively thin lithosphere in this region. As a result of this history of high deformation rates, the NW Iran might be a region of high seismic attenuation. In this study, we investigate attenuation of shear waves in NW Iran using local events recorded at the stations of IRSC. For this purpose, 132 waveforms recorded by eight short period stations of the Tabriz network (TBZ, BST, AZR, HRS, HSH, SHB, MRD, SRB) from 1996 to 2006 have been analysed. Fig. 1 shows stations, events and ray coverage used in this study. We used the method of spectral amplitude ratios versus distance (Tsujiura, 1966) to obtain the frequency dependence of Q_d over the study region.

DATA ANALYSIS

We calculated spectral amplitudes on the transverse component (T) in a shear wave window containing 90% of the total shear wave energy. Fig. 2 shows an example of the records and Fig. 3 shows an example shear wave window. A noise window after P wave arrival was also selected for the purpose of calculating signal-to-noise ratio. We analysed waveforms with signal to noise ratio greater than 2. To avoid