Tomography S velocity structure between Washington’s earthquake C022801L and observational station TUC through seismogram analysis

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Abstrak

In this research the S speed structure is investigated by seismogram analysis of Washington's earthquake, C022801L using data of TUC station, Tucson, Arizona, U.S.A. The seismogram comparison between the observed and the synthetic seismogram is conducted in time domain and three components simultaneously. The initially input for the calculation of synthetic seismogram is earth model of PREMAN and CMT solution from the earthquake. A low-pass Butterworth filter with corner frequency of 20 mHz is convolved to observed and synthetic seismogram. Waveform comparison shows a real deviation when travel time and waveform of some wave phase are compared, namely on S wave, surface wave of Love and Rayleigh and wave ScS and ScS-2. This research shows, how sensitive the waveform is to the earth model, better than the method of travel time or the dispersion analysis. Research hereinafter is addressed to finish the found discrepancies at S wave, surface wave of Love and Rayleigh and ScS and ScS-2 wave, in observation station TUC. To obtain the seismogram fitting, correction for S speed structure in earth model is needed, that are changes of earth crust thickness, the speed model of ï¢ in upper mantle covering the speed gradient of ï¢h and value of zeroeth order coefficient for the ï¢h and ï¢v, for accomplishing the discrepancies at surface wave of Love and Rayleigh. Further correction on S speed is conducted to accomplish the deviation at S wave at earth layering systems from Upper Mantle up to a 630 km depth. Mean while for the ScS and ScS-2 wave phase the correction is carried out on S speed in the earth layers up to CMB. Fitting Seismogram is obtained at waveform of various wave phases that is S wave, surface wave of Love and Rayleigh and ScS, ScS-2 wave, either on travel time or especially also at oscillation number in Love wave. This result indicates that the anisotropy is occurred not only in upper mantle but till deeper earth layers, till CMB.