CHAPTER VIII

CONCLUSIONS

Within the limits of accuracy set by the travel time data, amplitude measurements, computational methods and various assumptions made in the determination of velocity and Q structure of the earth's mantle below 700 km and up to about 2560 km depth, the following conclusions may be drawn.

(1) In each profile for sources at Eastern Kazakh increase in velocity with depth with fluctuations. Each profile is characterised by increase and decrease of velocities at various depths superposed on a gradually increasing trend. Eastern Kazakh profile shows more such variations compared to the other two.

(2) There is greater similarity of velocity distribution between Eastern Kazakh and Novaya Zemlya profiles, compared to E. Kazakh or Nevada and N. Zemlya profiles. This reflects the influence of the region of source location on velocity distribution with depth. Because of a single profile, no such conclusion can be drawn for Q-distribution.

(3) Although many high and low velocity anomalies occur in each profile, the high velocity anomalies at 1100-1200 km and 1500-1600 km depth, and low velocity anomalies at 800-900 km, 1400-1500 km and 1700-1800 km depths are common to both E. Kazakh and N. Zemlya profiles. Common to both N. Zemlya and Nevada
profiles are the low and high velocity-anomaly at 1300-1400 km and low velocity anomaly at 2000-2100 km depths.

(4) Most of the velocity-anomaly regions found in this study for different profiles agree with those found by other workers using more sophisticated methods. But no report has been available on the velocity anomaly region at 2000-2100 km depths found in N. Zemlya and Nevada profiles. More work will be necessary to establish the existence or otherwise of this anomalous region.

(5) Most of the irregularities found in each of the profiles smooth out leaving a small number of high and low velocity anomalies when an average velocity profile is drawn out of these three. But a prominent high velocity region from 1150-1400 km depth shows up in the average profile.

(6) The value of $Q$ for 770-950 km depth is 200. The average value of $Q$ obtained for 951-2650 km depth of the lower mantle is 380. These values are similar to those reported by other workers for similar frequency band for upper and lower mantle.

(7) High values of $Q$ occur in the layers with depth ranges 780-830 km, 950-1020 km, 1250-1400 km, 1600-1720 km and 2100-2500 km. Similarly low values of $Q$ occur around 925 km, 1075 km, 1225 km, 1450 km, 1800 km and 2550 km depths.

(8) In majority of the cases, higher values of $Q$ are associated with increasing P-wave. Velocity and lower $Q$ values are associated with decreasing P-wave velocity.

(9) The differences in the velocity profiles, which
are due to sources at three different regions of the earth, may tend to indicate the existence of lateral heterogeneities in the depth range considered in this study. But more detailed study with sophisticated analytical techniques at narrow azimuth range is necessary to find velocity and Q structure of the mantle with sources distributed at various parts of the earth's surface.