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G. UPPER MANTLE P WAVE VELOCITIES

The beam-power processing program described elsewhere in this report (section A) has been used to estimate apparent slownesses and azimuths of short period P signals from some 40 Russian explosions ($12^{\circ} \lesssim \Delta \lesssim 40^{\circ}$) and a comparable number of Atlantic earthquakes. Those data which have sampled only continental paths exhibit consistent evidence for multibranching in the approx. distance range $15^{\circ} < \Delta < 28^{\circ}$. These data are broadly consistent with a slightly modified version of the B1 model of Jordan and Anderson (1974). The observed slownesses and travel times of the explosion data are plotted in compact form on Fig. G.1 in comparison with the T-Δ curve entailed by a B1-type model with a modified velocity gradient in the uppermost mantle and with the discontinuities near 400 and 650 km reduced in size and smoothed. A model of this type explains the principal features of the data (although the need for further refinement and travel-time adjustment is recognized), and equally important does not entail features blatantly inconsistent with the data. The notable absence of arrivals corresponding to the prograde end of the triplication associated with 'the 650 km discontinuity' may be explained by postulating an increase in Q to accompany the velocity increase at that depth (see Mereu et al, 1974).

P waves from the North Atlantic earthquakes have upwards of half of their travel paths in oceanic structures. These data differ from the continental data insofar as evidence for multibranching is much less pronounced. The absence of clear secondary arrivals places some constraint on the size and nature of possible velocity discontinuities at depth.

Smooth models such as those presented by Kulhanek and Brown (1974) adequately explain most of the observed times and slownesses.

G. Calcagnile and D.W. King

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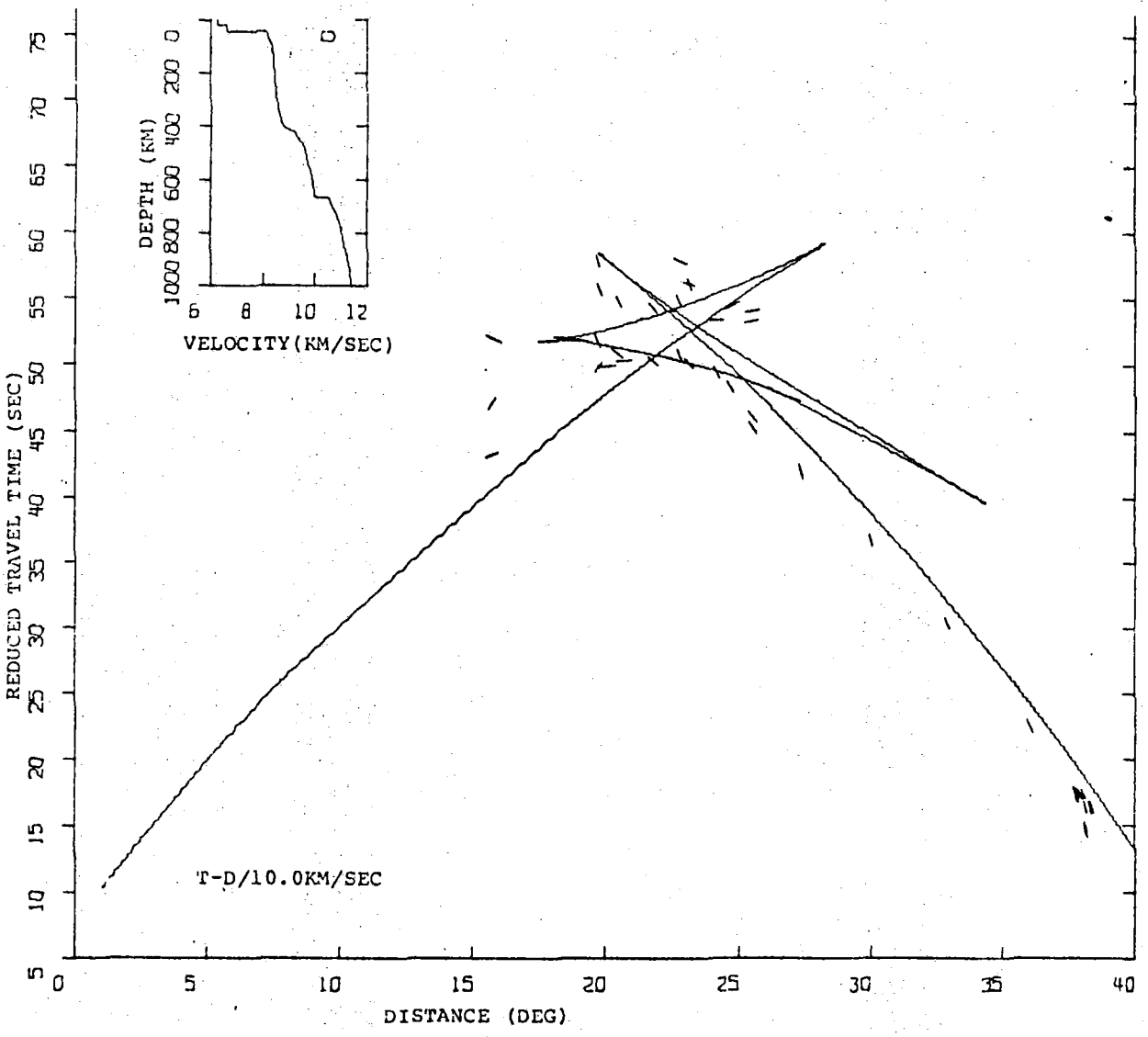

Fig. G.1 Observed slownesses and (reduced) travel times from Russian explosions in comparison with the T-Δ curve entailed by a modified B1 velocity model (inset).