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VII.3 The Use of Converted Phases to Infer the Depth of the
Lithosphere-Asthenosphere Boundary beneath the Baltic Shield

Long period (2-20 s), longitudinally polarized precursors to direct S have been observed at the NORSAR array from large earthquakes at epicentral distances of 70° - 82° . Normal phases, including multiple surface reflections, can be excluded on the basis of slowness and travel time. The slowness of these precursors differs enough from that of the background that the arrival time can be determined to within a second from the resulting discontinuity in the particle motion. The determined slowness (approximately that of direct S) and differential travel time (~ 28 s relative to S) suggest the interpretation of these arrivals as Sp; the S-to-P refraction is at an approximately horizontal interface about 235 km below the Baltic Shield 2° - 3° from NORSAR. The relative polarity of Sp and S (in phase on the horizontal, out of phase on the vertical) indicates a velocity decrease with increasing depth across the interface. We therefore suggest that the discontinuity is the lithosphere-asthenosphere boundary.

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