



Crustal and upper mantle structure of the Slave craton from P- and S-Receiver Functions

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Teleseismic events recorded by POLARIS array in NW Canada (Slave craton) and Yellowknife station were used to calculate a sufficient number of receiver functions for P (PRF) and S (SRF) waves. Velocity (V_p and V_s) and V_p/V_s profiles from the Earth's surface down to 300 km are obtained through the simultaneous inversion of PRF and SRF with teleseismic travel time residuals for the crust and upper mantle. We observe highly heterogeneous structure of the cratonic upper mantle. The Lehman discontinuity (the bottom of the low velocity zone) is found in the western Slave craton, whereas it is not observed in the eastern part of the Slave craton. At stations located in the southern part of the craton, we observe an increase of S-wave velocities (as compared to IASP91 values) at the depths 45-150 km which is typical for depleted cratonic mantle. Low V_p/V_s ratio, obtained for the uppermost mantle (1.65-1.70) can be explained by a high fraction of Opx. A comparison of our results with available xenoliths data shows a good agreement between seismic velocity change at a depth of ca. 160 km and a decrease in mantle depletion at about the same depth.