



Models for the ‘cold’ and ‘hot’ areas of the upper mantle beneath western North America.

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We have analysed traveltimes coming from earthquakes located in the different tectonic settings (respectively called ‘cold’ and ‘hot’ areas) in the western part of North America. The study is based on the P-wave arrival times reported in the ISC Bulletins for selected stations in the study area. The selected events were located in the offset range 600 – 3000 km, with magnitude larger than 4.5 and with similar hypocentral depth. The differences between P-wave delay times for ‘hot’ and ‘cold’ areas amount to 2-6 s. P-wave arrival times observed at some of the stations (especially at the border between tectonically active and stable regions) reveal ‘fast’ and ‘slow’ structures depending on the direction of the ray paths (earthquake-station). We have tested these observations by 1-D and 2-D modeling. The calculated traveltime curves and modeled velocity-depth distributions suggest a considerable difference in the upper mantle seismic structure of the mentioned regions. Presence of fluids (for example H₂O) can be the mean reason of these differences.