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The Lithoprobe trans-continental lithospheric cross sections:
Imaging the internal structure of the North American continent
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The LITHOPROBE trans-continental lithospheric cross sections: Imaging the internal structure of the North American continent

Three lithospheric cross sections provide a continental-scale synthesis of more than two decades of multidisciplinary research carried out by Lithoprobe and complementary projects. This plate-scale perspective emphasizes the relationships between orogens and permits visual comparisons to be made regarding structure and tectonic development. Each cross-section includes merged interpretations, near-vertical incidence seismic reflection profiles, and P-velocity structure models. Earth curvature is incorporated; the Trans-Continental Profile spans 6000 km. For detailed discussion and references see *Hammer et al., CJES, 47(5), 2010.*

Map: A simplified tectonic element map of Canada with locations of the cross-sections. Thin white lines identify terranes and other domains within the major tectonic units. To emphasize comparative structure and collisional sequence, the tectonic elements are grouped by tectonic age – defined as the most recent episode of major tectonic deformation in an orogen (see Appendix A). See text for detailed descriptions of each orogen. The cross-sections follow the corridors defined by the ten Lithoprobe transects. The Northwestern Corridor follows the Slave-Northern Cordillera Lithospheric Evolution (SNORCLE) transect. The Northeastern Corridor represents the Eastern Canadian Shield Onshore-Offshore (ECSOOT) transect. The Trans-Continental Corridor is based on the eight southern transects: Southern Cordillera (SCORD or SC), Alberta Basement (AB), Trans-Hudson Orogen (THO), Western Superior (WS), Great Lakes International Multidisciplinary Program on Crustal Evolution (GLIMPCE), Kapuskasing Structural Zone (KS), Abitibi-Grenville (AG), and Lithoprobe East (LE). The transects (and their internal components) were designed such that they could be linked directly or by projecting along strike, providing near-continuous coverage. Double-headed arrows show the along-strike offsets. Other abbreviations: JdF – Juan de Fuca, MHB – Medicine Hat Block.

Cross sections: The interpreted lithospheric structure for each profile is displayed in conjunction with seismic reflection and seismic velocity compilations. In all panels vertical exaggeration is 1:1. The transect (or experiment name if not part of a Lithoprobe transect) and seismic line name are given for each segment. Direction headings note changes in the general orientation of the profile segments. In general, the reflection fabric and velocity models are coincident; offsets are noted where present. In the migrated reflection profiles, thin red lines represent the most prominent reflections and denote fabrics and faults. The composite P-wave velocity model panels are presented using a common color scale. Velocities are also shown using numbers (km/s) and thin, dashed contour lines. The black lines represent interpreted wide-angle reflector locations. The interpretation panels represent a current synthesis of published work. Colours indicate tectonic age (see map and text). Heavy black lines represent major reflective or compositional boundaries inferred from seismic data. Anisotropic and/or heterogeneous structure in the lithospheric mantle is noted by short dashed zones. In the Western Superior transect segment, teleseismic velocity and resistivity anomalies in the lithospheric mantle are denoted by shaded ovals and corresponding annotation for average velocity (AV), high velocity (HV), low velocity (LV), and high resistivity (HR) regions (Percival et al. 2006). The teleseismic dataset revealed lateral compositional changes in the lithospheric mantle that corresponded closely with the orogenic boundary and possible subduction and delamination that were inferred from the active-source dataset (Musacchio et al. 2004; White et al. 2003). Estimates of lithospheric thickness are based on the work of Shapiro and Ritzwoller (2002) and Artemieva (2009). See *Appendix A* for a listing of references for the seismic profiles and the key papers used to develop the interpreted cross-sections.