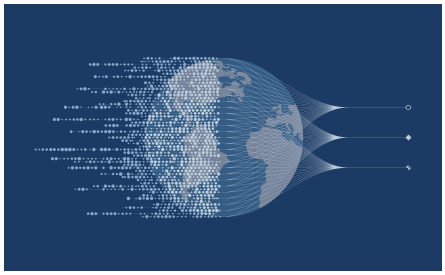

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and regional scale velocity models for Canada calibrated using a new ground truth event catalog

The Canadian National Seismograph Network (CNSN), covering one of the largest single-network areas worldwide, plays an important role in regional seismic event monitoring. To reduce seismic event location uncertainties from the CNSN, we are developing a unified 3-D local and regional scale crustal and upper mantle velocity model for operational location analysis based on the Regional Seismic Travel Time (RSTT) model (Begnaud et al., 2020; Myers et al., 2010). A full suite of local and regional seismic phases is used: Pg, Pn, Sn, Lg. Travel times are taken from the Canadian National Earthquake Data Base, NEDB (Natural Resources Canada, 1985) and include decades of local and regional travel times compiled pre- and post-CNSN refurbishment. Improvements to RSTT in Canada are obtained using a combination of NEDB analyst-reviewed events from natural, mining, and quarry source events, in addition to a newly assembled ground truth database of locally and regionally recorded mining events and refraction explosions of known location, depth and timing. Travel time residual variance for RSTT Canada in Lg is reduced 50%, compared to the initial starting model. Using a set of validation events with epicenter accuracy of 5 km or better, we assess the RSTT Canada median uncertainty ellipse area.

E-mail

claire.perry@nrcan-rncan.gc.ca

In-person or online preference

Primary author: Ms PERRY, Claire (Canadian Hazards Information Service, Natural Resources Canada)

Co-authors: Mr YOUNG, Brian (Sandia National Laboratories (SNL)); Mr BEGNAUD, Michael L. (Los Alamos National Laboratory (LANL)); Mr MYERS, Stephen (Lawrence Livermore National Laboratory (LLNL))

Presenter: Ms PERRY, Claire (Canadian Hazards Information Service, Natural Resources Canada)

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