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Regional Earthquake Depths Using IMS Seismic Arrays

Teleseismic observations from the International Monitoring System's (IMS) global seismic network provide complementary information to national and regional earthquake monitoring. Standard Event Lists (SEL1-3) from the International Data Centre (IDC) provide automatic short term feedback on significant events observed globally, while Reviewed Event Bulletins (REB) provide comprehensive global epicentral solutions and precise arrival times to which regional locations can be compared. This is of interest where regional epicentre bias may exist due to sparse station density and/or poor azimuthal coverage. IMS primary and auxiliary arrays' beamforming capabilities in particular may be used to constrain earthquake depths and their uncertainties by statistically identifying candidate depth phases (pP/sP). Candidate depth phases may be evaluated statistically to determine an event's most-probable depth using the methodology of Heyburn & Bowers (BSSA, 98(1), 2008). These probabilistic results serve as an automatable means of determining event depth, and provide a tool to robustly identify and pick depth phases for manual review. This methodology is applied to a series of significant aftershocks after the 7.7 Mw earthquake on October 28th, 2012 off the southwestern coast of Haida Gwaii, Canada, where regional stations provide limited azimuthal coverage of the offshore events and poorly constrained free depths.

Primary author: EDWARDS, Wayne (Natural Resources Canada)

Presenter: EDWARDS, Wayne (Natural Resources Canada)

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