High-resolution surficial soil velocity models in the Canterbury, New Zealand basin

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This presentation summarizes the development of high-resolution surficial soil velocity models in the Canterbury, New Zealand basin. Shallow (<30m) shear wave velocities were primarily computed based on a combination of a large database of over 15,000 cone penetration test (CPT) logs in and around Christchurch, and a recently-developed Christchurch-specific empirical correlation between soil shear wave velocity and CPT. Large active-source testing at 22 locations and ambient-wavefield surface wave and H/V testing at over 80 locations were utilized in combination with 1700 water well logs to constrain the inter-bedded stratigraphy and velocity of Quaternary sediments up to depths of several hundred meters. Finally, seismic reflection profiles and the ambient-wavefield surface wave data provide constraint on velocities from several hundred meters to several kilometres. At all depths, the high resolution data illustrates the complexity of the soil conditions in the region, and the developed 3D models are presently being used in broadband ground motion simulations to further interpret the observed strong ground motions in the 2010-2011 Canterbury earthquake sequence.