

# EFFECT OF PARTIAL SATURATION ON LIQUEFACTION TRIGGERING

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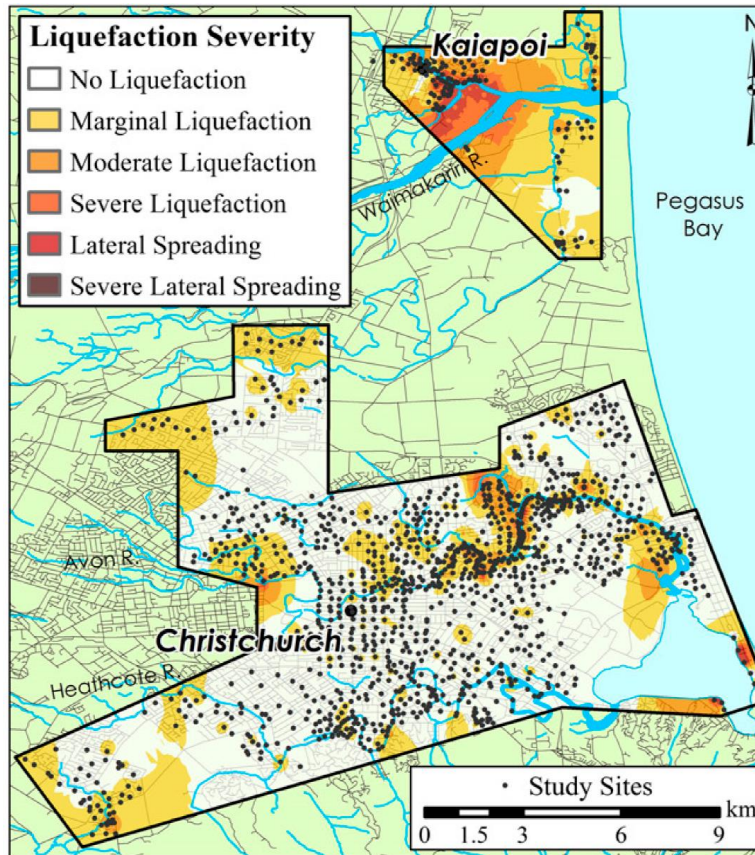
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2016 Annual Meeting  
31 August - 2 September

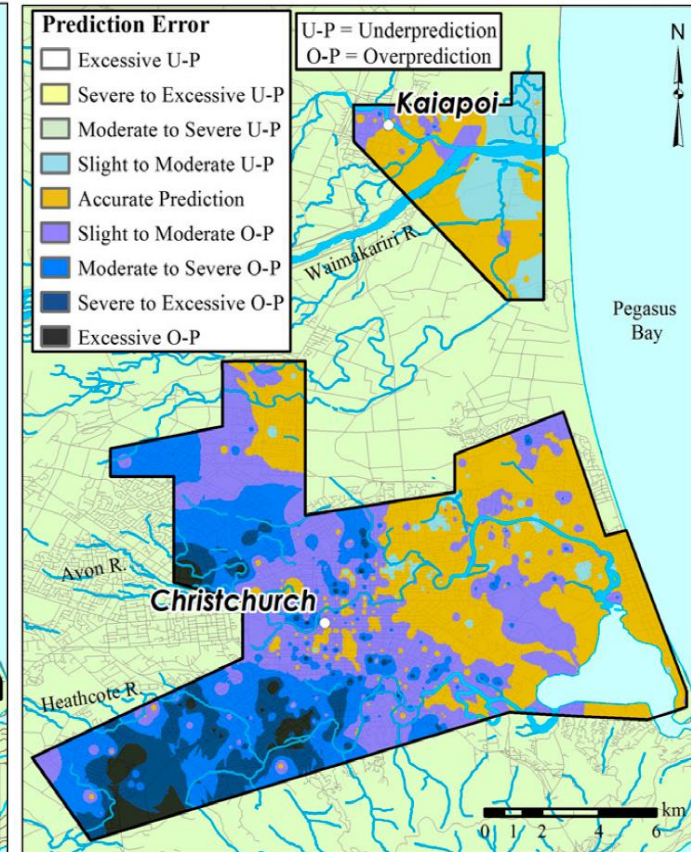
# Motivation for this study

Liquefaction severity and its prediction by simplified liquefaction evaluation methods.

**Darfield earthquake, September 4, 2010**



Liquefaction severity



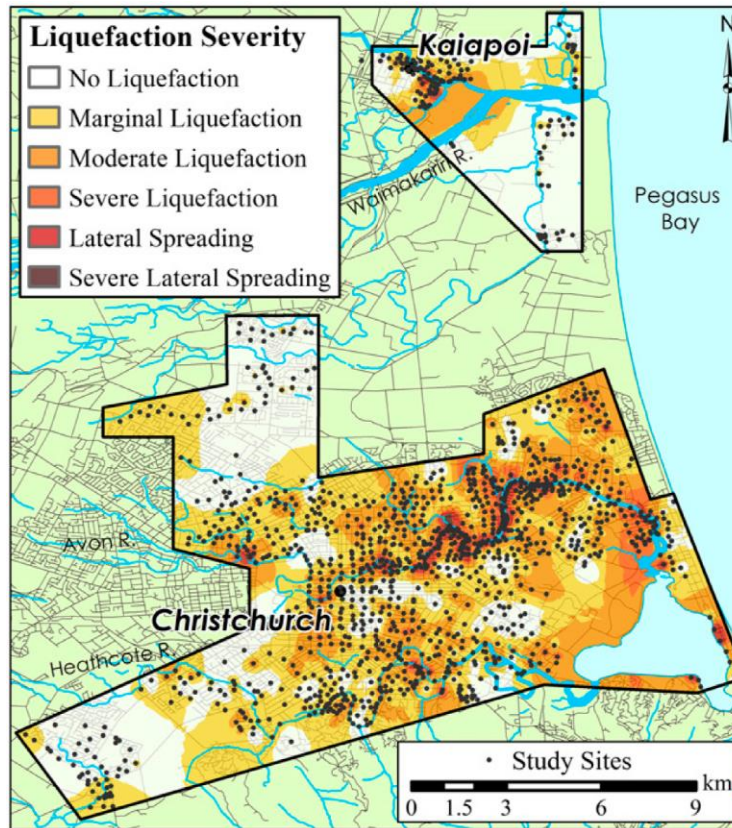
Liquefaction evaluation methods prediction

(Maurer et al. 2014)

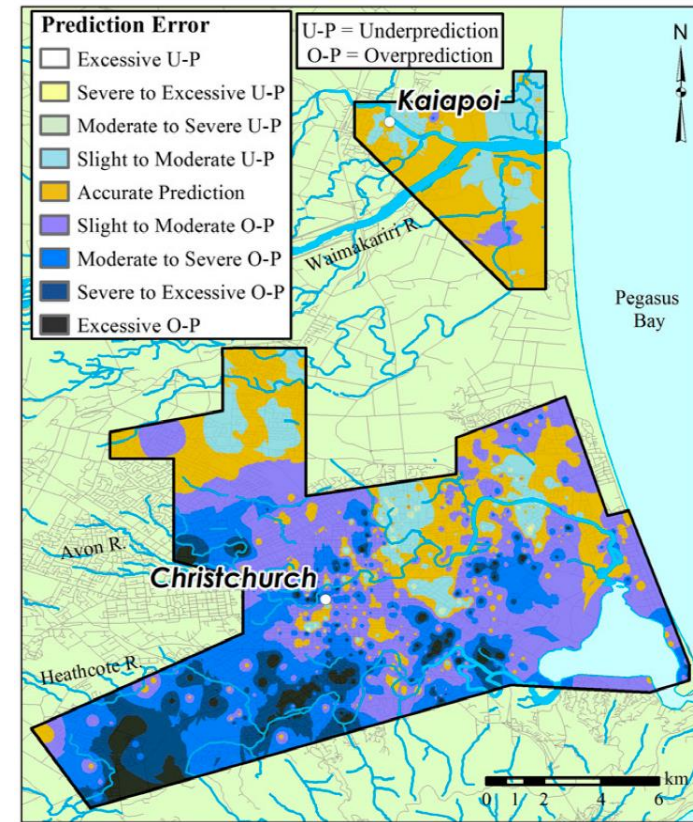
# Motivation for this study

Liquefaction severity and its prediction by simplified liquefaction evaluation methods.

## Christchurch earthquake, February 4, 2011



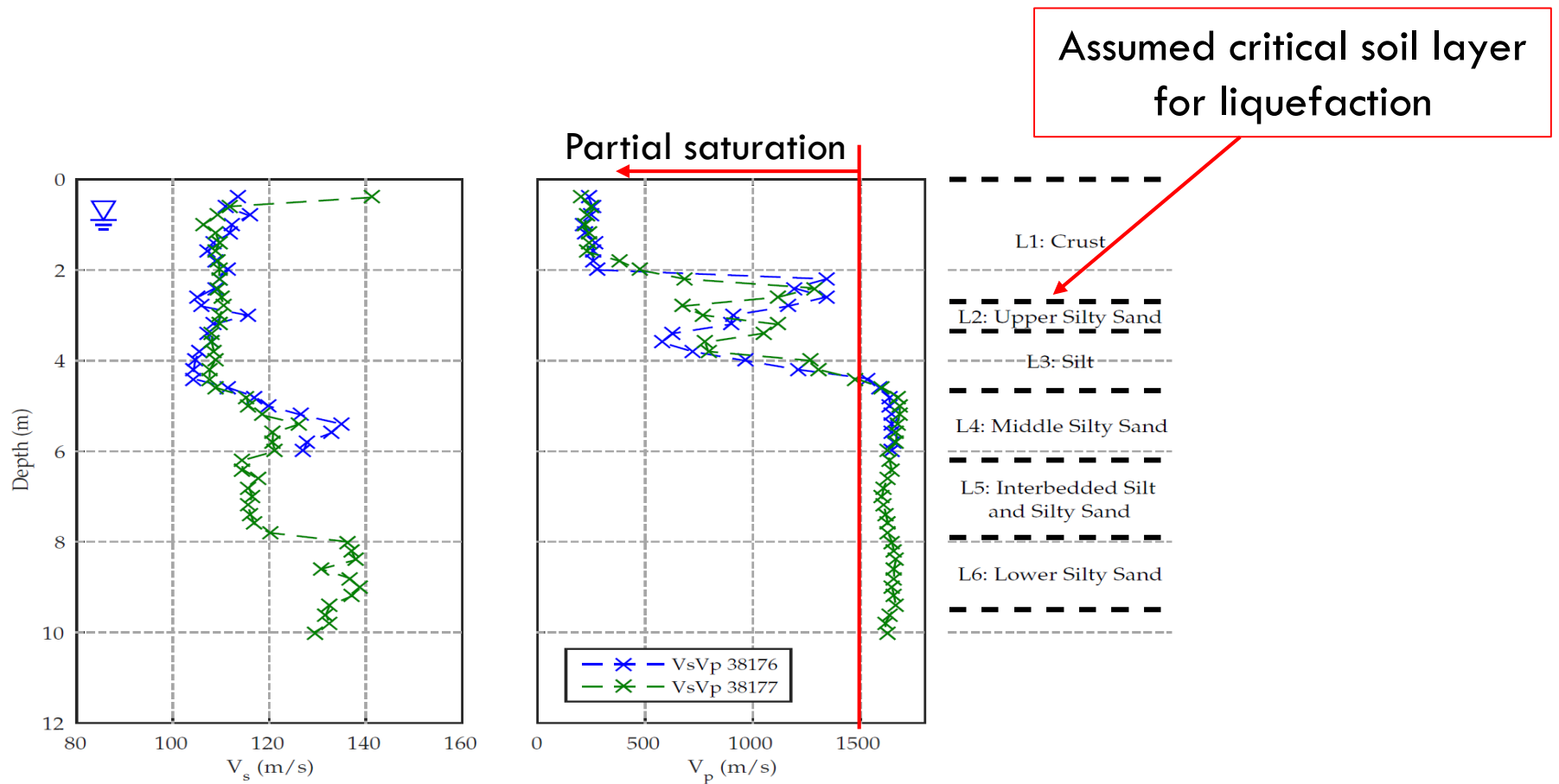
Liquefaction severity



Liquefaction evaluation methods prediction

(Maurer et al. 2014)

# Motivation for this study



Field test data showing partial saturation, Gainsborough Reserve, Christchurch

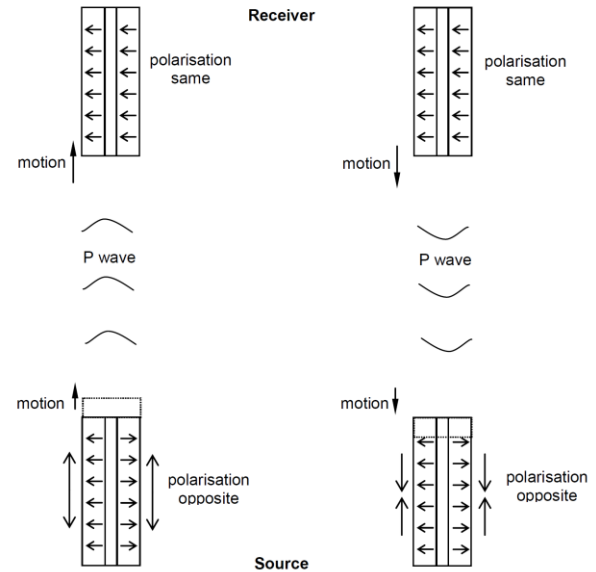
# Research aims

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- To correlate liquefaction resistance with degree of saturation for characteristics Christchurch soils including sands with fines and silts.
- To incorporate the effects of saturation in simplified procedures for liquefaction assessment.
- Provide basis for quantifying the effects of partial saturation in advanced seismic analysis.

# Experimentation

- Three types of typical Christchurch soils will be tested covering:
  - Fines content between 0 and 60%.
  - $S_r$  from 60% to 100%.
- $V_p$  will be measured at different stages of testing allowing us to estimate the degree of saturation during the testing.



Bender elements and modified triaxial platens for  $V_p$  measurement

# Thank You!

# References

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Maurer, B.W., Green, R.A., Cubrinovski, M., and Bradley, B. 2014. Evaluation of the Liquefaction Potential Index for Assessing Liquefaction Hazard in Christchurch, New Zealand. *Journal of Geotechnical and Geoenvironmental Engineering* **140**(7): 04014032-04014031-04014011. doi: 10.1061/(ASCE)GT.1943-5606.0001117.

Canterbury Geotechnical Database, C.G.D. (2013). 'Liquefaction and lateral spreading observations, Map Layer CGD0300 -11 Feb 2013, retrieved from <https://canterburygeotechnicaldatabase.projectorbit.com/>.'