# OCGC SEMINAR

## Lg-Q attenuation relations in the Grenville and northern Appalachian Provinces and their use in reconciling magnitudes in eastern Canada and beyond

**Dr. Claire Perry**
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**Thursday, March 28th, 2019, 11:30 AM**
**University of Ottawa**
**Advanced Research Complex**
**Room 233**

**Jeudi le 28 mars 2019, 11h30**
**Université d'Ottawa**
**Advanced Research Complex**
**Pièce 233**

**Abstract:** I will assess the ability of regionalized attenuation relations in reducing relative magnitude discrepancies between seismic stations in the northern Appalachian and Grenville provinces. Discrepancies in regional magnitude estimates have long been noted to exist between stations in the two provinces for the same event origins. Such discrepancies could arise from systematic site condition variations between the geologic provinces or from varying crustal attenuative properties. *Lg* amplitudes are analyzed from over 6000 waveforms recorded by Grenville and northern Appalachian receivers from 420 natural earthquakes of $M_N$ magnitude 3 and above to evaluate frequency-dependent anelastic attenuation in the form of a quality factor, *Q(f).* Waveform analysis is strictly limited to analyst-reviewed, vertical component waveforms where *Lg* is clearly identified, ensuring that the dataset exhibits dominant, high frequency energy in the *Lg* velocity window. *Q(f)* is shown to be significantly higher in the Grenville Province compared to the northern Appalachians. Magnitude relations of mbLg and $M_N$ for eastern Canada are revised to incorporate the new frequency-dependent *Q* values, which significantly diminishes and nearly resolves discrepancies in magnitudes between the provinces. *Q* is an important parameter in ground motion models used in probabilistic seismic hazard analysis. Correcting regional magnitude discrepancies between provinces is critical for reliable regional seismic hazard estimates, as magnitude misestimation between regions would lead to increased uncertainty in seismic hazard and the potential for under- or over-building of structures.

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