

Learning from Earthquakes

Val-des-Bois EQ

Report provided by Martha Merriam of Caltrans and Murat Saatcioglu of the University of Ottawa.

On Wednesday, June 23, 2010, at 1:41 pm local time, a M5.0 thrust-type earthquake occurred 55 km northeast of Ottawa, near the town of Val-des-Bois, Quebec (45.904, -75.497). The earthquake (depth 22 km) lasted 10-15 seconds and was widely felt throughout Ontario and Quebec and as far south in the U.S. as Kentucky. The earthquake was typical of events located in the Western Quebec Seismic Zone. This NW elongated zone is characterized by mostly small events that have not been associated with individual faults. The area experiences earthquakes of this magnitude about every 20 years, with larger events every 100 years.

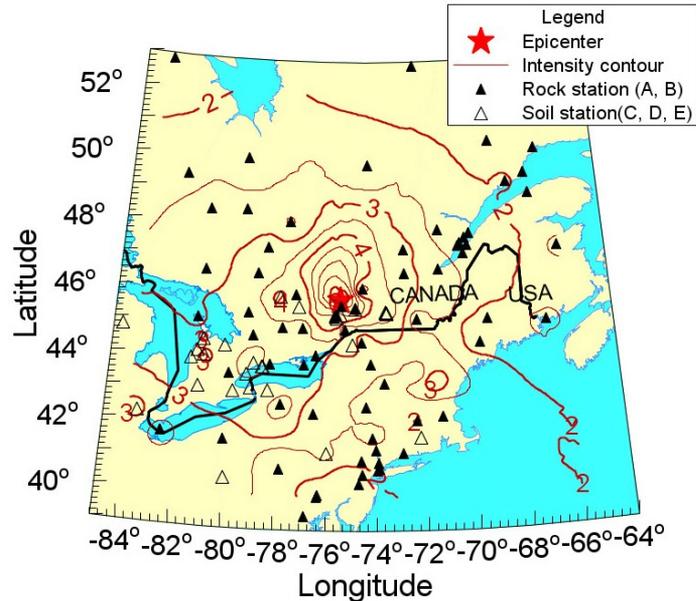
According to the University of Western Ontario researchers Gail Atkinson and Karen Assatourians, in a paper accepted by *Seismological Research Letters*, recordings obtained from 120 stations at distances from 60 to 1000 km provide important data for assessing new ground motion predictive equations (GMPEs) for eastern North America. This event produced response spectral amplitudes at distances of less than 200 km that were greater than predicted by the recently developed GMPEs. In contrast, intensities tended to be smaller than predicted. At 60 km, the maximum pga recorded on bedrock was 0.03 g and on soil the maximum pga was 0.07 g. The response spectrum generated from an earthquake record on rock in Ottawa was about 1/5 of the design spectrum specified in the *National Building Code of Canada (NBCC-2005)*. The damage in the city was limited to nonstructural elements, including a chimney collapse on Bank Street, damage to the suspended ceiling of a supermarket on Greenbank Road, cracked masonry

in a number of school buildings, and crushed concrete block masonry in one of the local hockey arenas. Near the epicenter, a church, restaurant, community center, and hotel were damaged, and a section of highway collapsed into a river. Near Bowman,

about 10 km from the epicenter, a bridge failed as a result of embankment failure.

A map of intensities was developed from the earthquake, with intensity IV, indicating a level of shaking that is felt by most people.

Instrumental Intensity: June 23, 2010 M5.0 Earthquake



Reproduced from "Attenuation and Source Characteristics of the June 23, 2010, M5.0 Val-des-Bois, Quebec, Earthquake," by Gail M. Atkinson and Karen Assatourians, Dept. of Earth Sciences, University of Western Ontario.



Landslide near the epicenter resulted in 50 m of downhill movement, soil failure, and damage to a barn foundation near Gracefield, close to epicenter.



Embankment failure south of Bowman, Quebec (photo: Jean Levac).