
Historical earthquakes (1764–1961) in the Saint John region and effects from regional earthquakes

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A study has been made of historical documents (newspapers, diaries and letters) which could contain information on the effects of earthquakes felt in New Brunswick. Selected weekly newspapers were scanned for mention of previously unlisted earthquakes. Documents for dates following already known earthquakes were also read for accounts of these latter events. Modified Mercalli intensity values were assigned from the described effects of each earthquake at places mentioned in these reports. Finally, magnitudes and epicentres were determined from the intensities and felt areas, using empirical relationships obtained from seismographically recorded earthquakes in eastern North America.

There are 8 earthquakes listed in the National Earthquake

DataBase for a $1^{\circ} \times 1^{\circ}$ area centred on Saint John for the period 1764 to 1961, the latter year being when the first network seismograph was installed in the province. Re-valuation of these 8 events using the information from the historical documents found that they were not all earthquakes, and the epicentre of one earthquake is incorrect. Vibrations from a slowly moving landslide were mistaken for an earthquake in 1870; a cryogenic event at Rothsay in 1884 was erroneously interpreted as an earthquake. The epicentre of the 1937 earthquake was mislocated in the southern part of the province and this event was really an earthquake in the Central Highlands of New Brunswick. Minor revisions of earthquake parameters were also necessary for some of the other earthquakes. Four previously unlisted events in the Saint John region, in 1838, 1869, 1888 and 1898, have been found by scanning issues of weekly newspapers published in the southern part of the province. All of these local historical earthquakes have magnitudes of less than 4.

Effects of larger regional earthquakes ($>$ magnitude 5) were also investigated by seeking reports of these events in historical documents. For Saint John, these reports show that minor damage occurred as a result of earthquakes in the Passamaquoddy Bay and Central Highlands regions of New Brunswick. Also, intensity values of up to 5 have been estimated for larger, more distant, earthquakes in Quebec and on the Grand Banks. Seismic hazard determinations for Saint John should therefore take into consideration the effects of these larger regional earthquakes.