



(I) A 4000-year record of earthquakes in late Holocene sediments from Saanich Inlet, British Columbia Canada.

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(IV) Short hydraulic piston cores collected in Saanich Inlet in 1989 and 1991, combined with longer piston cores collected in the same area in 1996 during Ocean Drilling Program Leg 169S, record a sequence of large earthquakes in southwestern British Columbia during the late Holocene. The sediment cores consist of rhythmically laminated (varved) marine mud with intercalated debris flow deposits. Some of the extensive debris flow deposits are linked to past earthquakes, including the 1946 Vancouver Island earthquake ($M7.3$), a great ($M\sim 9$) plate-boundary earthquake at the Cascadia subduction zone in January 1700, and a large crustal or plate-boundary earthquake about 1000 years ago. Earthquakes may also be responsible for debris flows about 300, 450, 600, 850, 900, 1050, 1200, 1250, 1600, 1700, 1900, 2250, 2270, 2550, 3050, 3100, 4000, 4020 years old. We estimated the average recurrence interval for crustal and subcrustal earthquakes by excluding known plate boundary events (shown in *italics*). The calculated recurrence interval, 268 years, corresponds to a peak acceleration of 0.24 g, derived from a recurrence relationship generated from earthquake statistics. A peak acceleration of about 0.24 g translates into seismic shaking of MM (Modified Mercalli) Intensity VII, a level of shaking that can produce submarine landslides. We conclude that most or all of the extensive debris flow deposits in Saanich Inlet were triggered by moderate to large earthquakes rather than by non-seismic processes.