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# Factors controlling submarine landslide occurrence: Lessons learned from plate-boundary decollement zones

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Most submarine slopes are inherently stable. However, once submarine landslide generated, it could induce destruction of seabed infrastructure and tsunamis. The factors controlling submarine landslide occurrence remain poorly understood, mainly because there has been very limited access to slip surface of landslide. Initiation and evolution of plate-boundary decollements in subduction zones may be useful to understand the location of slip surfaces and the slip behavior of submarine landslides. Here, I review decollement processes in subduction zones, which have been revealed from deep ocean drilling in the last 20 years. The decollements develop along (1) weak, smectite-rich layers, (2) the zones of elevated pore pressure, and (3) the mechanical boundary between cemented and non-cemented intervals. These results provide important implications for submarine landslide occurrence. The slip surfaces may localize along an interval of smectite-rich lithology. Such smectite-rich lithology could link to the increased volcanic activity as smectite is commonly derived from alteration of volcanic ash/tuff. The permeability contrast in slope sediments could also play an important role on the development of slip surfaces. The rapid sedimentation of coarse-grained sediments onto fine-grained, argillaceous sediments may cause the generation of elevated pore pressure, which in turn facilitates the onset of submarine landslide. The trap of the hydrate-derived fluid beneath the low permeability sediment may also cause the development of overpressure. The slope sediments may contain the cementation boundary (e.g., opal-A to opal-CT reaction) particularly when geothermal gradient is high. In such case, the submarine landslides may generate along the surface bounding different cementation states.