

Regional-Scale Gravity Tectonics in Low and High Relief Terrains

Peter Jones*

International Tectonic Consultants Ltd, Calgary, AB
peter.jones@thementors.com

Summary

Although gravity-driven structures are often obvious in mountainous terrains, many lie unrecognized because their size and distance traveled are too large to visualize, because their heads and or toes may be buried (blind), or because the apparent slope or paleo-slope is too small for sliding to have occurred. Gravity-driven structures include thrust, normal and strike-slip faults, all of which may be emergent and/or blind. Gravity-driven structures fall conveniently into two categories: Local and Regional, although there are certainly slides that fall between the two categories.

Local slides include the more obvious minor, catastrophic, incoherent, fluid (mud) or debris (rock) slides, such as the Frank Slide of southern Alberta. Such events are governed by local topography and may be triggered by weather or human activity. The distance travelled is almost always greater than the width of the slide by a ratio from 2:1 or orders of magnitude greater.

Regional-scale landslides are emplaced in a different manner: slowly, starting from a nucleus and gradually spreading laterally for tens or hundreds of kilometres, retaining their consistency, so that they act as coherent thrust sheets, sliding on discrete faults along bedding-planes, sometimes compartmentalized by relatively minor strike-slip faults. Their width along strike tends to be many times greater than distance travelled. Many slides have buried tip lines or blind thrust fronts. In some cases the normal fault at the head of a slide is also buried.

Examples described include the Hosmer nappe, Fernie, B.C. the Rat Creek syncline of northeastern B.C., and the "Hideaway slide" southeast of Calgary, Alberta, all of which cover much greater areas than the famous Frank Slide.