# GPS measurements on analogue models to monitor fault activity

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http://www.tectonic.geo.uu.se/HAK/Index.html

Active faults, have a strong influence on the topography of an area. Thrust faults transport thick piles of rocks over long distances and result in formation of structural heights, which are later subjected to erosion. Analogue models are used to study the effect of erosion and basal friction, above which a fold-thrust belt is gliding, on the activity of thrust faults. Two kinds of models were investigated; models shortened above a high friction decollement and models shortened above a low friction ductile decollement. In models shortened above a ductile substrate, since shortening is accommodated by several faults, slip rate along each fault was relatively small. In models with frictional decollement where only one of the faults (frontal) accommodates the bulk shortening at any given time, slip rate along this fault was large. Erosion or change in basal friction in the models resulted in reactivation of older and inactive thrusts and in some cases formation of out-of-sequence thrusts. Applied to nature, model results suggest that in areas where sedimentary rocks are shortened above a layer of salt more than one thrust is active at a time resulting in low magnitude earthquakes. In the absence of a ductile layer, a piggy-back stack of imbricates form with only the youngest of the thrusts at the deformation front being most active. In these areas, slip rate is expected to be high. Therefore, large-magnitude earthquakes is expected to occur in areas shortened above high friction decollements.