Detailed fracture studies of detachment folds and thrust faults,
Moose Mountain, Canadian Foothills

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A fracture study was undertaken during the 2000 field season in order to
decipher the genetic relationship between folding, faulting and fracture
development in the Moose Mountain anticlinorial structure. A deeper
understanding of the mechanical significance of fractures and their development
is required to make predictions as to their distribution. Two different geological
structures were analysed separately: detachment folds and a thrust fault.

Many different fracture sets can be recognized in the area. Results indicate that
two distinct regional fracture sets (N70° and N330°) developed before the
detachment folding event. Within the detachment folds two fracture sets
developed during folding, with fracture frequencies increasing in the hinge area.
Low interconnection between these fracture sets and bedding planes combined
with short lengths and small lateral extension provides for an ideal potential for
anticlinorial traps.

For thrust faults, the two regional subvertical fracture sets, N70° and N330° were
recognized as well as numerous small fractures planes that developed
approximately subparallel to the thrust fault (N142°/32). Fracture densities
increase dramatically in the hanging wall of the fault a few meters above the fault
zone and decrease drastically in the footwall. The low-angle fractures are clearly
related to the development of the thrust fault and increase the hydraulic
conductivity within the fault zone.