Thrusting tectonics in eastern Notre Dame Bay

Paul F. Williams, Karl Karlstrom and Ben van der Pluijm
Department of Geology, University of New Brunswick, Fredericton, N.B. E3B 5A3

Structural analysis of the area examined has produced sufficient geometrical constraints to allow meaningful kinematic modeling.

F_1 folds are intrafolial and where asymmetry can be determined are markedly asymmetrical in general. In addition, if F_2 folds are unfolded such that

bedding is restored to horizontal the F_1 folds are recumbent. This geometry can only be explained by a kinematic model of heterogeneous flow approximately parallel to bedding. Such a model is consistent with either a soft sediment slumping origin for the folds or with a hard rock origin in a thrusting environment. Such hard rock folds are common as early structures in other areas where thrusting has been an important deformation mechanism (e.g. the Caledonides and the Alps).

F_2 folds are hard rock structures and are asymmetrical upward facing folds that are overturned to the north. The overturned limb is weakly deformed whereas the normal limb is very strongly attenuated. The folds have an axial plane foliation and the regional enveloping surface is at most only shallowly dipping. This geometry can be produced by a kinematic model involving an early stage of layer parallel shortening followed by strong, enveloping surface parallel shear. The second part of this model is again indicative of thrusting and since no alternate model has proved satisfactory we believe that F_2 folds represent a continuation of the thrusting style of deformation that is responsible for F_1. In the case of F_2 there is sufficient evidence to say that thrusting was towards the north-west.

Two other sets of data support the model for F_2. The grade of regional metamorphism increases towards the southeast and post F_2 normal faults are believed to be southeast block down.

In summary, kinematic considerations suggest that the area was one in which deformation was principally associated with the emplacement of thrust slices.