

Preliminary geomatics analysis of the St. Mary's basin, Nova Scotia

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A GIS and Image database is currently being established for the St. Mary's basin, central Nova Scotia. The database will include satellite optical and radar imagery, geophysics, including magnetics, gravity, and radiometrics, geochemistry, and lithological and structural data from parallel field mapping. The goal of the project will be to use this technology in two modes: (1) to examine the strengths of correlations between known geology and the geomatics datasets, and (2) to assist in the delineation of lithologies and interpretation of the tectonic setting of the basin and surrounding terranes.

The St. Mary's basin is comprised of the Horton Group

which appears to be locally derived from the Meguma Terrane to the south. The rocks were deposited in a tectonically active strike slip basin as is evident by the fanglomerates at the southern flank and alluvial deposits in the central basin. The northern portion of the basin has been tectonically removed by dextral motion along the Cobequid/Chedabucto fault system. The southern boundary is defined by fault contact in the east with the West St. Mary's fault and in the west by an unconformity with the Meguma Group. Both the northern and southern boundaries are visible on the image data.

Deformation in the basin is minor with the exception of

the northern boundary and a northeast-trending zone of intense folding in the Stewiacke River area. The basin is characterized by northwest-trending lineaments representing fracture planes associated with dextral motion between the Meguma and Avalon terranes. Some lineaments appear to continue from the Meguma Terrane through the basin and into the Avalon Terrane to the north.

Image processing of the radar, Landsat, and geophysical information will assist in defining structures and potential lithological contacts within and surrounding the basin. The integration of the lithological and structural data from parallel mapping will be used in combination with the imagery to define approximate contacts. Profile modelling of the geophysical data (magnetics and gravity) is planned to assist in determining the extent of the basement blocks beneath the basin. Digital

1:250 000 and 1:50 000 base maps will be merged with the imagery and field data to produce image maps depicting several layers of information on a single map. A lineament analysis will be performed on the original imagery and shaded relief products, and interpreted based on the local strike-slip tectonic regime. General characteristics of the signatures (land cover, topography, geophysics, geochemistry) between the Avalon Terrane, basin, and Meguma Terrane will be examined for some key areas. Stream geochemistry will be examined to identify areas of potential mineralization and possible correlations with the source materials. All of the information will be compiled and presented using desktop mapping software for display and query. Mineral resource potential will be examined and modelled within the study area using a GIS.