
Remote predictive mapping of the Baie Verte Peninsula, Newfoundland: integration of geophysical and remote sensing imagery

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The Baie Verte Peninsula is a geologically complex area of the northwest coast of Newfoundland. This region is composed of multiple geological domains that have undergone multi-phase tectonic activity resulting in unconformities and thrust boundaries. Contemporaneous with the deformation, intrusions and volcanic cover sequences added to the complexity of the geology. Like many other exploration areas the degree of rock exposure is highly variable: around the coast exposure is often very high, whereas inland the exposure is very poor. Producing a geological map in this type of situation requires the continuation of contacts from regions of well defined and constrained boundaries into areas with poor outcrop control and hence speculative boundary locations. Where adjacent rock units have different physical properties an estimate of the location of the contact can be derived from regional surveys. In addition the spatial relationship between the observed geological contact and local topographic surface provides a constraint on the local geometry of the contact. Extending this geometry information into the subsurface allows for the possible construction of 3D geological models. Interrogating these 3D models can provide insights into the temporal and spatial evolution of magmatic and tectonic processes.

Multiple data sets are available for the Baie Verte Peninsula. Four sources of topographic data, each with different spatial resolution are available. While each of the DEM data sets map the same major structures, the lack of internal consistency prevents their use for defining more detailed features. Integration of the regional scale airborne radiometric survey with the high resolution aerial photographic record provides a clear delineation of some geological boundaries. A new high resolution aeromagnetic survey of the peninsula like earlier surveys documents the strong magnetic signals associated with the ophiolite sequences, but also shows that onshore portion of the Betts Cove complex is part of a much larger regional fold structure. This new survey also reveals new structures within the Pacquet Harbour Group that were not apparent in

previous lower resolution surveys. In situ physical and optical property measurements have been acquired to provide ground truth constraints to assist in the interpretation of the remotely sensed imagery.