



Reflection seismic profiling and its correlation with surface geological observations in the Brunswick No. 6 area, Bathurst Mining Camp, New Brunswick, Canada

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The Brunswick No. 6 deposit is located in the Bathurst Mining Camp, northern New Brunswick, Canada. Exploration for new base metal deposits in the camp requires focused investigation of geological structures at depth. For this reason, seismic reflection data in the Brunswick No. 6 area were acquired along three 2D profiles in 1999, with a total length of about 30 km. We have recovered, processed and re-interpreted these seismic data in conjunction with petrophysical and geological data from the study area. More specifically, a 3D geological model provided the framework for the interpretation of the seismic profiles. The seismic data and the borehole geophysical data allow a better understanding of both the shallow and deep structures (to 9 km depth) in the area. Sequences of reflective and transparent zones in the seismic data show a good correlation with the surface geological observations, have helped us to image main structures and lithological formations down to 9 km of the crust. Contacts between reflective and transparent zones represent a series of reverse faults juxtaposing various formations of the Brunswick Belt. A reflective package, related to the Brunswick horizon, the main ore bearing horizon in this camp, can be also observed in all the three profiles down to 3 km depth. Two other sets of deep reflections are also imaged in all the three profiles in the depth range of about 5-8 km. We interpret them as two sets of thrust sheets, which could be an indication that the Brunswick belt extends down to a maximum depth of 8 km. To unravel shallower structures and to provide targets for detailed base metal exploration, we are currently processing a 3-D seismic data set acquired over the study area. Since the 3-D seismic reflection has a better coverage compare to 2-D data, we expect to better resolve subsurface structures. In this work, we present results of the 2D data processing in the shed of existing 3D geological models and preliminary results of the 3D data.