Potential source rocks for gold in Meguma-hosted auriferous vein deposits, Nova Scotia

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Initial Sr (carbonate) and Pb (galena) isotopic ratios from auriferous vein deposits hosted in Cambro-Ordovician Meguma Group rocks provide constraints regarding origin and potential metal source in the deposits. The Sr_i of carbonates range from 0.7079 to 0.7156 and $^{206,207,208}Pb/^{204}Pb$ for galena range from 17.191 to 18.568, 15.483 to 15.643 and 36.767 to 38.309, respectively. Large variations in radiogenic isotopes are present within individual deposits (e.g., Moose River, Goldenville). The observed variations and radiogenic tendencies cannot be attributed to stratigraphic position or proximity to exposed intrusions. The ranges of calculated Sr_i and $^{206}Pb/^{204}Pb$ at 372 Ma for various groups of metamorphic and intrusive rocks are given in Table 1. It is clear that neither the Meguma Group alone nor any combination of Meguma Group metasedimentary rocks and Devono-Carboniferous intrusions can accommodate the ranges of observed initial Sr and Pb isotopic ratios in the vein deposits. Alternatively, the Liscomb gneisses could potentially be the sole source for the observed ratios and hence, also for the hydrothermal fluids from which the quartz veins formed. In summary, these isotopic data indicate that the Meguma Group can be eliminated as the sole consideration to the auriferous veins via a metamorphogenic model and that a fluid/metal source within the Liscomb gneiss rocks is more probable.

Table 1

	$^{87}Sr/^{86}Sr$ irt at 372 Ma	$^{206}Pb/^{204}Pb$ irt at 372 Ma
Gold deposits (N=20)	0.7079 - 0.7156	17.191 - 18.568
Meguma Group (N=12)	0.7113 - 0.7177	17.632 - 18.277
Liscomb gneisses (N=10)	0.7060 - 0.7165	16.365 - 18.506
Felsic sed. granulites (N=17)	0.7046 - 0.7088	18.507 - 18.954
Mafic granulites (N=11)	0.7028 - 0.7051	18.124 - 19.194
SMB: Magmatic (N=21)	0.7076 - 0.7094	18.141 - 19.154
Liscomb granite (N=3)	0.7080 - 0.7090	18.411 - 18.435
Liscomb mafic intrusions (N=7)	0.7031 - 0.7078	17.599 - 18.566
Lamprophyre dyke, Tangier (N=3)	0.6994 - 0.7067	18.334 - 18.771