

ICP-MS trace element analyses of surface waters from fault zones in the eastern and western margins of the Dunnage tectonostratigraphic zones of the Newfoundland Appalachians

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Fifty-three surface water samples were collected from standing bodies of water located in the vicinity of major regional fault systems and/or mineral occurrences on both the eastern and western margins of the Dunnage Zone. The

samples were 50 or 100 ml specimens which were collected with disposable syringes, filtered through 0.45 μm disposable filters and acidified with 1 to 2 ml distilled 8M nitric acid to make \approx 0.2M nitric acid solutions; all in the field. The

samples were run at the ICP-MS laboratory, Department of Earth Sciences, MUN, using a modified biological waters analytical program. Concentrations of 29 elements were analyzed in each sample. Detection levels for 26 elements (all except Cl, Ca and Fe) were < 1 ppb, and < 0.1 ppb for 17 elements. Hg and Tl were not detected in any samples.

There were distinct geochemical differences in the waters from the different margins of the Dunnage Zone. The western Dunnage samples contained generally higher concentrations (in terms of mean values) of Ag, B, Ba, Ca, Ce, Cl, Cu, Mg, Ni, Se, Sr, V and Zn. The eastern Dunnage samples had relatively higher values of As, Cd, Fe, Li, Mo, Sb, Rb and U. These elemental distinctions are logically linked to the differences in lithologies associated with the different regions sampled, viz.: the western Dunnage samples were

collected from the Baie Verte Peninsula and Carboniferous Deer Lake basin area and hence have abundant oceanic crust in the vicinity; the eastern Dunnage samples came from areas underlain by granitoids and felsic volcanic rocks in the St. Albans area and by shales and siltstones of the Davidsville Group, Gander area. The most elevated Cu, Mg, Mo, Ni and Se contents were in a water sample from Winsor Lake, Tilt Cove.

The ICP-MS water analysis technique offers an inexpensive and relatively simple means of deriving geochemical data at very low detection levels for exploration and/or environmental monitoring. The method involves sampling a medium which is essentially a focus and locus for regional geochemical inputs.