flux to shift towards the ^{13}C-enriched carbonate end-member, increasing the $\delta^{13}C$ value of carbon transported by rivers to both epeiric seas and the oceans. Differences in magnitude between Hirnantian $\delta^{13}C$ excursions in shallower- and deeper water parts of epeiric sea basins, as well as between different regions, may be explained by water mass differentiation between those regions and differences in regional sea level histories.

Carbon isotope chemostratigraphy in the Late Ordovician in Arctic Canada: the signal of the Hirnantian glaciation

Michael J. Melchin[1] and Chris Holmden[2]
1. Department of Earth Sciences, St. Francis Xavier University, Antigonish, NS, B2G 2W5 <mmelchin@stfx.ca> ¶
2. Saskatchewan Isotope Laboratory, Department of Geological Sciences, University of Saskatchewan, 114 Science Place, Saskatoon, SK, S7N 5E2 <chris.holmden@usask.ca>

Four sections through late Ordovician to earliest Silurian strata in the central Canadian Arctic Islands have been studied for carbon isotopes, derived from the organic matter ($\delta^{13}C_{org}$) and whole-rock carbonate ($\delta^{13}C_{carb}$) fractions. The lithologies and graptolite faunas provide good constraints on the age and depositional environment of these strata. $\delta^{13}C_{org}$ data appear to provide a signal that mainly reflects chemical changes in the seawater. However, sediment reworking and diagenesis appears to have had a significant influence on the $\delta^{13}C_{carb}$ signal.

Results show that a positive $\delta^{13}C_{org}$ excursion of 3–6 ‰ begins just below the base of the Hirnantian Stage and peaks in the lower part of the *N. extraordinarius* Biozone of lower Hirnantian. This is followed by an interval of reduced $\delta^{13}C$ values and a second peak of similar magnitude, which occurs in the lower *N. persculptus* Biozone (upper Hirnantian). These peaks appear to correlate well with episodes of glacial expansion described from West Africa and this is supported locally by the relationship between the isotope shifts and lithologic evidence for sea level fall.

Global correlation of $\delta^{13}C$ curves suggests that the timing of positive excursions is not synchronous in all regions of the world. In particular, the lower Hirnantian peak seen in Arctic Canada and some other areas appears to be reduced in some circum-Iapetus regions, where peak values occur in later Hirnantian time. The hypothesis that one regional $\delta^{13}C$ curve can reliably serve as a benchmark for high-resolution, global correlation, is not supported by these observations.

These data suggest that an important factor in controling the $\delta^{13}C$ values in Late Ordovician epeiric and continental margin seas was the variation in rates of weathering of carbonate platforms, exposed during the glacio-eustatically controled sea-level fall. This caused the isotope value of the C-weathering

Copyright © 2015 Atlantic Geology