



Constraints on the Origin of Dolomite in the Middle Cambrian Eldon Formation at Mt. Wapta from Fluid Inclusion and Stable Isotope Data

Ron Spencer*

University of Calgary, Calgary, Alberta, Canada
geology@ucalgary.ca

Abstract

Mt. Wapta is located in Yoho National Park, and stands above the famous Burgess Shale fossil location. The cliffy exposure of the Middle Cambrian Eldon Formation is spectacular, due to a number of cone-shaped dolomite bodies cutting through the limestone. Samples were collected across one of these dolomite bodies, and through the adjacent limestone interval.

Stable isotopes of carbon and oxygen were analyzed on all samples. Carbon isotope values reflect the source of carbon; the ^{13}C values here are between 0 and -1 per mill (V-PDB). Oxygen isotope values are a function of both temperature and composition of the waters in equilibrium with the minerals; the ^{18}O values for limestone and calcite cement samples here are between -10 and -19 per mill (V-PDB), while dolomite samples range from -14 to -19 per mill (V-PDB). Fluid inclusions preserve a record of the temperature of formation of minerals, and here indicate that the dolomite formed at moderately high temperature (in excess of 100 C).

The data indicate that dolomitization of the Eldon was a result of hot fluids ascending through the limestone near the Cambrian platform margin. Others have presented evidence that fossils in the adjacent shale basin are associated with hydrothermal fluids exhaled onto the sea floor. Through an innovative educational partnership, about thirty high-school students are participating in this research, and are thereby experiencing the scientific method.