# The Reliability of Fluid Inclusions as Indicators of Temperature

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## ABSTRACT

Fluid inclusion homogenization temperatures give the minimum temperature of entrapment of a fluid in a mineral. This temperature, combined with other geochemical techniques, constrains potential sources and migration pathways of diagenetic fluids; thus constraining the geologic setting for diagenesis. Entrapment and post-entrapment conditions and processes along with sample preparation may influence fluid inclusion homogenization temperatures. These are a concern for the reliability of fluid inclusion data. The large database of fluid inclusion homogenization temperatures for Devonian and Mississippian dolomite in Western Canada is potentially valuable for interpreting the origin of the dolomite.

In order to apply fluid inclusion data to geologic systems a better understanding of data reliability is needed. Criteria for distinguishing “good” and “bad” data need to be developed. Two potential problems in interpretation of fluid inclusion data are addressed. First, in order for a fluid inclusion homogenization temperature to be meaningful the fluid inclusion must have trapped a single phase. This can be addressed by analyzing fluid composition using quadrapole mass spectrometry. Second, the question of post entrapment changes in the volume of the fluid inclusion (stretching during burial or preparation) is addressed. Stretching of fluid inclusions in certain minerals (barite, fluorite and calcite) is reported from laboratory experiments. Other minerals, such as quartz, are much more difficult to stretch. Prior to this study there are no data for dolomite. The question that must be answered: is stretching of fluid inclusions in dolomite, exposed to extreme geologic conditions, likely?