

## Ground temperature histories from geothermal data: evidence of recent climatic change

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Borehole temperature-depth data from Canada have been collected and analyzed to determine past changes in ground surface temperature from temperature perturbations to the equilibrium geothermal gradient. Generalized inversion was used to extract the information from the data. Results suggest a warming by 1 to 2°C in the last 100 years for most of the sites analyzed and the existence of an earlier cool period which may be associated with the Little Ice Age, implying that the warming detected might be partially due to the recovery from this colder period. Regional ground temperature histories (GTH's) were obtained by simultaneous

inversion of several temperature logs from the same areas. The inferred GTH's exhibit long-term trends similar to those obtained from tree-ring indices in nearby regions. The modern warming appears to be correlated with the atmospheric concentration of CO<sub>2</sub> as measured in ice cores. Ground temperature is a robust indicator of the energy imbalance at the surface of the Earth; as such it can be used to constrain proxy climatic indicators such as oxygen isotope data from ice cores and dendrochronological data. The particularities of this "calibration" method will be explained and some results presented.