CGNHS Miscellaneous Map MM-2013-01
Connecticut Geothermal Map Series No. 1 of 8

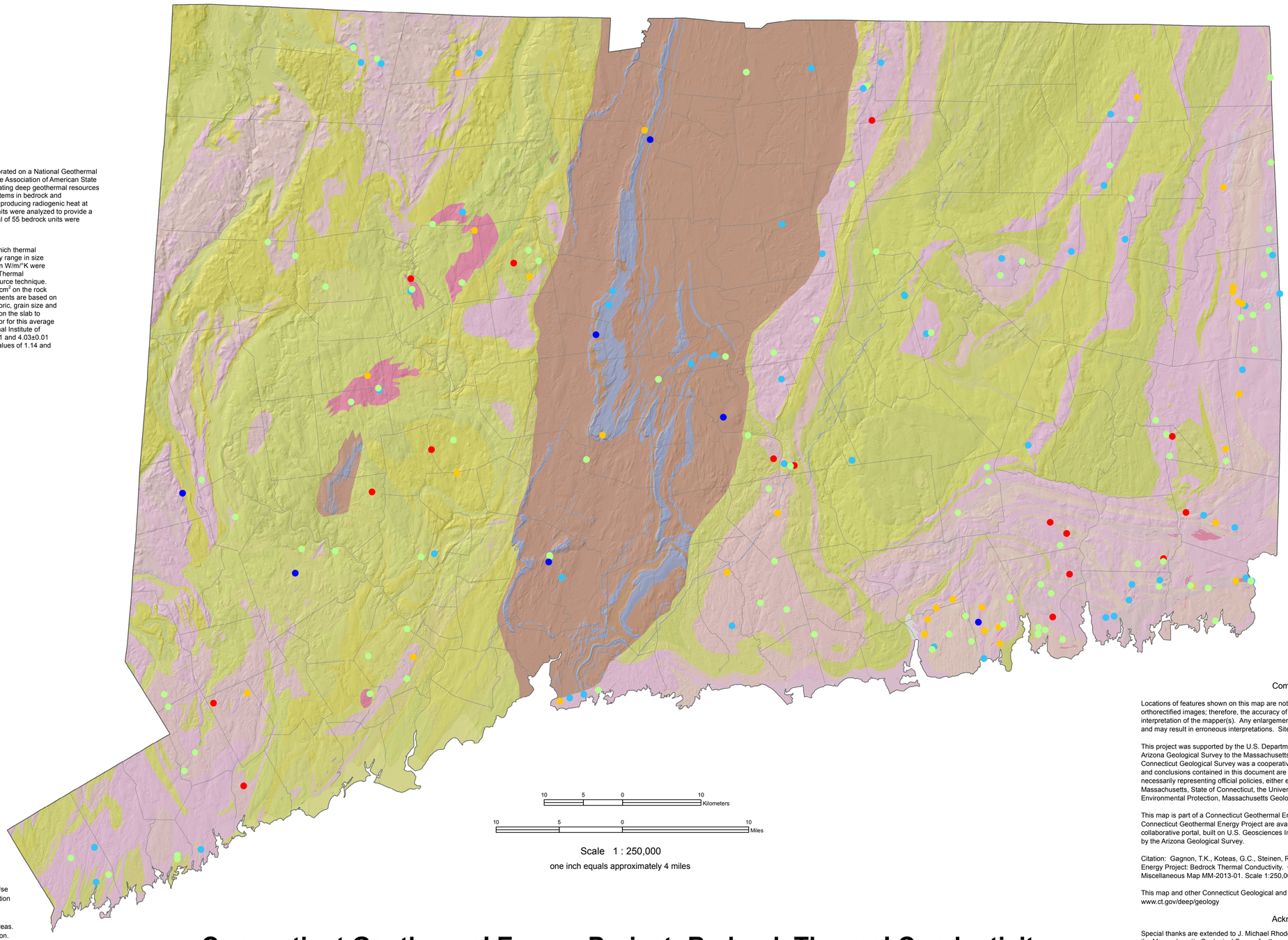
Connecticut Geothermal Energy Project:
Bedrock Thermal Conductivity
2013

About This Map

The Connecticut and Massachusetts Geological Surveys collaborated on a National Geothermal Data Project funded by the US Department of Energy through the Association of American State Geologists. The goal was to develop information to assist in locating deep geothermal resources and provide data for better design of Enhanced Geothermal Systems in bedrock and unconsolidated sediments. Bedrock units suspected capable of producing radiogenic heat at depth were the primary focus of this study. Additional bedrock units were analyzed to provide a regional view of the geothermal potential across the State. A total of 55 bedrock units were targeted and 242 samples were collected for this study

This map shows the location of surface outcrop samples from which thermal conductivity measurements were obtained. The samples typically range in size between 0.2 to 1.0 kg. Thermal conductivity measurements (K) in W/m/°K were made on polished slabs of these samples using a C-Therm TCi Thermal Conductivity meter which utilizes the modified transient plane source technique. The sensor measures the thermal conductivity of an area of 1.8 cm^2 on the rock slab using either water or glycerin as a contact agent. Measurements are based on 10 replicate measurements (typically 4–10), depending on the fabric, grain size and homogeneity of the sample, and are made at different locations on the slab to obtain an overall average thermal conductivity. The standard error for this average is typically within ±0.14 W/m/°K (~5%). Measurements on National Institute of Standards (NIST) Pyrex and Pyroceram standards are 1.15±0.01 and 4.03±0.01 W/m/°K respectively, and compare favorably with the reported values of 1.14 and 3.97 W/m/°K.

APPROXIMATE MEAN
DECLINATION, 2013



Scale 1 : 250,000
one inch equals approximately 4 miles

Bedrock Lithology

- Granite
- Granitic Gneiss
- Mafic Igneous rocks
- Metamorphic rocks (undivided)
- Sedimentary rocks

Bedrock Thermal Conductivity ($W/m/^0K$)	Number of Samples
> 3.5	18
3.0 - 3.5	49
2.5 - 3.0	110
2.0 - 2.5	58
< 2.0	7
Sample Total	242

Sources

Hillshade base was produced by the University of Connecticut, College of Agriculture and Natural Resources, Center for Land Use Education and Research (CLEAR). It is derived from point elevation data captured during the year 2000 using Light Detection And Ranging (LiDAR) technology. Note, the 2000 LiDAR data for Connecticut is incomplete, necessitating interpolation in some areas. See http://cteco.uconn.edu/data_guides.htm for further information. This data is available for download at www.ct.gov/deep/gisdata

Geologic units are generalized from the Bedrock Geological Map of Connecticut, Rodgers (1985)

Field sampling by T.K. Gagnon, R. Steinen, G.C. Koteas and A. Ryan (2010-2012).

Sample preparation and lab analyses by G.C. Koteas, R. Weiss, S. Adams, C. League, M. Vollinger, M. Mnich and B. Leighton at the University of Massachusetts (2010-2012).

Digital cartography and editing by T.K. Gagnon, M.A. Thomas, J.M. Rhodes, S.B. Mabee, L.C. Belliveau (2013).

Connecticut Geothermal Energy Project: Bedrock Thermal Conductivity

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Comments to Map Users

Locations of features shown on this map are not surveyed, but are determined by GPS and verified using orthorectified images; therefore, the accuracy of feature locations depends on the scale of the mapping and the interpretation of the mapper(s). Any enlargement of this map could cause misunderstanding in the detail of mapping and may result in erroneous interpretations. Site specific conditions should be verified by field checking.

This project was supported by the U.S. Department of Energy through a subcontract award granted by the Arizona Geological Survey to the Massachusetts Geological Survey under award number MA-EE0002850. The Connecticut Geological Survey was a cooperative partner in the project for investigations in Connecticut.The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing official policies, either expressed or implied, of the U.S.Government, Commonwealth of Massachusetts, State of Connecticut, the University of Massachusetts, the Connecticut Department of Energy and Environmental Protection, Massachusetts Geological Survey, or the Connecticut Geological Survey.

This map is part of a Connecticut Geothermal Energy Project Map Series. All data and mapping products of the Connecticut Geothermal Energy Project are available through www.stategeothermaldata.org, a 50 State collaborative portal, built on U.S. Geosciences Information Network (USGIN) protocols and standards, and hosted by the Arizona Geological Survey.

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This map and other Connecticut Geological and Natural History Survey Publications are available at www.ct.gov/deep/geology

Acknowledgements

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