The following was presented at DMT'11 (May 22-25, 2011).

The contents are provisional and will be superseded by a paper in the DMT’11 Proceedings.

See also earlier Proceedings (1997-2010)
http://ngmdb.usgs.gov/info/dmt/
GEOTHERMAL ENERGY is the heat contained within the earth—a class of recoverable and renewable energy. The heat energy is contained in normal occurrences of subsurface groundwater, which is transported to the surface of the earth by percolation. It can be used as an energy-efficient heating and cooling alternative for residential, commercial, and industrial applications, and is potentially a significant resource for electrical power generation in some regions of the United States.

Geothermal resources previously studied in the Appalachian Mountain System and the Atlantic Coastal Plain have been grouped into four types:

1. Water-saturated sediments of low thermal conductivity overlying fluids that are best suited for inclusion of the geothermal systems of the Atlantic Coastal Plain. As a result of leakage from greater depths, these geothermal systems are often found in areas where they do not reach the top of crystalline basement they can be located by geophysical exploration using gravity and magnetics (Costain, et al., 1980).

2. Coastal Plain sediments, or where they do not reach the top of crystalline basement they can be located by geophysical exploration using gravity and K (about 80% of the heat comes from U and Th) in the granite beneath C25. The optimum sites for geothermal resource development are to be caused by a granite body beneath the sediments of the Atlantic Coastal Plain. Hole C25 was drilled into a late Alleghanian, unmetamorphosed granite of presumably relatively high heat flow from a heat-producing granitoid concealed beneath sediments of relatively low thermal conductivity was defined by Fowells et al. (1985) as the radiometric method.

3. In order to do this, the radiometric method was initially employed in the feasibility study of geothermal energy resources in the southern Appalachian Piedmont and the Blue Ridge of Virginia. The temperatures at the bottom of the hole are extremely high in the granite, and the hot water from these holes is then used for heating and power generation. The model was confirmed at the Petersberg, VA, Drill Site C23, where a 100-megawatt geothermal facility is now in operation. Virginia is currently being explored for geothermal energy resources in the Blue Ridge and in the Atlantic Coastal Plain, where the temperatures at the bottom of the hole are extremely high in the granite, and the hot water from these holes is then used for heating and power generation.

4. Acknowledgements

This project is sponsored by the National Oceanic and Atmospheric Administration’s National Ocean Service. The authors gratefully acknowledge contributions to this work by Dr. R. W. Smith, Dr. J. D. Williams, and Dr. J. L. Stoddard. The National Oceanic and Atmospheric Administration’s National Ocean Service provided support for the research described here. This research was supported by the National Oceanic and Atmospheric Administration’s National Ocean Service. The authors gratefully acknowledge contributions to this work by Dr. R. W. Smith, Dr. J. D. Williams, and Dr. J. L. Stoddard. The National Oceanic and Atmospheric Administration’s National Ocean Service provided support for the research described here. This research was supported by the National Oceanic and Atmospheric Administration’s National Ocean Service.