Temperature Distribution within Deep Sediments of the Texas-Louisiana Continental Shelf

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SUMMARY

A recent compilation of bottom-hole temperature (BHT) data reported from the wells in the Texas-Louisiana continental shelf in the Gulf of Mexico, individually corrected for the disturbance due to drill fluid circulation, reveals some geographic trends in temperature distribution and geothermal gradient in deep sediments (2 to 6 km, or 6,600 to 19,700 ft below seafloor) in the region. Geothermal gradients increase from east to west with relatively low values (< 0.02 K/m) in the eastern Louisiana shelf to higher and more variable values (0.03 to 0.06 K/m) in the Texas shelf. In addition, thermal gradients tend to decrease from the inner shelf (near the shoreline) to the outer shelf. Even though the Louisiana continental shelf enjoys greater oil and gas production activities than the Texas shelf, in terms of geothermal power generation, the latter looks more promising with generally higher sedimentary temperatures.
In one area offshore Matagorda Island in the Texas shelf in particular, corrected BHTs exceed 150° C (302° F) at depths shallower than ~4 km (~13,100 ft) below seafloor, and it may be worth serious consideration for geothermal power generation.
In many other areas in the westernmost Louisiana through Texas shelf, sediment temperatures are measured or estimated to be over 160° C (320° F) at 5-km (16,400-ft) depth based on the trends of the BHTs obtained at shallower depths.