

# Geothermal potentialities of Morocco

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## **Abstract**

In order to reduce the deficit of its energy balance, several research programs have been undertaken in Morocco for prospecting the possibility of new and renewable energy sources in the country. The temperature is studied by considering either the deep oil well data or data from shallow wells. Temperature measurements are treated in a synthetic way for each identified basin. This work allowed also to compare the importance and meanings of the temperature methods and to propose a conceptual model of hydrodynamic operation of the hot water aquifers in Morocco as well as a synthetic diagram explaining the different behaviours of thermal profiles in the investigated wells. In Morocco there are several geothermal anomalies and thermal clues, with occurrence of numerous hot springs and important deep aquifers; thus it could be considered as a real geothermal promising country.

Geothermal data has been indicating promising potentialities in the north-eastern Morocco. There are new temperature data, recently recorded in water boreholes located in the Berkane and Oujda areas. Generally, the observed temperature gradients are rather high. One hole near Berkane, revealed an average geothermal gradient of more than 110 °C/km at depths greater than 300 m. This result confirms the geothermal gradient estimated in a mining borehole located about 30 km west of the Berkane borehole, in which water temperature of 96 °C is reached at a depth of about 700 m. Such a high geothermal gradient, exceeding by far the ones already determined for northeastern Morocco, could act as a stimulus to programs aimed at the geothermal exploitation of high temperature aquifers.

**Keywords:** *Geothermal, Energy sources, Well data, Geothermal gradient, Heat flow, Thermal spring, Geothermometer, Geothermal potential, Morocco.*