



## **EXPERIMENTAL TECHNIQUE AND NEW TEMPERATURE AND HEAT FLOW MEASUREMENTS IN THE DEEP BOREHOLES**

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One of the outstanding problems for the modern prospect geophysics is the following, whether permeable zones and commercial petroleum concentrations exist in deep crystalline basement. Temperature measurements allow us to more accurately determine the permeable layers and reservoirs in the basement. Electronics and equipment for remote measurements in the boreholes include a set of deep instruments, cable winch and surface recording unit placed onboard a car. We made temperature measurements by the specially developed measurement technique that gives high accuracy and validity. The temperatures were measured downwards into the borehole, precluding additional fluid mixing in the hole. The thermometer lowering rate was minimised with 200 meter per hour. Measurements were made in deep and superdeep boreholes having steady-state temperature regime. Temperature was measured up to a depth of 5800 m with a sampling interval of 10 cm to 5 m. Measurements were made in the open hole and in the drill string. Temperature measurements give evidence for the existence of anomalous zones potentially corresponding to permeable layers. Unconsolidated zones occur at great depths in the granite-gneiss layer and their thickness and magnitude increase with increasing depth. The studies indicate that fluid injection anomalies, gas anomalies, sheet flow and overflow zones can be detected by temperature measurements. The drilling in the hole revealed heavily shattered rocks (fault breccia) at these depths. New temperature measurements in the deep boreholes that stood idle for 3 to 9 years after the drilling suggest permanent migration of gas from greater depths.