Introduction to Hydro – Geothermal Exploration of the Couloir sud Rifain, Morocco

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Geothermal characterization of the Couloir sud Rifain has been led by an integrated approach using petroleum well, shallow geothermal prospecting and the study of thermal springs emerging in the Couloir. The compilation and the treatment of those data permit to determining the underground temperature that constitutes the main parameter of basis for all geothermal prospecting.

The investigation of temperature deep obtained from petroleum well permitted to have a middle geothermal gradient of about of 23.6 °C/kms. Besides, the analysis of the shallow depth temperatures gotten from the geothermal prospecting companion in the superficial slice of soil, showed that these temperatures are influenced by local, climatic and streamlined conditions and that this influence seems to dim from the depth of 5 m. The calculation of thermal indexes gave relatively elevated indications (> 25°C) notably in the northern part of the Couloir, to the west of Fez city. With these relatively elevated indications, this area seems to be confirmed like a zone where geothermal applications are foreseeable, at least for the medium and low enthalpies.

Couloir sud Rifain region is recognized by the presence of several thermal springs such Moulay Yacoub, Sidi harazem, Ain Allah… Thermal water, with temperature of emergence is up to 54°C, that constitutes indeed, the expression in surface of a hydro – geothermal reservoir, permitted an evaluation of water temperature in the deep reservoir (i.e. Liasic reservoir). Geothermometric investigation reveals that studied waters are all in equilibrium with quartz, thus, quartz geothermometer can be used for the estimation of temperature at deep reservoir.

Key words: temperature, geothermal gradient, thermal water.