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# Building geomechanical characteristic model in Ilan geothermal area, NE Taiwan

Yu-Hsuan Chiang and Jih-Hao Hung
National Central University, Department of Earth Sciences, Taiwan (coco199011211005coco@gmail.com)

National Energy Program-Phase II (NEPPII) was initiated to understand the geomechanical characteristic in Ilan geothermal area. In this study, we integrate well cores and logs (e.g. Nature Gamma-ray, Normal resistivity, Formation Micro Imager) which were acquired in HongChaiLin (HCL), Duck-Field (DF) and IC21 to determine the depth of fracture zone, in-situ stress state, the depth of basement and lithological characters. In addition, the subsurface in-situ stress state will be helpful to analyze the fault reactivation potential and slip tendency. By retrieved core from HCL well and the results of geophysical logging, indicated that the lithological character is slate (520m $\sim$ 1500m) and the basement depth is around 520m. To get the minimum and maximum horizontal stress, several hydraulic fracturing tests were conducted in the interval of 750$\sim$765m on HCL well. The horizontal maximum and minimum stresses including the hydrostatic pressure are calculated as 15.39MPa and 13.57MPa, respectively. The vertical stress is decided by measuring the core density from 738m to 902m depth. The average core density is 2.71 g/cm3, and the vertical stress is 19.95 MPa (at 750m). From DF well, the basement depth is 468.9m. Besides, by analyzing the IC21 well logging data, we know the in-situ orientation of maximum horizontal stress is NE-SW. Using these parameters, the fault reactivation potential and slip tendency can be analyzed with 3DStress, Traptester software and demonstrated on model. On the other hand, we interpreted the horizons and faults from the nine seismic profiles including six N-S profiles, two W-E profiles and one NE-SW profile to construct the 3D subsurface structure model with GOCAD software. The result shows that Zhuosui fault and Kankou Formation are dip to north, but Hanxi fault and Xiaonanao fault are dip to south. In addition, there is a syncline-like structure on Nansuao Formation and the Chingshuihu member of the Lushan Formation. However, there is a conflict on Szeleng sandstone. We need to more drilling data to confirm the dip of Szeleng sandstone.