



Seismic exploration of the subsurface structure of a geothermal well site in Ilan, Northern Taiwan

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Geothermal energy is one of the most important natural resources around the world. In Taiwan, many studies have revealed that abundant geothermal resource could be stored beneath the Ilan plain in northern Taiwan, and made Ilan become the first target for exploring the geothermal resources. However, the Ilan plain is covered by thick Quaternary sediments, although there were many geologic studies conducted in the plain, subsurface structure of the Ilan plain is still unclear. In order to provide reliable information for locating a geothermal well in the Ilan plain, in this study, we used seismic reflection method to delineate the detailed subsurface structure of the candidate well site. Two seismic lines were deployed perpendicularly to each other at the Sanhsing area in the Ilan plain. Two vibrators (EnviroVibe) and a seismograph of 384 channels were used for collecting the field data. Results of the two seismic reflection profiles show promising images of the structure of the potential well site. In the W-E profile, an unconformity at the bottom of the sediment was clearly imaged, in which thickness of the sediment was found increased from 500 m in the west to 600 m in the east. In the N-S profile, thickness of sediment was varying and increased from 300 m in the south to 500 m in the north. A major fault system could be interpreted across that N-S seismic line as well. Variation of the thickness of the sediment could be caused by activities within the fault system. Currently, a broad picture of the subsurface structure beneath the potential well site has been obtained. We are now reconstructing the detailed image for the fault system by using the depth migration methods.