

State of stress near the Chelungpu, Taiwan, fault estimated on boring cores retrieved from a 2-km deep hole of TCDP

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Stress states at depths of 739m, 927m, 1082m, 1122m, and 1316m in the northern portion of Chelungpu, Taiwan, fault which has slipped for the 1999 Chi-Chi earthquake (Mw7.6), were investigated on the basis of stress memory effect of rocks recovered by a deep drilling (TCDP). A fault zone at 1111m depth (FZ1111) is considered to correspond to the Chelungpu fault. Magnitude of the minimum horizontal compression, S_{\min} , was 14MPa independently of depth. Magnitudes of the maximum horizontal compression, $S_{H\max}$, in the hanging-wall and footwall were 23MPa and 32.5MPa, respectively. Azimuth of $S_{H\max}$ was parallel to slip direction for the Chi-Chi earthquake. Gradient of vertical stress, S_v , in the hanging-wall was smaller than that in the footwall. Stress states were generally of a strike-slip regime, but it just above FZ1111 was of a normal faulting one. Discontinuous changes in gradient of S_v and magnitude of $S_{H\max}$ across FZ1111 suggest the fault is weak. Since remarkable deformability of TCDP core samples imply quick establishment of the stress memory, the estimated stress state might be of after the earthquake. The normal faulting regime just above FZ1111 may be a consequence of overshoot of fault motion during the earthquake.