

Fossil fluid reservoirs beneath a duplex fault structure within the Central Range of Taiwan

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We investigated the Taiwan slate belt and discovered potential fossil fluid reservoirs beneath a duplex fault structure. The incentive of the investigation originated from better understanding the mechanisms which facilitated the rupturing process of the 1999 Mw 7.6 Taiwan Chi-Chi earthquake. The damaging earthquake rocked Taiwan at about ten kilometers at depth. We examined exposed rocks in regions of the Taiwan Central Range where mostly resemble the pressure and temperature conditions for the hypocenter of the Chi-Chi earthquake, i.e., about sub-greenschist facies. Field observations suggest that the impermeable slate layers may act as cap rocks for confining and retaining high-pressured fluids coming from at deeper depth by the dehydration reaction. In the arc-continent collision zone such as Taiwan, duplexing of continental shelf deposit would provide extensive slate distribution in the mid-crust. We postulated that episodic leakage of the confined and stored fluids may provide the fluid source for fault lubrication during earthquake rupturing. Upon leakage and subsequent volatilization of gases, the volatile fluids injected into the fault planes and dramatically facilitate the earthquake rupturing process. Detailed description of the fluid composition would be presented by Masago et al. in the same session.