

## **Geochemical precursors of fluid samples from an active fault zone in SW Taiwan**

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Representative gas samples were collected from southwestern Taiwan, where many hot springs and mud volcanoes are distributed along tectonic sutures, for gas composition and helium and carbon isotopes measurement before and after the 1999 disaster seismic swarm. No significant variations of gas composition were observed in mud volcanoes. Chunlun hot spring is located on the Chuko fault zone, which has been considered as one of the most potential faults to be re-activated in SW Taiwan. Originally, the bubbling gases of Chunlun hot spring exhibit higher helium isotopic ratios ( $3\text{He}/4\text{He}=4.0\sim 5.9\text{Ra}$ ) before 1999 Chi-Chi Taiwan Earthquake. However, its helium isotopic compositions decrease significantly after the main shock. The gas has been obviously mixed with the crust and/or air component due to the faulting. Another earthquake ( $M=6.4$ ) hit SW Taiwan again at 10:19 October 22 local time. Its epicenter was closer to the stations where we collect samples in this study. The  $3\text{He}/4\text{He}$  ratio of Chunlun gas drops dramatically from  $3.7\text{Ra}$  to  $0.7\text{Ra}$  two weeks before this earthquake. Consequently, the ratio is down to  $0.13\text{Ra}$ , which is clearly dominated by crust component. Such kind of variations, including  $\text{CH}_4/\text{CO}_2$ ,  $\text{CO}_2/3\text{He}$  and  $3\text{He}/4\text{He}$  ratios, can also be found in other stations before and after earthquake. It indicates that the variations of gas compositions may be useful as a precursor of earthquake.