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Chemical composition, source, and flux of mud volcano fluids along Chi-shan Fault, southwestern Taiwan

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Mud volcanoes are important conduits for fluids which are seated and generated in the deep sediment to migrate upward. Understanding its temporal and spatial characteristics and variations provides us the first information before drilling to depth. Fluids emitted from 12 mud volcanoes were sampled and measured their fluxes and chemical compositions monthly for 2 years. Major elements of the fluids are Cl, Na, with high alkalinity, distributed between 82.2 and 117mM, 114 and 145 mM, and 23.1 and 58.3 mM, respectively. High content of B, Ba, and Li are also detected. Results show that there are no significant variations on chemical compositions temporally, indicating no source variations during and sampling period. However, the flux of emitted fluids does vary with time at several mud volcanoes. Mud volcano YNH-B shows the highest slurry outflow flux, up to 1 dm3 per second. The large quantity of the mud and high salinity fluids expelled may indicate the possible impact on sediment and element budget in the mudstone region. Future study on developing real-time mud volcano fluid flux monitoring technique is suggested in the purpose of correlating with tectonic stress and crustal deformation.