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中国東北部 Tancheng-Lujiang 断層におけるヘリウム同位体比の分布
3He/4He distributions near the Tancheng-Lujiang faults zones, at Liaoning, NE China

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Chemical and isotopic compositions have been measured for natural gases near the NNE trending Tancheng-Lujiang Fault Zones (TLFZ) at Liaoning Province, NE China, including hydrocarbon-rich natural gases from Liaohe basin (121oE-124oE, 40.5oN-42oN) and nitrogen-rich geothermal gases from the eastern Liaoning Mountains. Observed 3He/4He ratios show two orders of magnitude variability from 0.04 RA to 3.5 RA where RA is atmospheric 3He/4He ratio 1.4x10-6. The following geochemical observations are noted: (1) at Liaohe basin and the adjacent geothermal fields, 3He/4He ratios show positive correlations with He contents; (2) in Liaohe basin, the 3He/4He ratios are largely variable (0.04-3.5 RA), generally high in the eastern depress and low in the western depress; (3) in the eastern Liaoning mountains, geothermal 3He/4He ratios are generally low (0.2-0.7 RA) but have closed relationship with distribution of seismic activity and heat flow; and (4) overall there is a spatial distribution pattern that 3He/4He ratios gradually decrease from the TLFZ eastwards and westwards. Such a 3He/4He distribution feature shows strong evidence that the TLFZ played an important role on mantle-derived helium transform from mantle upwards and groundwater circulation along the deep major faults.
Keywords: helium, fault, china, isotopes