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The influential factors of fault hydrogen concentration and the potential efficiency evaluation of earthquake prediction in Korla, Xinjiang

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Under the action of temperature pressure gradient difference and concentration difference, the gas in the earth's interior continuously escapes to the surface atmosphere. In the process of fault activity and earthquake incubation, the underground medium condition changes under the action of stress/strain, resulting in rock mass deformation and rupture or chemical reaction leading to abnormalgas release from the earth. Among all kinds of gases, hydrogen is the most active, with the characteristics of lightest mass, minimum radius, migration speed and strong penetration. It is regarded as the most sensitive geochemistry for earthquake prediction. Based on fault hydrogen observation data in Korla,we studied the influence of atmospheric pressure and temperature on the change of fault hydrogen concentration by calculating the correlation coefficient between atmospheric pressure and temperature and fault hydrogen concentration. The Molchan chart method is used to test the seismic reflection efficiency of fault hydrogen and then to extract the prediction index quantitative. Our study results show that:

(1) Both atmospheric pressure and temperature has an influence on the change of fault hydrogen concentration, and there is a positive correlation between the atmospheric pressure and the fault hydrogen concentration. The correlation coefficient is 0.6735, and the temperature is negatively correlated with the fault hydrogen concentration. The correlation coefficient is -0.4262. The atmospheric pressure has an influence on the hydrogen concentration in the fault, and the temperature has little influence on the hydrogen concentration in the fault .

(2) The test results of the fault hydrogen concentration and the earthquake-reflecting ability of Korla in the Molchan chart show that the seismic reflection effect of the fault hydrogen in Korla is better. The corresponding time interval of the earthquake prediction advantage interval is 2 months, and the optimal threshold is 0.3392×10-6. This value can be used as an seismic anomaly discrimination index of the fault hydrogen in Korla in the corresponding time.