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An Analysis of Relation Between Soil Radon Anomalies and Geological Environment Change

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Abstract : As an open system, the earth is constantly undergoing the transformation and release of matter and energy. Fault zones are relatively discontinuous and fragile geological structures, and the release of material and energy inside the Earth is strongest in relatively weak fault zones. Earthquake events frequently occur in fault zones and are closely related to tectonic activity in these zones. In earthquake precursor observation, monitoring the spatiotemporal changes in the release of related gases near fault zones (such as radon gas, hydrogen, carbon dioxide, helium), and analyzing earthquake precursor anomalies, can be effective means to forecast the occurrence of earthquake events. Radon gas, as an inert radioactive gas generated during the decay of uranium and thorium, is not only a indicator for monitoring tectonic and seismic activity, but also an important topic for ecological and environmental health, playing a crucial role in uranium exploration. At present, research on soil radon gas mainly focuses on the measurement of soil gas concentration and flux in fault zone profiles, while research on the correlation between spatiotemporal concentration changes in the same region and its geological background is relatively little. In this paper, Tangshan area in north China is chosen as research area. An analysis was conducted on the seismic geological background of Tangshan area firstly. Then based on quantitative analysis and comparison of measurement radon concentrations of 2023 and 2010, combined with the study of seismic activity and environmental changes during the time period, the spatiotemporal distribution characteristics and influencing factors were explored, in order to analyze the gas emission characteristics of the Tangshan fault zone and its relationship with fault activity, which aimed to be useful for the future work in earthquake monitor of Tangshan area.

Keywords : radon, Northern China, soil gas, earthquake
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