THE SPACE-TIME FRACTAL DIMENSION CHARACTERISTICS OF ENVIRONMENTAL HAZARDS ALONG RAILWAY IN XINJIANG SECTION

Yaning Chen (1), Zhihui Liu (2), Siquan Yang (1)
(1) Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences
chenyaning@ms.xjb.ac.cn
(2) Department of Geography, Xinjiang University
lzh@xju.edu.cn or liu@ihw.baug.ethz.ch

Fractal and Chaos Theory is a subject on entering a kind of special disordered state in the process of system evolution. In this paper, based on the random and indeterminacy of regional natural disaster, the space-time fractal characteristics of the environmental hazards along the railway in Xinjiang section is analyzed by using the methods of Fractal and Chaos Theory. The analysis of 38 years water hazard data shows: the environmental hazards in Xinjiang line have self-similarity not only in the time alignment (volume fractal dimension D_f varied from 0.8302 to 1.437), but in the space alignment (informative fractal dimension D_1 varied from 0.0997 to 0.1272). Moreover, except for showing the grades of environmental hazards as time alignment by the relationship that volume fractal dimension D_f is in inverse proportion to the complicity of hazards, and the space alignment can reveal the irregularity of environmental hazards distribution. The results are useful for us to recognize the inner regularity and dynamic characteristic of the water hazard.