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The construction and periodicity analysis of natural disaster database of Alxa area based on Chinese local records

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Abstract: Chinese hand-written local records were originated from the first century. Generally, these local records include geography, evolution, customs, education, products, people, historical sites, as well as writings of an area. Through such endeavors, the information of the natural materials of China nearly has had no "dark ages" in the evolution of its 5000-year old civilization. A compilation of all meaningful historical data of natural-disasters taken place in Alxa of inner-Mongolia, the second largest desert in China, is used here for the construction of a 500-year high resolution database. The database is divided into subsets according to the types of natural-disasters like sand-dust storm, drought events, cold wave, etc. Through applying trend, correlation, wavelet, and spectral analysis on these data, we can estimate the statistically periodicity of different natural-disasters, detect and quantify similarities and patterns of the periodicities of these records, and finally take these results in aggregate to find a strong and coherent cyclicity through the last 500 years which serves as the driving mechanism of these geological hazards. Based on the periodicity obtained from the above analysis, the paper discusses the probability of forecasting natural-disasters and the suitable measures to reduce disaster losses through history records.
Keyword: Chinese local records; Alxa; natural disasters; database; periodicity analysis