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FUZZY-BASED CLUSTERING OF EPICENTERS AND STRONG EARTHQUAKE-PRONE AREAS

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Abstract

An original Discrete Perfect Sets (DPS) algorithm was developed and applied to clustering of earthquake epicenters with $M \geq 3.0$ in California. The obtained clusters correspond well with the locations of the epicenters of strong earthquakes with $M \geq 6.5$. This fact allows considering them as earthquake-prone areas for the magnitude $M \geq 6.5$. We compared the obtained clusters with the areas recognized in 1976 using Earthquake-Prone Areas (EPA) method. The comparison shows that the epicenter clusters recognized by DPS algorithm are mostly located within the EPA areas or continue them in a specific direction. At the same time, the clusters cover significantly smaller zones, about 13% of the total area of the EPA zones. An important feature of the performed DPS clustering is that it uses only earthquake epicenters data instead of a wide range of geophysical, geomorphological and geological objects and parameters used by EPA technique. The efficiency of DPS clustering for recognition of earthquake-prone areas is also illustrated by applying to the seismic region of Caucasus.

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