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Earthquake hazard zoning using Analytical Hierarchy Process (AHP) and fuzzy logic (study area: Southern Khorasan Province)

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Abstract:

Southern-khorasan Province is located in east of Iran and northern part of Sistan Suture Zone. Active faults and different earthquake occurrences imply high seismic potential in this province. In this zonation, several factors such as seismic moment, seismic is acceleration, is fractures, distance from fault, alluvial depth and erosion province maps are used. Hazard zonation shows more than 40% of Province is located in very high to high risk classes, 16% in medium risk class and 40.6% in low to very low risk classes. The results of zoning map shows most risk of occurrence of earthquakes are coinciding with environs of Ardekol (city Haji Abad), Dasht- e- bayaz (Nim block, Qayen), the eastern part of the Doroneh (Ferdows, Tabas), Giv (Birjand), Sedeh (Sedeh, Arian city), Naiband (Tabas, Khuor), Ferdows (Ferdows, Sarayan), Esfandiar (Boshrooyeh) and then fault Shah Abad (Sarbisheh, Darmiyan, Asadiyeh), Sahl Abad (Darmiyan, Asadiyeh), Abgarm (Gazik), Pourang (Sarbisheh, Darmiyan, Gazik), Nozad (Sarbishe, Darmiyan, Asadiye), Kalmard (Tabas, Khuor) and south of Birjand faults(Birjand). The comparison of AHP method and fuzzy logic shows that zoning map prepared by fuzzy logic has more coinciding with reality and in the meantime operators OR (community), Product (Multiplication algebraic) and Sum (sum) were fuzzy coincides with reality. Among them the OR fuzzy (community) has the best matching seismic areas.

Keywords: Southern Khorasan Province, Sistan Suture Zone, Seismic moment, AHP, Fuzzy Logic.