Subsidence hazard assessment and mapping around underground space considering the angle of collapse

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As the human activities in underground area increased in order to enhance the land use, the number of ground subsidence occurrences are also escalating. It is observed not only domestically but also globally that the ascending trend in both pecuniary losses and casualties where the ground foundation is unstable. Analyzing and mapping the ground subsidence hazards in advance is one of the most essential process. GIS (Geographical Information System) is powerful tool for quantitative estimation and display of ground subsidence hazards on regional sites. In recent studies, it is popular that conducting statistic approaches on hazard assessments using GIS. The objective of this research is to design the analysis model to assess subsidence hazard adopting the triggering factors within the radius of influence. The radius of influence can be calculated with the spatial analysis algorithm, which is mainly concerned with the angle of collapse, and allocated to each underground cavity. Ground subsidence inventory obtained by Korea Expressway Corporation and Mine Reclamation Corporation are applied to training stage of frequency ratio analysis, which identifies the degree of each triggering factor. The whole analysis stages are designed as a spatial analysis module to automate the whole process. As a result, the ground subsidence hazard map is composed to display the risk level of target site. It is supposed that this analysis can help in decision-making stage for the reinforcement and urban planning.

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