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Multiple Criteria Analysis of Spatial-Temporal Information for a Preliminary Assessment of the Landslide Susceptibility for Environmental Protection in the Zagreb Region based on Geodynamic Network

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Years of research at the Geodynamic study of the Zagreb region based on precise GPS measurements have been continued through the study of multiple criteria analysis of spatial-temporal information related to environmental protection.
'Land' plays multidimensional role in maintaining many global processes, therefore sustainable planning and management of land resources is an important issue at the global forum. The process of land resource planning and associated decision-making invariably involves multiple objectives, multiple criteria and multiple social interests and preferences. Such complexity necessitates a systematic approach to the decision-making process to accommodate the multiplicity and multi dimensionalities of the problem to improve the reasonability of decisions and to justify the actions to be taken. Application of Geographical Information Systems (GIS) is widely spread in resource inventory and mapping, however, the potential of GIS for planning and decision-making couldn't be utilized fully due to its limited ability to represent judgments, values, arguments and opinions of the decision makers. Integrating GIS and Multicriteria Decision Making (MCDM) methods can overcome these limitations.
The paper describes the study whose objective was to perform a preliminary assessment of the landslide susceptibility for environment protection in the Zagreb region. A geographic information system (GIS) database was compiled based on data from precise geodetic GPS network, topographical and geological maps. Weight of evidence, analytic hierarchy process (AHP), and fuzzy logic methods, as well as hybrid methods, were used to establish the rating of classes for each factor, weightings for the factors, and to combine multiple factor layers into landslide-susceptibility maps. The results recognize relative weights between the influential factors and promote the real efficiency on Zagreb region hillsides disaster can be important references for establishing the evaluation model. In addition, this system significantly provides an immediate decision system to improve the application in hillside residence area, increases system accuracy and computational efficiency.
It also shows that this methodology can also be implemented on wider regions as a result of possible future cooperation among universities of CE countries using geodetic reference frame and additional interdisciplinary data in Central Europe.