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Evaluation of Landslide Hazard Zonation Models in Latian Dam Watershed

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Abstract

(Paper pages 24-41)

Different methods are used for landslide hazard zonation. Some of the methods are based on specific condition of the area. In this research, applicapibility of a number of landslide hazard zonation methods in Latian Dam watershed is evaluated. For this purpose Latian Dam watershed due to variety in geological condition, engineering geological characteristics, topography, geomorphology, and precipitation was selected. Different thematic layers including geology, distance from active faults, elevation, slope rate and aspect, precipitation, and vegetation cover were prepared. More than 150 single and landslide zones were recorded based on aerial photo interpretation and field survey. The data were analyzed to find out about landslide controlling factors. Considering instability controlling factors, Nilsen, Information Value, Weight of evidence, and Density area methods were used for preparation of landslide hazard zonation in the watershed. The comparison of the prepared hazard zonation maps with landslide inventory map indicates that weight of evidence and information value methods with accuracy of 99.4 and 99.7 percent respectively are most appropriate methods for preparation of landslide hazaed zonation map in similar area in Central Alborz.

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Investigation of Mineralogical Characteristics of Vertisols of Fars Province and Their Relationships With Some Physical Indices in These Soils

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Abstract

(Paper pages 1-23)

Clay Mineralogy and some Physical Indices has been investigated on four Pedons of Vertisols from Fars Province, located between 27 49´to 29 14´ north latitude and 54 00´to 54 26´ east longitude. Although these soils show sufficient shrink- swell properties (COLE>0.07) and have all requirements of Vertisols, including; clay content, slickensides and/or wedge shape structure and cracks that open and close periodically in upper 100 cm of soil surface, and has been classified as Vertisols, but they are not dominated by smectitic clay mineralogy as is general believe about the mineralogical composition of these soils. Taking into account the clay content, the low clay CECs (25.46- 44.56 $cmol_c/kg$) and the results of XRD and SEM , the probability of the presence of high amounts of Vermiculite and Smectite clays was very low, and the dominant clay minerals revealed to be Chlorite (swelling and well crystallized), Palygorskite, Illite and some smectite and kaolinite. The measured Atterberg limits (liquid and plastic limits)as compared with the standard values for different clay types also showed that montmorillonite is not the dominant mineral in these soils and chlorite, illite or other low activity clays are more frequent..

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Solution of Groundwater Flow Problem Using Spreadsheet Modeling

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Abstract

(Paper pages 42-65)

The spreadsheet modeling method is a practical tool for solution of the steady state, confined to the groundwater flow problems.The methodology is simple and includes many of the aspects of general flow condition such as anisotropy, heterogeneity, discharge, recharge, and irregular boundary shapes. The method incorporates numerical solution techniques for large matrices. In addition, since users program the equations in spreadsheet cells manually, the method provides good physical intuition for a groundwater flow problem. This may not always be the case when using commertial software programs. Especially it is a good teaching tool in the classroom for many students because they will understand the solution physically well. Governing equations could be developed for anisotropy and heterogeneous flow conditions. Mathematical treatment of boundary conditions is presented and the sink and sources incorporated into the domain of flow problem. The analysis shows that the solution is sensitive to the selection of the dimension of blocks or cells, node spacing and the number of iteration in spreadsheet program. Finally, advantages and limitations of solution methods are discussed in comparison with other numerical solution techniques. This method offers a number of advantages including, simplicity, accuracy and wide availability of spreadsheets such as Microsoft EXCEL. The method also has a number of limitations such as the necessity for hand programming

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in which viewed as shortcoming for accuracy and mistakes by handwriting and the speed of convergence of solution due to low order numerical techniques in the spreadsheet.`

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