Relationship between the fractal dimension and the width to length ratio of mass movements

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Mass movements have some typical geometrical dimensions. One of these typical geometrical dimensions is the width to length ratio. Also, the fractal dimensions of mass movements from the inventory maps of natural mass movements can be used for their geometrical description and characterization. For this reason, in the present study, development of a computer programme for digitizing and determining the fractal dimensions of mass movements, and investigation of the relationship between the fractal dimensions and the width to length (W/L) tario of the mass movements are aimed. For the purpose of the study, a computer programme namely FRACEK for determination of fractal dimensions of amorphous areas is developed by using the JAVA computer language at first. Secondly, a database including the shapes of the mass movements was compiled from the literature and digitized. Then, their width to length ratios and fractal dimensions were calculated. Finally, a series of simple statistical analyses were performed on the data obtained and the results were interpreted. To investigate the relationships between the fractal dimensions and W/L ratios of the mass movements, a series of simple regression analysis is performed. During the regression analyses, linear, power, logarithmic and exponential functions are employed. According to the results obtained, there are some correlations between the D and the W/L ratio. When considering only debris flow data, a power relationship between the D and the W/L ratio was found and its coefficient of correlation was obtained as 0.85. The lowest coefficient of correlations were obtained from the rotational failure data. The coefficients of correlations of the power and exponential funtions were same, 0.53. A similar result was obtained for the translational failure data. Their coefficient of correlations was 0.74. When all data is evaluated together, a relatively strong correlation between the D and the W/L ratio was obtained. These results revealed that to make a differantiation among the mass movements using the fractal dimension is possible.