Bayesian analysis of uncertainty in predisposing and triggering factors for landslides hazard assessment

I. Sandric (1,2), Y. Petropoulos (3), Z. Chitu (4), and B. Mihai (1)

(1) University Of Bucharest, Faculty of Geography, Environmental studies, Bucharest, Romania (sandricionut@yahoo.com), (2) Esri Romania, (3) Foundation for Research and Technology - Hellas (FORTH), Institute of Applied and Computational Mathematics, Regional Analysis Division, (4) Spiru Haret University, Faculty of Geography

The landslide hazard analysis models takes into consideration both predisposing and triggering factors combined into a Bayesian temporal network with uncertainty propagation. The model uses as predisposing factors the first and second derivatives from DEM, the effective precipitations, runoff, lithology and land use. The latter is expressed not as land use classes, as for example CORINE, but as leaf area index. The LAI offers the advantage of modelling not just the changes from different time periods expressed in years, but also the seasonal changes in land use throughout a year. The LAI index was derived from Landsat time series images, starting from 1984 and up to 2011. All the images available for the Panatau administrative unit in Buzau County, Romania, have been downloaded from http://earthexplorer.usgs.gov, including the images with cloud cover. The model is run in a monthly time step and for each time step all the parameters values, a-priory, conditional and posterior probability are obtained and stored in a log file. The validation process uses landslides that have occurred during the period up to the active time step and checks the records of the probabilities and parameters values for those times steps with the values of the active time step. Each time a landslide has been positive identified new a-priory probabilities are recorded for each parameter. A complete log for the entire model is saved and used for statistical analysis and a NETCDF file is created