

Tuesday, 27 May 2013, 15:30–16:00, Géopolis 2224

## Seminar in Computational GIScience

<http://igd.unil.ch/geocomp/seminar>

Mauro Rossi

# Optimal landslide susceptibility zonation based on multiple forecasts

Landslide susceptibility is a key issue for the assessment of landslide risk. Many studies have attempted to evaluate landslide susceptibility, using a variety of statistical classification techniques. A statistical modeling approach for landslide susceptibility assessment is presented in this talk. In the proposed approach, different statistical classification techniques are exploited to assess landslide susceptibility including: (i) a linear discriminant analysis (LDA), (ii) quadratic discriminant analysis (QDA), (iii) logistic regression (LRM), and (iv) a self-optimizing neural network (NNM). The proposed approach is scale independent, and it requires in input information on landslide occurrence (grouping variables) and on the environmental setting (explanatory variables). A diagnostic procedure are proposed to detect collinearity in the explanatory variables. A combination model (CFM) based on a regression approach, is proposed to obtain an "optimal" susceptibility zonation. Different metrics are used to evaluate the quality of the susceptibility zonations, including degree of model fit, uncertainty in the probability estimates, and model prediction skills. The combined models resulted in a reduced number of errors and in less uncertain predictions; an important result that suggests that the combination of landslide susceptibility zonations can provide "optimal" susceptibility assessments.

### Short biography:

Mauro Rossi is a geologist and he has a research permanent position at CNR IRPI in Perugia, Italy. His research activities is mainly focused on landslide hazard and risk modeling and on prediction of rainfall-induced landslides. In particular he worked on the statistical modeling of landslide hazard and risk, developing open source software tools (written mainly in R) for the susceptibility assessment, for the estimation of landslides magnitude, for the landslide empirical rainfall thresholds determination, and for the analysis of rainfall induced landslide time series (distribution and clustering) including their effects on population. He recently got a PhD focused on the joint modeling of rainfall-induced processes controlling slope dynamic (erosion and instability processes) exploiting rain gauge measures and satellite rainfall estimates. During his research career Mauro Rossi was a visiting scientist at the NASA Goddard Space Flight Center, Hydrological Sciences Laboratory (US) and at Department of Geography of King's college London (UK).



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