



## **Practical application of an open-source, web-GIS platform (RISKGIS) in learning risk management of geohazards**

Zar Chi Aye (1), Roya Olyazadeh (1), Marc-Henri Derron (1), Michel Jaboyedoff (1), and Johann Lüthi (2)

(1) Risk Analysis Group, Institute of Earth Sciences (ISTE), Faculty of Geosciences and Environment, University of Lausanne, Lausanne, Switzerland (zarchi.aye@unil.ch), (2) Faculty of Geosciences and Environment, University of Lausanne, Lausanne, Switzerland

Within the framework of the Innovative Teaching project at the University of Lausanne, an open-source web-GIS platform (RISKGIS) is developed for students studying environmental risk systems with a focus on geohazards and risk. The aim is for students to better understand and become familiar with approaches used by experts as well as for teachers to better evaluate and monitor student learning. Another objective is also to apply innovative, technology-assisted solutions for enhanced learning experiences and effective teaching, combined with approaches which promote active, experiential and collaborative learning. For this purpose, this platform is developed and applied in Environmental Risk and Advanced Quantitative Risk and Vulnerability courses at the University of Lausanne with undergraduate and postgraduate students, replacing some of the paper-based exercises. A series of practical exercises are conducted, starting with the rapid risk calculation (individual) exercise and moving on to the more complex risk management (individual and group) exercises, incorporating different case studies and functionalities of the platform. Real case studies of hazard events and approaches used by experts are used in the platform to support the experiential learning. This is further complemented by activities such as quiz, discussion, group work, role-playing and hands-on participation, challenging students to develop skills in problem-solving, critical thinking, collaboration and self-reflection. For example, in the exercise carried with postgraduate students (autumn semester, 2017), a real case study of the debris flow event in Brienz (Switzerland) is used, one of the many disastrous events occurred during August 2005 in the Bernese Oberland and the Swiss Alps (Hitz and Hählen, 2014; PLANAT, 2018). During this exercise, students share their thoughts and knowledge in groups to evaluate risk, establish risk reduction strategies and make decisions based on multi-criteria analyses, by playing roles of different actors in risk management (such as geologists, planners, environmental associations, local authorities, and population). Evaluation feedback was collected from students and favorable responses were achieved on various dimensions (technology, perceived learning, etc.) of the exercise and the platform, according to the preliminary feedback analysis.

This platform is developed based on the Boundless framework and its client-side development environment. Free and open source components were applied: PostGIS spatial database, GeoServer and GeoWebCache for application servers with tile cache, and GeoExt and OpenLayers for user interface development of the platform.

### References:

- Hitz, O. and Hählen, N. (2014). Field Trip Brienz, The Flood Event of 2005 at Glyssibach in Brienz, “Living with Geological Risks” of the EuroGeoSurvey Workshop, 22 October 22, Bern, Switzerland.
- PLANAT (2018). Debris flows Brienz (2005). <http://www.planat.ch/en/images-details/datum/2011/06/22/murgaenge-brienz-2005/> (accessed 09 January 2018).