IPL Project Annual Report Form 2015

1 January 2015 to 31 December 2015

1. Project Title

Croatian Virtual Landslide Data Center (CiViLdc)

2. Main Project Fields

(3) Capacity Building

Capacity Building B. Collating and Disseminating Information/ Knowledge

3. Name of Project leader: **Prof. Snježana Mihalić Arbanas**

Affiliation: (office and position) and Contact: (postal address and email)

**Associate Professor**

University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering

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Core members of the Project: Names/Affiliations: (4 individuals maximum)

**Prof. Željko Arbanas, Associate Professor,** University of Rijeka, Faculty of Civil Engineering

**Sanja Bernat, Assistant,** University of Zagreb, Faculty of Mining, Geology and Petroleum Engineering

**Dr. Martin Krkač, Assistant,** University of Zagreb, Faculty of Mining, Geology and Petr. Engineering

**Dr. Sanja Dugonjić, Assistant Professor,** University of Rijeka, Faculty of Civil Engineering

**Petra Đomlija, Assistant,** University of Rijeka, Faculty of Civil Engineering (involved in the project at the beginning of 2014)

4. Objectives: (5 lines maximum)

**General objective of the project is to introduce systematic collection of data about**
landslides in Croatia in the form of data base aimed at dissemination of information to wider society, primarily to public and governmental entities. Specific objectives are:

(1) Development of a web based landslide database;

(2) Collection of data about past and present landslides in Croatia;

(3) Organization of presentations of Croatian Virtual Data Center to governmental entities so as public offering.

5. Study Area: (2 lines maximum)

All over Croatia

6. Project Duration (1 line maximum)

Originally planed project period is 3 years (1 November 2011-1 December 2014). There is need to prolong project period for two years from December 2014 to December 2016.

7. Report

1) Progress in the project: (30 lines maximum)

Main results of project activities implemented in the 2015 are: (i) collection of data about landslides for the national landslide inventory in cooperation with National Protection and Rescue Directorate of the Republic of Croatia; (ii) collection of data for the catalog of Croatian landslides of the Croatian Landslide Portal (http://www.klizista-hr.com), with analysis of spatial and temporal conditions of landslide (re)activation; (iii) presentation of project outcomes to project beneficiaries (public; national, regional/local government) through Croatian Landslide Portal and presentations at the international scientific conferences dealing with landslide science.

Landslide inventories - collection of data about landslides. Visual interpretation of DEM derived maps from airborne LiDAR DEM followed by field checking at the area of: (a) Vinodol Valley (area of approx. 60 km²) in the Primorsko-Goranska County; (b) Zagreb hilly area (area of approx. 20 km²) in the City of Zagreb. Landslides from the evidences of the local governments of: Karlovac City (area of approx. 400 km²); Samobor City (area of approx. 400 km²); Bednja Municipality (area of approx. 80 km²). Digitalization and systematization of historical landslide inventory for the hilly area of the City of Zagreb (area of approx. 100 km²).

Landslide causes - analysis of spatial and temporal conditions of landslide (re)activation. Analysis of triggering factors, i.e., precipitation at the area of the City of Zagreb, Samobor City and Bednja Municipality. Analysis of relationship between landslide types and geomorphological units at the area of the Vinodol Valley (Primorsko-Goranska). Statistics of landslide size based on data from historical landslide inventory of the City of Zagreb from 1979.
Landslide monitoring, analysis of data series gathered by monitoring of the Kostanjek landslide (Zagreb, Croatia). Analysis of monitoring data collected in 2013 and 2014 (during multiple precipitation events) encompassed landslide movement, groundwater and precipitation data. Analyses were performed by means of its reliability, representatives and interrelationship between movement parameters and groundwater, groundwater and precipitation. Obtained results enabled establishment of the phenomenological model of the Kostanjek landslide with prediction capability of 10 days, based on precipitation data. Predictions of landslide movement and groundwater can be used for development of early warning system of the Kostanjek landslide.

Presentation of project outcomes to project beneficiaries (national, regional/local government). Presentation of project results through contacts and cooperation with local government of the City of Zagreb (City Office for Emergency Management), the City of Samobor and the City of Karlovac, as well as with national government, i.e., National Protection and Rescue Directorate.

2) Planned future activities or Statement of completion of the Project (15 lines maximum)

January 2016 –December 2016:

- Data collection and entry about landslides in Lóbor Municipality of 61 km² (Krapinsko-Zagorska County) and Lepoglava Municipality of 65.89 km² (Varaždin County). Field checking of reported landslides.
- Visual interpretation of airborne LiDAR derivative maps at the area of City od Zagreb, Vinodol Valley and Rječina Valley;
- Development and promotion of the application ‘Apply Landslide’ at the Croatian Landslide Portal (http://www.klizista-hr.com) aimed at collecting information about landslides from citizens;
- Development of the web module of GIS software of the Kostanjek landslide monitoring system;
- Presentation of project outcomes to project beneficiaries through Croatian Landslide Portal and presentations for national and regional/local governmental bodies dealing with national protection and land-use planning.

3) Beneficiaries of Project for Science, Education and/or Society (15 lines maximum)

- National, regional and local administration and centers who are in charge of physical planning and developing and implementing of landslide hazard mitigation measures, and civil protection (City Office for Physical Planning, Construction of the City, Utility Services and Transport; Emergency City Office of the City of Zagreb; Primorsko-Goranska County, City of Rijeka, City of Karlovac, City of Samobor, Bednja Municipality, National Protection and Rescue Directorate);
4) Results: (15 line maximum, e.g. publications)

- Scientific papers published in journals and at the conferences
- PhD and master thesis
- Web-based landslide database
- ‘Sendai Framework for Disaster Risk Reduction 2015-2030’ signed by Croatian National Protection and Rescue Directorate and ICL to collaboration aimed at promotion and support of the availability and application of landslide science and technology to decision-making in Croatia

5) The list of publications in the framework of the project is as follows:

**PhD thesis**


**Diploma thesis**


**Book chapter**


**Journal papers**

Mihalić Arbanas, S., Krkač, M., Bernat, S (In press) Application of advanced technologies in landslide research in the area of the City of Zagreb (Croatia, Europe). *Geologia Croatica*, Accepted for publishing.

**Conference papers**

a reservoir water level impact on landslide reactivation. Proceedings of 2nd Regional Symposium on Landslides in the Adriatic-Balkan Region, (B. Abolmasov Ed.) Faculty of Mining and Geology, University of Belgrade, Belgrade.


Note:

1) If you will change items 1)-6) from the proposal, please write the revised content in Red.

2) Please fill and submit this form by 1 February 2015 to ICL Network <icl-network@iclhq.org>