

## IPL Project (IPL - 216) Annual Report Form 2017

**1 January 2016 to 31 December 2016**

1. Project Number (approved year) and Title,

**IPL-216 Diversity and hydrogeology of mass movements in the Vipava Valley, SW Slovenia**

2. Main Project Fields

(1) Technology Development

✓ A. Monitoring and Early Warning, B. Hazard Mapping, Vulnerability and Risk Assessment

(2) Targeted Landslides: Mechanisms and Impacts

A. Catastrophic Landslides, B. Landslides Threatening Heritage Sites

(3) Capacity Building

A. Enhancing Human and Institutional Capacities

✓ B. Collating and Disseminating Information / Knowledge

(4) Mitigation, Preparedness and Recovery

✓ A. Preparedness, B. Mitigation, C. Recovery

3. Name of Project leader: **Timotej Verbovšek, PhD, assoc. prof.**

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Core members of the Project:

Names/Affiliations: (4 individuals maximum)

Tomislav Popit, PhD, University of Ljubljana, Faculty of Natural Sciences and Engineering

Jernej Jež, PhD, Geological Survey of Slovenia

Ana Petkovšek, PhD, University of Ljubljana, Faculty of Civil and Geodetic Engineering

Matej Maček, PhD, University of Ljubljana, Faculty of Civil and Geodetic Engineering

4. Objectives: (5 lines maximum)

The northern slopes of the Vipava Valley are one of the areas in Slovenia with the highest landslide susceptibility. *First objective* is to create a landslide inventory of the Vipava Valley in GIS environment, to comprise the diversity of mass movements in this area. This will result in a database and a GIS map of different units with their lithological, geotechnical and rheological properties. *Second*, to perform a hydrogeological analysis of selected springs in this area, which are related to landslides. *Finally*, to monitor the movement of some of the selected landslides, according to available budget.

5. Study Area: (2 lines maximum)

Study area is located in SW Slovenia, in the northern slopes of the Vipava Valley.

6. Project Duration (1 line maximum): 3 years, 2016(2017)–2019.

## 7. Report

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

The project is in its early beginning phase, and according to plan, several activities have started simultaneously. First, the geological and geomorphological investigations (mapping and GIS analyses) are taking place, with the aim of creation of a detailed engineering-geological map in GIS environment. Also, a multivariate classification of lithology of slope deposits is under current work, and partial results will be published in this year's 23<sup>th</sup> National meeting of Slovenian geologists (<https://sites.google.com/a/geo.ntf.uni-lj.si/23-posvetovanje-slovenskih-geologov/prejeti-povzetki-prispevkov>). At the same meeting, another presentation will be performed about the small lake formed on the Vipava Valley slopes, related to scree slope deposits and flysch. On the 27<sup>th</sup> Annual conference of Geological remote sensing group (<https://www.grsg.org.uk/wp-content/uploads/2016/11/GRSG-2016-Final-Programme-.pdf>) we presented geomorphometric characteristics of selected fossil landslides in the Vipava Valley. For Podrta gora and Gradiška gmajna fossil landslides we roughly identified two main types of movements: structurally conditioned movement and movement that originate from gravitational slope processes. Complexity of these processes is expressed in the form of large rotational carbonate and breccia blocks, which were gravitationally sliding on the flysch basement, the upper weathered part of the flysch or on the muddy sediment.

Current hydrogeological investigations also include measurements of physico-chemical parameters of springs in and groundwater and inclinometers on the northern slopes of the study area. Work is partly performed by a MSc student.

Activities comprise the organization of two important events: first, the co-organization of 4<sup>th</sup> World Landslide Forum in Ljubljana, 29<sup>th</sup> May–2<sup>nd</sup> June 2017 (both organization and field trip preparations). Field study tour #1 to Slovenia will be organized on first day in the Vipava Valley (the topic of IPL-216 project). Second event is the organization of the 3<sup>rd</sup> ReSysLAB (<http://www.geo-zs.si/ReSyLAB2017/>), with first field study tour also taking place in the Vipava Valley. This work included all project team members.

Several investigations are taking place, with aim to be published in peer-reviewed journals. One (current status: In Press) focuses on huge gravitational carbonate blocks near the more known Slano blato landslide, and will be published in a SCI IF journal Acta Geographica Slovenica.

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

We will continue with plan for first year; with further activities focused on production of a map of the area with lithological, geotechnical and rheological properties of the mass movements, plus simultaneous hydrogeological measurements of water related to landslides. IPL-216 project will be mentioned at this year's summer school "Natural disasters", as the topic relates to the Vipava Valley. Outcomes of the work will be

presented at scientific meetings and published in various journals. In the end of the year, we will publish the first yearly report. Also we will continue with a visual interpretation of shaded digital terrain model and indicators of surface roughness, calculated from the ALS data, where we try to identify the forms, prevalence and characteristics of the surface of individual sedimentary bodies.

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

Until now, the beneficiaries are the first the scientists, as work on the project was presented at conference meetings and published in peer-reviewed paper, and secondly, the *students*, as some of them are active in the research project topics. In addition, we are collaborating with a Head of Civil Protection of the Ajdovščina Municipality, who is informed with all major project findings important for CP activities.

4) Results: (15 lines maximum, e.g. publications)

Publications:

- Verbovšek, T., Košir, A., Teran, M., Zajc, M., Popit, T. 2017. Volume determination of the Selo landslide complex (SW Slovenia): integrating field mapping, ground penetrating radar and GIS approaches. *Landslides*, <http://dx.doi.org/10.1007/s10346-017-0815-x>
- Maček, M., Majes, B., Petkovšek, A. 2016: Lessons learned from 6 years of suction monitoring of the Slano blato landslide. *Rivista Italiana di Geotecnica* 5, 21-33. <http://www.associazionegeotecnica.it/rig/2016/1/lessons-learned-6-years-suction-monitoring-slano-blato-landslide>
- Conference presentations at the 27<sup>th</sup> Annual conference of Geological remote sensing group (Popit, T., Rožič, B., Verbovšek, T. 2016). *Geomorphometric characteristic of selected fossil landslides in the Vipava Valley, SW Slovenia*, available at the site: <https://www.grsg.org.uk/meetings/grsg-27th-annual-conference-future-of-geological-remote-sensing-innovation-and-challenges-london-united-kingdom-7th-to-9th-december-2016/>
- Conference presentations at the 32nd IAS International Meeting of Sedimentology (Martín-Pérez, A., González-Acebrón, L., Košir, A., Popit, T. 2016). *Sandstone diagenesis, salt-induced weathering and landslide formation: the case of Slano Blato Landslide, Slovenia*. <http://programme.exordo.com/ims2016/delegates/presentation/368/>.
- Acceptance of extended abstracts at the 4WLF in Ljubljana:
  - Verbovšek, T, Kočevar, M., Benko, I., Maček, M., Petkovšek, A.: A Mass movement processes of Quaternary deposits in Vipava Valley, SW Slovenia authors: Popit, T., Jež, J., Verbovšek, T. WLFO-D-16-00225.
  - Popit, T., Jež, J., Verbovšek, T. *Mass movement processes of Quaternary deposits in Vipava Valley, SW Slovenia*. WLFO-D-16-00225.

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 **30 March 2017** to **ICL Network** <[icl-network@iclhq.org](mailto:icl-network@iclhq.org)>