

IPL Project Proposal Form 2016

(MAXIMUM: 3 PAGES IN LENGTH)

1. Project Title: (2 lines maximum)

Diversity and hydrogeology of mass movements in the Vipava Valley, SW Slovenia

2. Main Project Fields

Select the suitable topics. If no suitable one, you may add new field.

- (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; what you expect to accomplish?)

First, 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. Background Justification: (10 lines maximum)

Various types of different mass movements occur in the Vipava Valley, with huge fossil landslides being the largest, followed by active landslides in the vicinity of Ajdovščina town – the Slano Blato mudflow and Stogovce landslide, both in the range of 1 million m³ of transported material. Apart from these bigger events, deep rotational landslides of carbonate gravel and translational landslides (plus huge carbonate blocks) occur and smaller creep movements endanger smaller unhabituated areas, mostly due to combination of the high precipitation and a larger extend of unconsolidated gravel. Relatively unknown is the influence of ground water, seeping from carbonate into flysch slopes. All these processes contribute to a complex mass movement situation, endangering some of the villages in the valley.

6. Study Area: (2 lines maximum; where will the project be conducted/applied?)

Study area is located in SW Slovenia, in the upper Vipava Valley.

7. Project Duration: 3 years, 2017–2019.

8. Resources necessary for the Project and their mobilization

Personnel, Facilities, and Budgets

- *Personnel* consists of scientists, which are employed at different institutions – two faculties belonging to the University of Ljubljana, and from the Geological Survey of Slovenia. These form the core of the project team. Additional personnel will consist of civil protection of the involved municipalities, for the transfer of knowledge to the resident level. Other professionals will contribute to the investigations of boreholes, hydrogeological research and monitoring.
- Required *facilities* are available at the faculties, Geological survey, municipalities. Needed equipment for the realization: GPS, GIS software, hydrogeological probes, laptops.
- *Budget* of the project can not be estimated in this stage, as the project will comprise field work during regular research activities, covering the mapping and first year plans. Financing of the hydrogeological and other activities will be dependent on the other financial sources, related to proposed research projects. If these will not be fully granted, these investigations will be limited to basic measuring of physico-chemical properties and monitoring with the existing GPS network.

9. Project Description: (30 lines maximum)

The aim of the project is the holistic approach to the investigation of the mass movements in the Vipava Valley, one of the most active and interesting regions regarding these movements in Slovenia. Morphologically diverse Vipava Valley has elevations from 100 m a.s.l. in the bottom of the valley to about 1200 m. on the high karstic plateau, resulting in very diverse mass transport processes, active both in the past and present times. Landslides and problematic areas have been known in the past, but no integrated map of the landslides has been produced until now. A quite unknown factor is the influence of ground water, infiltrating in the high karstic plateau and emerging in several springs on the slopes. Therefore, the investigations will be also focused on the quantity and quality of the springs.

Finally, selected mass movements will be monitored with GNSS probes (this is currently in progress for some locations) and their geotechnical and rheological properties will also be investigated.

10. Work Plan/Expected Results: (20 lines maximum; work phases and milestones)

- Year 1 (2017): Data collection and literature review of the mass movements in the Vipava Valley. Engineering-geological mapping of the area, creating a database in GIS environment.
- Year 2 (2018): Continuation of previous year activities, plus hydrogeological measurements.
- Year 3 (2019): Continuation of previous year activities, plus monitoring and geotechnical investigations, final investigations.

11. Deliverables/Time Frame: (10 lines maximum; what and when will you produce?)

- Year 1: *First report* on the activities conceived in the work plan, map of the area with lithological, geotechnical and rheological properties of the mass movements.
- Year 2: *Second report*, comprising the hydrogeological measurements of the selected springs, their locations and possible hydrogeochemical analysis (according to available budget), plus dissemination of the obtained results on scientific and professional conferences.
- Year 3: *Final report*, comprising the results of monitoring and geotechnical plus rheological investigations, plus all activities during the project, plus publication of papers in peer-reviewed journals.

12. Project Beneficiaries: (5 lines maximum; who directly benefits from the work?)

- *Residents of Ajdovščina and Vipava municipalities*, living with with slope mass movements, with improved knowledge mass movements (problematic areas for buildings and infrastructure).
- *Scientists*, with published papers about the research work on mass movements.
- *Spatial planners and civil engineers*, with improved professional knowledge.
- *Students*, as many of the project team members are employed at the universities and will present the project results and ICL activities inside the lectures.

13. References (Optional): (6 lines maximum; i.e. relevant publications)

- Popit, T., Rožič, B., Šmuc, A., Kokalj, Ž., Verbovšek, T., 2014: A LIDAR, GIS and basic spatial statistic application for the study of ravine and palaeo-ravine evolution in the upper Vipava Valley, NW Slovenia. *Geomorphology* 204, 638–645.
- Jež, J., 2007: Reasons and mechanism for soil sliding processes in the Rebrnice area, Vipava Valley, SW Slovenia. *Geologija* 50/1, str. 55-63, Ljubljana.
- Petkovšek, A., Fazarinc, R., Kočevar, M., Maček, M., Majes, B., Mikoš, M., 2011: The Stogovce landslide in SW Slovenia triggered during the September 2010 extreme rainfall event. *Landslides* 8, 499–506.

Note: Please fill and submit this form by 1 July 2016 to ICL secretariat

<secretariat@iclhq.org> and ICL network <ICL-network@iclhq.org>