

**World Centre of Excellence (WCoE-2017-2020)**  
**Progress Report Form 2017**  
**29 May 2017 to 31 December 2017**

1. Short Title of WCoE: Geological data and landslide risk reduction at local scale
2. Name of Institution (Name of leader and email): Mateja Jemec Auflič, PhD.; Geological Survey of Slovenia, Dimičeva ulica 14, 1000 Ljubljana, Slovenia, [mateja.jemec@geo-zs.si](mailto:mateja.jemec@geo-zs.si)
3. List of core members: Jernej Jež, Miloš Bavec, Tina Peternel, Bogomir Celarc
4. Progress report of activities up to 31 December 2017 (up to 30 lines)

Landslide hazard models almost always rely on geological data obtained by field mapping, boreholes or outcrops while the accuracy depends on the level of field survey. One of the most exposed landslide hazard areas is Koroška Bela catchment (previously investigated in the IPL-188, and in the ongoing IPL-226). Through an interdisciplinary approach aimed at developing a methodology for risk assessment of landslides and debris flows, which will include landslide origin (source areas) modelling, assessment of deposition volume, determination of rheological characteristics of the material, and modeling of the runout distance and the zone of deposition, the important step towards risk reduction in this highly prone village will be done. In the first year of approved WCoE our investigations were mainly focused on the field data acquisition using geological mapping and drilling. Based on this data we created a landslide susceptibility map, landslide source areas and volume. We have established monitoring by applying piezometers and inclinometers in two sites in the hinterland of Koroška Bela village and estimated the potential volume that could in time of abundant rainfall mobilize into debris flow and hit the village below. According to the data collected so far we estimated that  $1,4 \times 10^6 \text{ m}^3$  of material could mobilize into debris flow. Modeling the movement of potential debris flows using Flo-2D software shows that the overall depths of the stream on the peak in some areas along the Bela stream could exceed the depths of 6 m. Such intensity of the phenomenon is devastating for residential buildings and other facilities in this area.

The core members started working on the EU project GIMS and U-Geohaz, focused on monitoring surface deformation by a new, low cost advanced technology (GNSS, Sentinel-1 and MEM sensors) and developing software to process SAR data for monitoring urban areas.

The core members of WCoE, together with the University of Ljubljana, organized the 3rd

regional symposium on landslides in the Adriatic Balkan region which took place from 11 to 13 October 2017 in Ljubljana. The symposium was attended by 70 scientists, engineers and researchers from 9 countries that are active in the field of landslide research. A round table was also held within the framework of the symposium, titled: Promoting cooperation between science and end-users.

5. Plan of future activities (up to 30 lines)

We will continue with the developing of methodology for risk assessment of landslides and debris flows with the focus on geomechanical properties of soils taken at the Koroška Bela hinterland with the aim to define the correlation between groundwater levels, rainfall and displacement rates. This will enable the understanding of landslide dynamic and contribute to preventive measures and to set up an effective early warning system. We will be applying new advanced technologies for slope mass movements identification/zonation and monitoring with special emphasis on geodetic techniques (GNSS, GBInSAR) and further development of the national warning system for rainfall induced landslides including system validation, defining new rainfall thresholds and establishment of local early warning system.

6. Publication (in Landslides, proceedings, meeting reports, or WEB)

JEMEC AUFLIČ, Mateja, JEŽ, Jernej, POPIT, Tomislav, KOŠIR, Adrijan, MAČEK, Matej, LOGAR, Janko, PETKOVŠEK, Ana, MIKOŠ, Matjaž, CALLIGARIS, Chiara, BOCCALI, Chiara, ZINI, Luca, REITNER, Jürgen, VERBOVŠEK, Timotej. (2017). The variety of landslide forms in Slovenia and its immediate NW surroundings. *Landslides*:14/ 4, 1537-1546.

KOMAC, Marko, PETERNEL, Tina, JEMEC AUFLIČ, Mateja. TXT-tool 2.386-2.1: SAR interferometry as a tool for detection of landslides in early phases : TXT-tool 2.386-2.1. V: SASSA, Kyoji (ur.), et al. *Landslide Dynamics: ISDR-ICL landslide interactive teaching tools*. Vol. 1, Fundamentals, mapping and monitoring. Berlin: Springer. 2018, 275-285.

JEMEC AUFLIČ, Mateja, ŠINIGOJ, Jasna, PETERNEL, Tina, PODBOJ, Martin, KRIVIC, Matija, KOMAC, Marko. A system to forecast rainfall-induced landslides in Slovenia : TXT-tool 2.386-2.1. V: SASSA, Kyoji (ur.), et al. *Landslide Dynamics : ISDR-ICL landslide interactive teaching tools*. Vol. 1, Fundamentals, mapping and monitoring. Berlin: Springer. 2018, 391-404.

JEMEC AUFLIČ, Mateja (urednik), MIKOŠ, Matjaž (urednik), VERBOVŠEK, Timotej (urednik). *Living with slope mass movements in Slovenia and its surroundings : post forum study tour guide book*, Saturday 3 June - Monday 5 June, 2017. Ljubljana: Faculty of Civil and Geodetic Engineering, 2017.

[https://www.wlf4.org/wp-content/uploads/2017/06/Vodic-po-4thWLF\\_Post-Forum-Study-Tour.pdf](https://www.wlf4.org/wp-content/uploads/2017/06/Vodic-po-4thWLF_Post-Forum-Study-Tour.pdf).

JEMEC AUFLIČ, Mateja (2017). 3rd Regional Symposium on Landslides in the Adriatic - Balkan

Region, Ljubljana - ReSyLAB 2017, 11-13 October 2017, Ljubljana, Slovenia. Symposium programme. Book of abstracts. Ljubljana: Geological Survey of Slovenia, 2017. 63P. [http://www.geo-zs.si/ReSyLAB2017/docs/3rd%20ReSyLAB\\_Abstracts.pdf](http://www.geo-zs.si/ReSyLAB2017/docs/3rd%20ReSyLAB_Abstracts.pdf).

Note:

Please fill and submit this form by **30 March 2018** to ICL Network <[icl-network@iclhq.org](mailto:icl-network@iclhq.org)>

Less than 2 printed pages.

Activities are recommended to submit to the ICL-IPL activities of Landslides: Journal of International Consortium on Landslides.