
Involvement of the Geological Survey of Slovenia in the field of natural hazard risk management

Špela Kumelj, Mateja Jemec-Auflič, Jernej Jež, Tina Peternel, Blaž Milanič
Geohazard group, GeoZS

COMLAND workshop, Ljubljana, 23.06.2016

WHAT IS THE GeoZS?

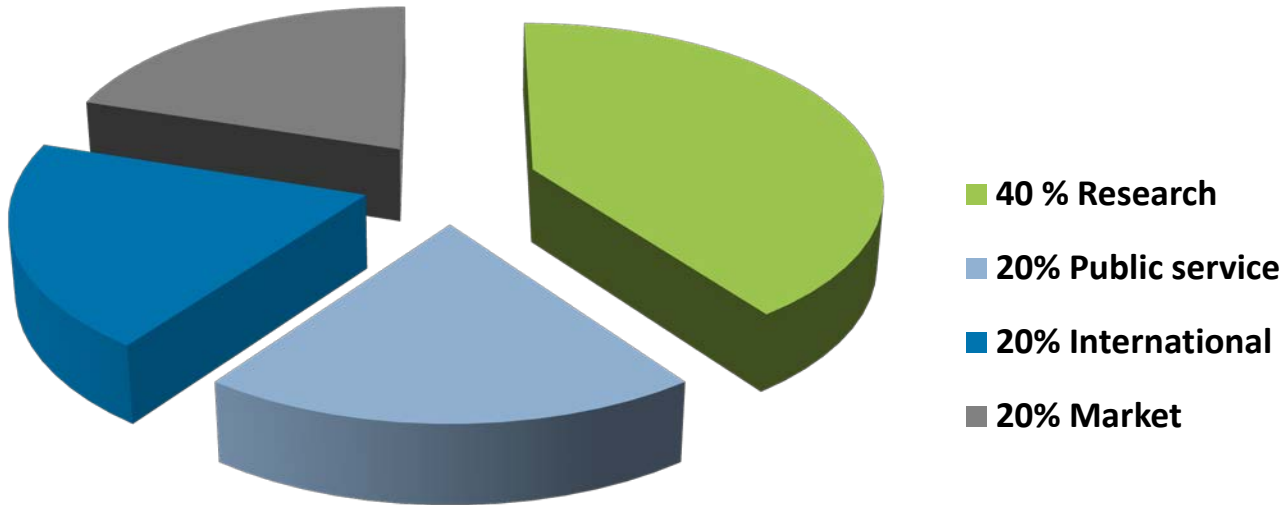
- **Legal status: Public Research Institute**
- **Owned by The Republic of Slovenia**
 - **Ministry of Environment and Spatial Planning**
 - **Ministry of Science**
 - **Ministry of infrastructure**



OUR HISTORY

- **Funded: 1946 as the Geological Survey Ljubljana**
- **Reorganised into GeoZS: 1991**

Funding structure



Projects, connected to NHRM

ClimChAlp (PSInSAR methodology was applied to observe the movements of the displacement rates in the NW of Slovenia)

AdaptAlp (Impacts of climate change on slope mass movements' occurrences were examined through displacement rates of PS points and rainfall patterns).

Start-it-up (development of common “state-of-the-art” or “best-practice” in the field of Natural Hazard Risk Management (NHRM) and Risk Governance (RG)).

SafeLand (risk management and innovative approaches to risk mapping on European level were studied)

I2GPS integrated two technologies InSAR and global navigation satellite system (GNSS).

RECALL focuses on smart, community based solutions supporting local authorities in better planning and implementing landslides and disaster prevention measures in their territories.

GeoZS + prevention measures

- Susceptibility assessment
- Database of past events
- A landslide forcast system

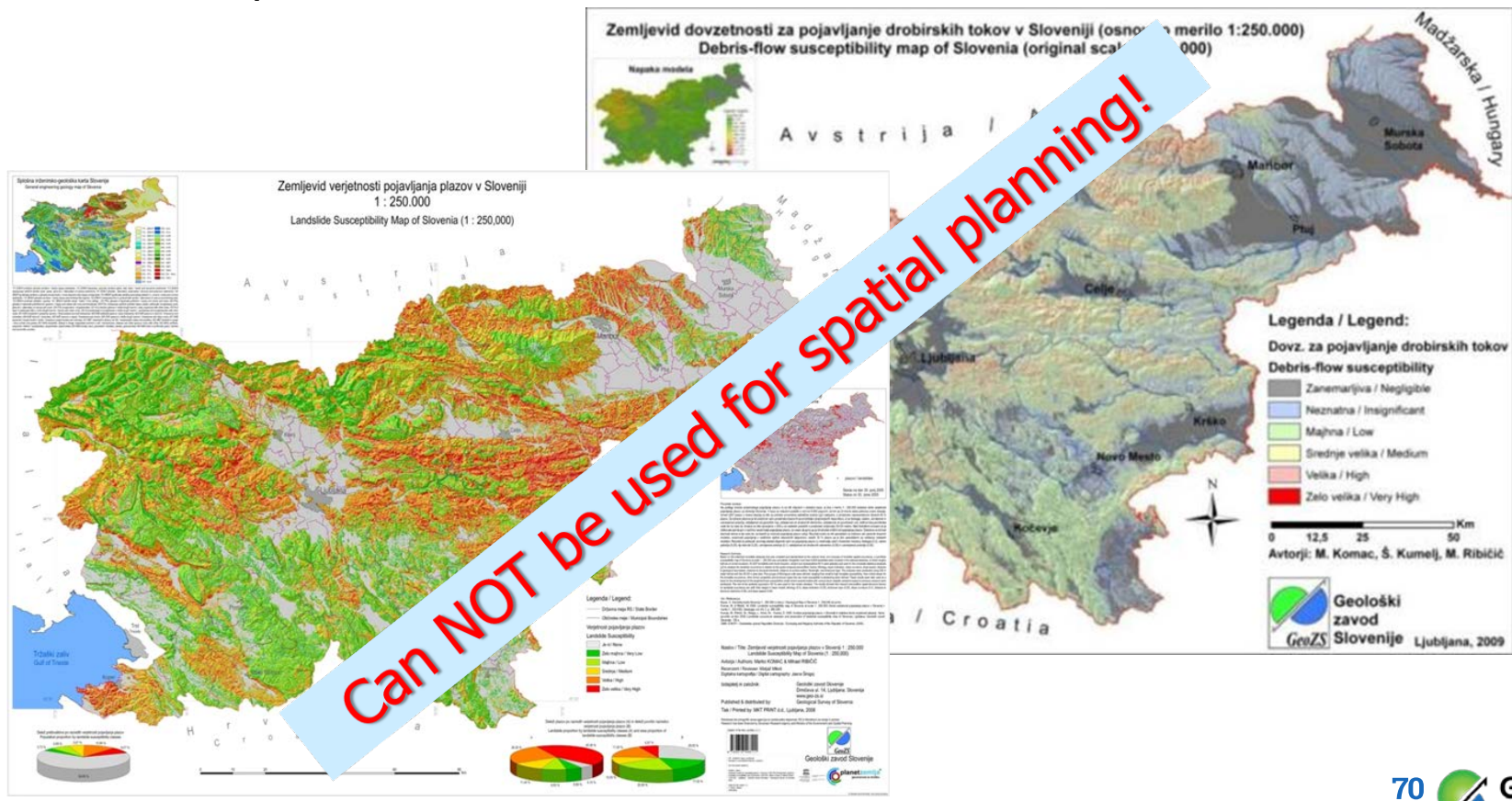


Different types of mass movement processes:
landslide (left), debris-flow (middle), rock-fall (right)

(photos © M. Ribičič)

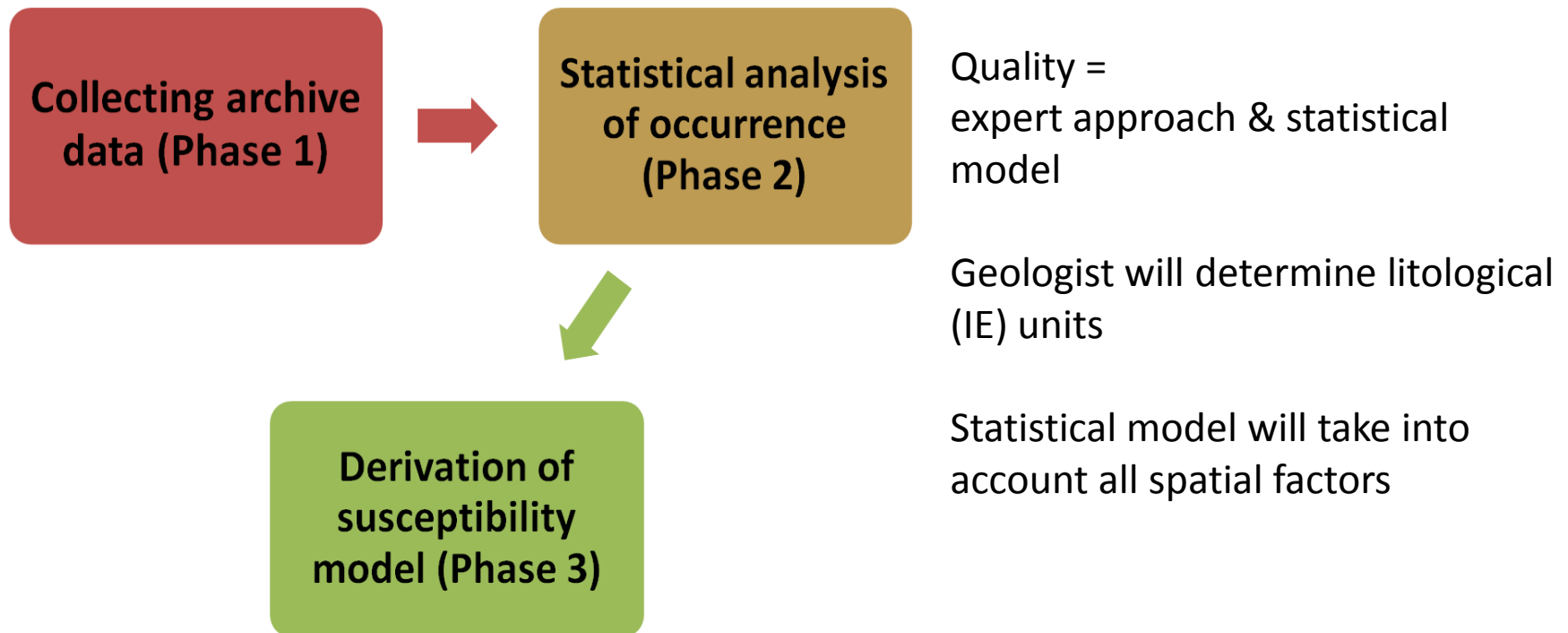
GeoZS approach to susceptibility assessment

- **Landslide and debris flows susceptibility map, both in scale of 1:250,000 (Komac 2005 & 2009) have been developed.**

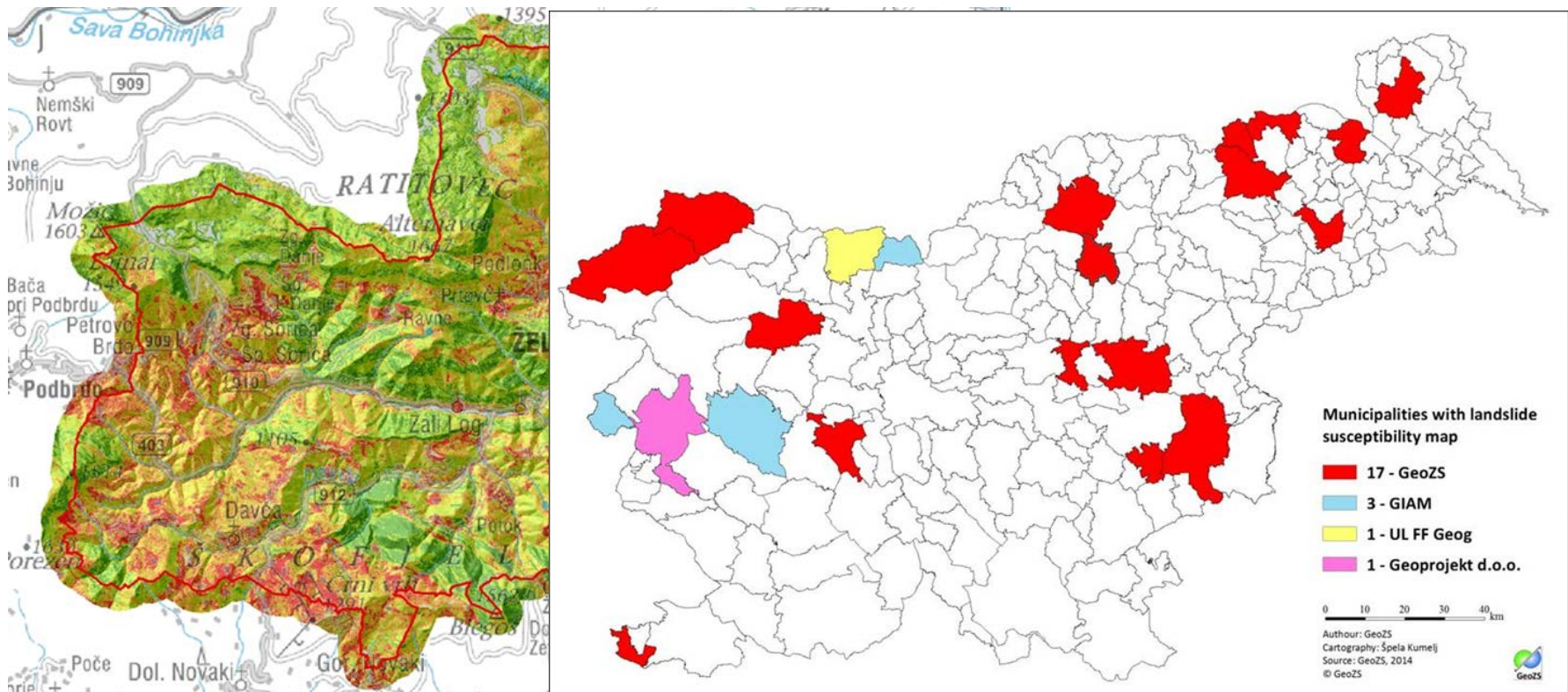


GeoZS approach to susceptibility assessment

- **Methodology** of susceptibility maps derivation is adapted to levels of precision depending on expected use of results (Regional, Local and municipal (1:25,000), Detailed (1:5,000 and 1:1,000))



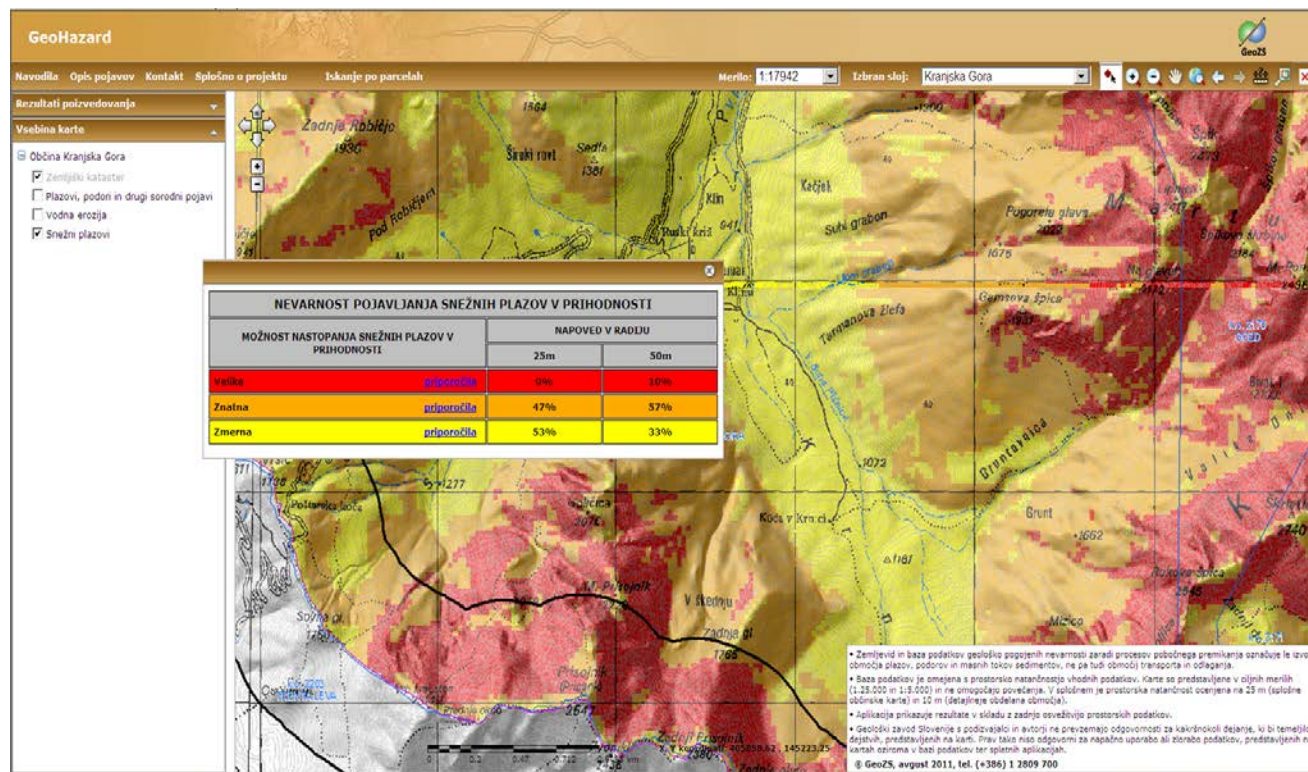
GeoZS approach to susceptibility assessment



- Methodology can be also adopted to different environments. After retrieving of new data or new validation of results, system enables new recalculation and reclassification.

Interactive web application

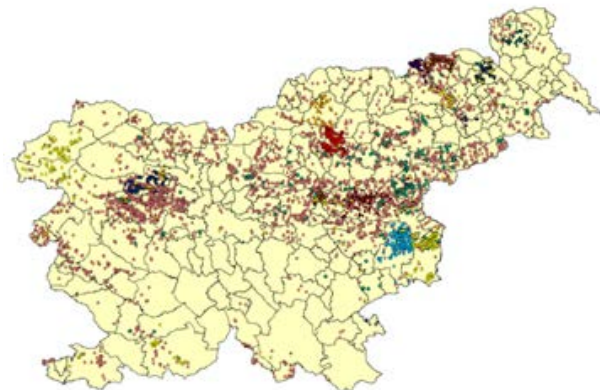
- Results are available as datasets in standard GIS format, adapted to end users.
- <http://akvamarin.geo-zs.si/geohazard/> (The visualization of the results is limited by the spatial accuracy of input data)

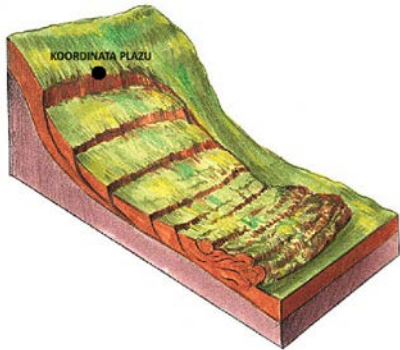


Uniform spatial DB of SMM events

- GeoZS collects event data since 1998 (7273 events; 6941 landslides with know location; 898 with known location + date of occurence)
- Uniform and central gathering is still inadequate.
- Status: kaotic

sources and purposes for collecting data are different, geographic positioning is not correct in 20% of the data, maintenance, traceability,...





Geographic location



Lesjak , Florjan pri Šoštanju (foto: podjetje RGP)

Uniform spatial DB of SMM events

- Administration for civil protection and disaster relief, Ministry of Defence, has established the working group to prepare The Procedure for actions taken when landslides are triggered.
- Within this group a **common inventory form** to collect event data and to assure higher quality of collection was developed
- Minimum datasets to assure projects' quality demands (Date of occurrence, Location, Type and description (dimension), Cause of event and damage (risk)- (SEF), Proposal of Actions to be taken(SEF), Documents and contacts)
- **web application e-Plaz**

Spletna aplikacija e-Plaz

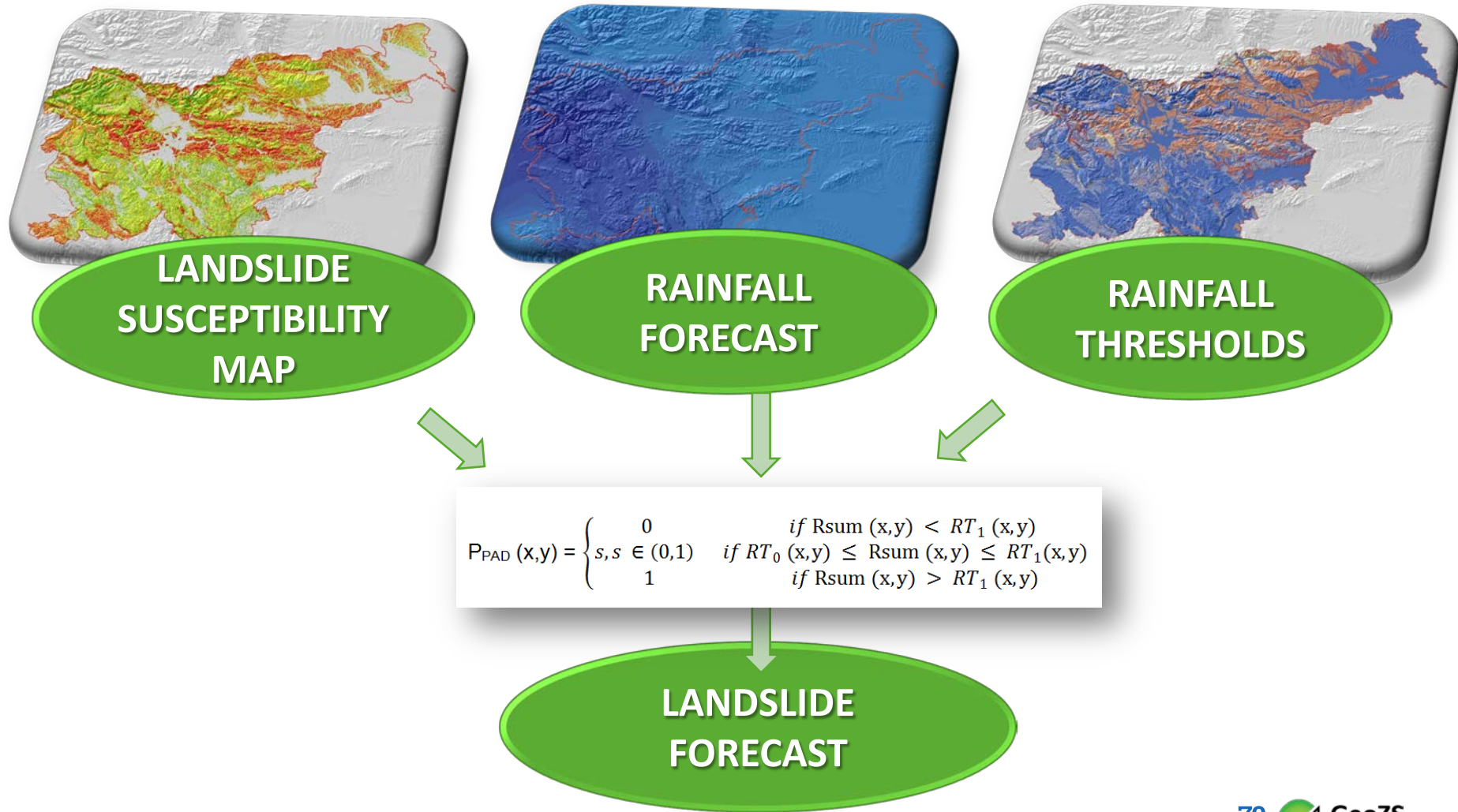
e-Plaz  Kontakt

 Prijava

Project MASPREM / MASPREM 2

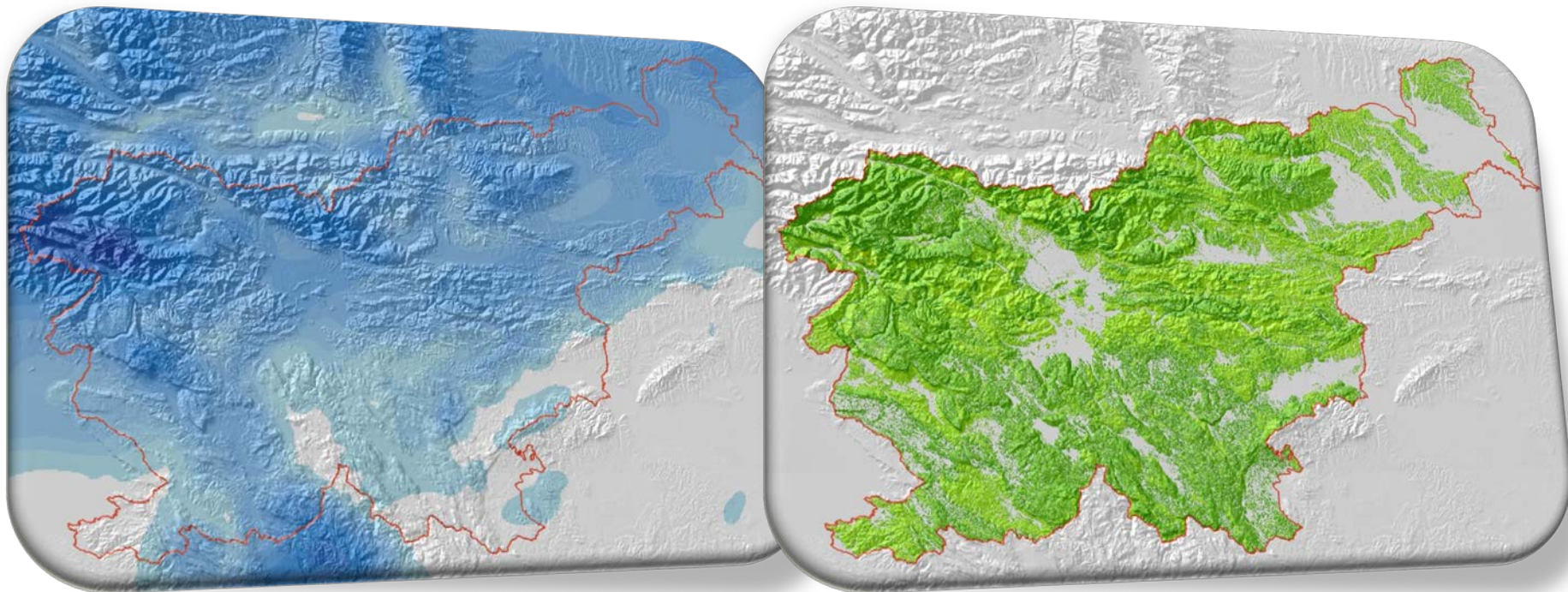
- To develop a landslide forecast system that will, through a **web application, inform** responsible authorities /**warn** inhabitants of **an increased landslide hazard** as a consequence of heavy precipitation that would exceed the threshold landslide triggering values.
- National project, funded by Administration for civil protection and disaster relief, Ministry of Defence

A landslide forecast system



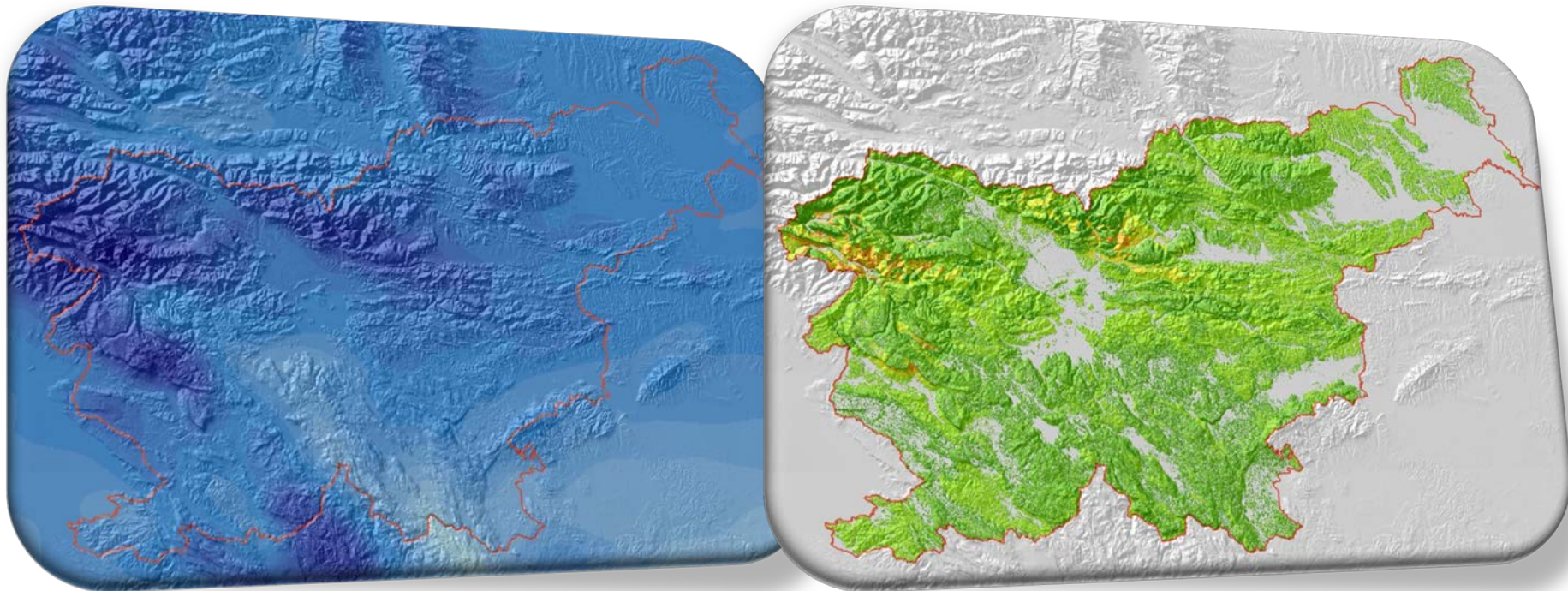
Calculation of landslide forecast predicts an increased probability of certain date.

FORECAST EXAMPLE



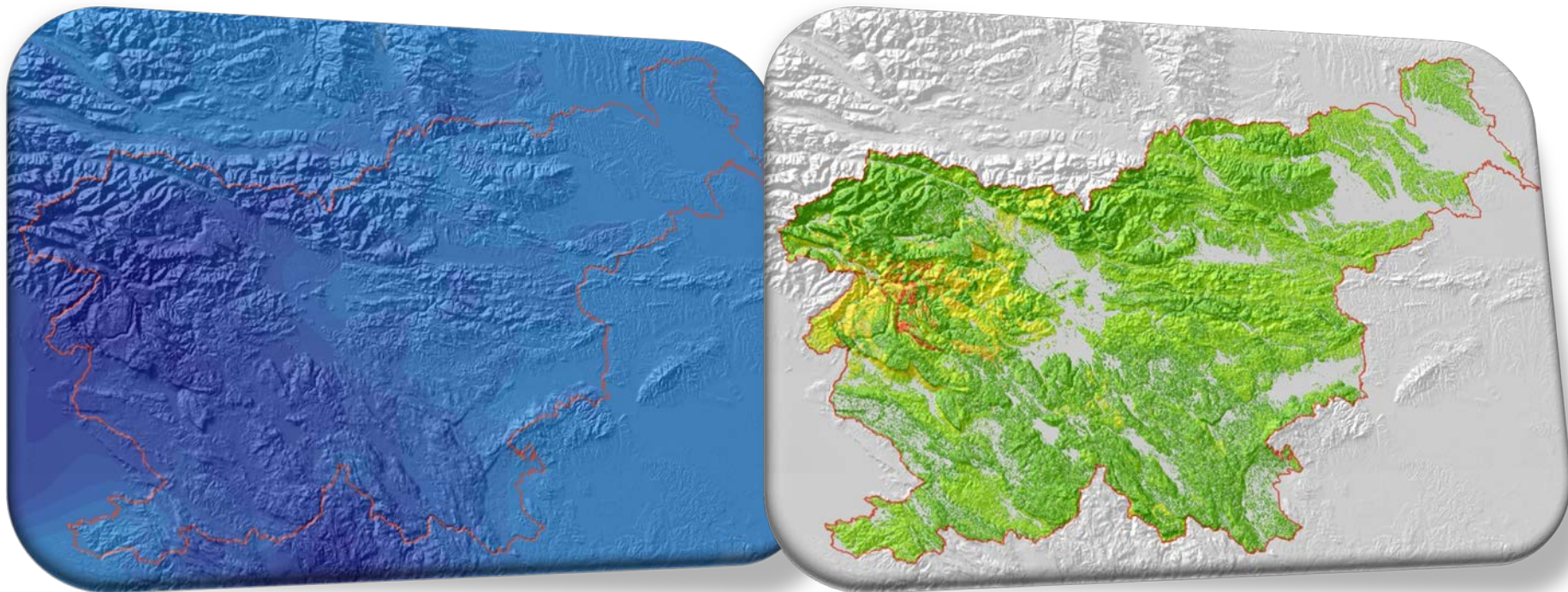
1st day, 24-hour forecast

FORECAST EXAMPLE



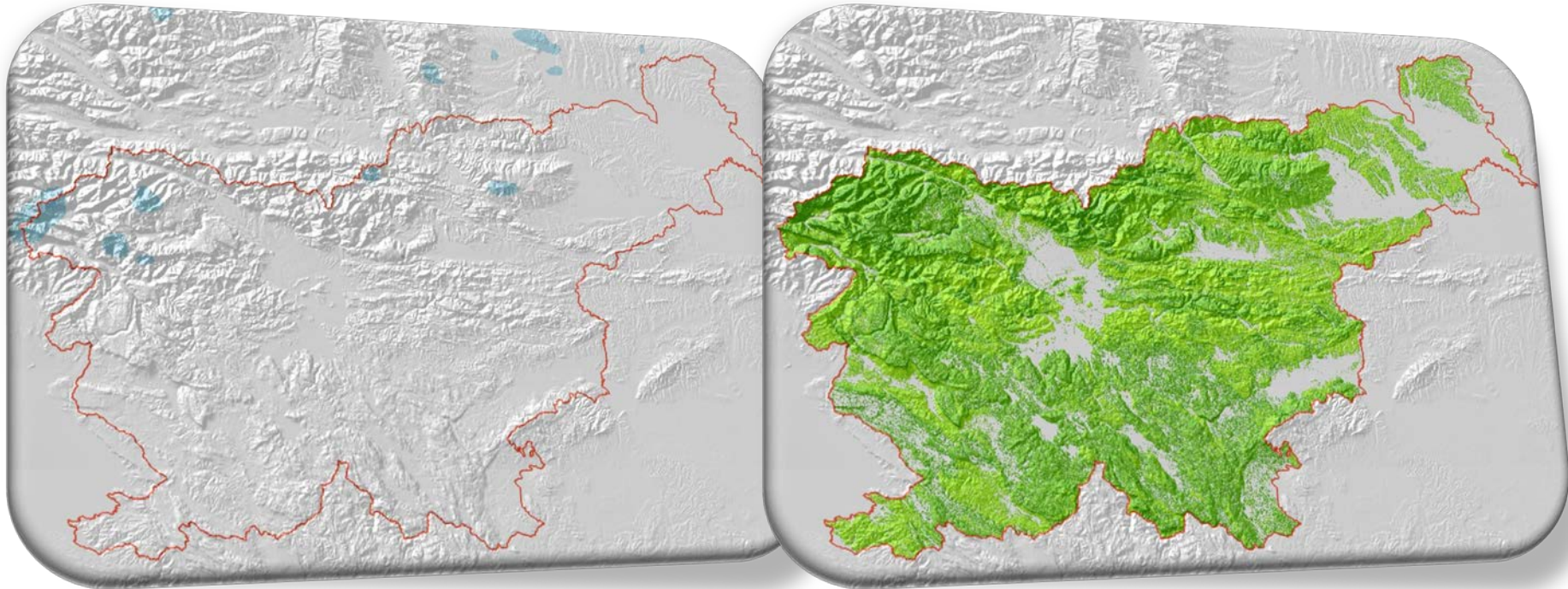
2nd day, 24-hour forecast

FORECAST EXAMPLE



3rd day, 24-hour forecast

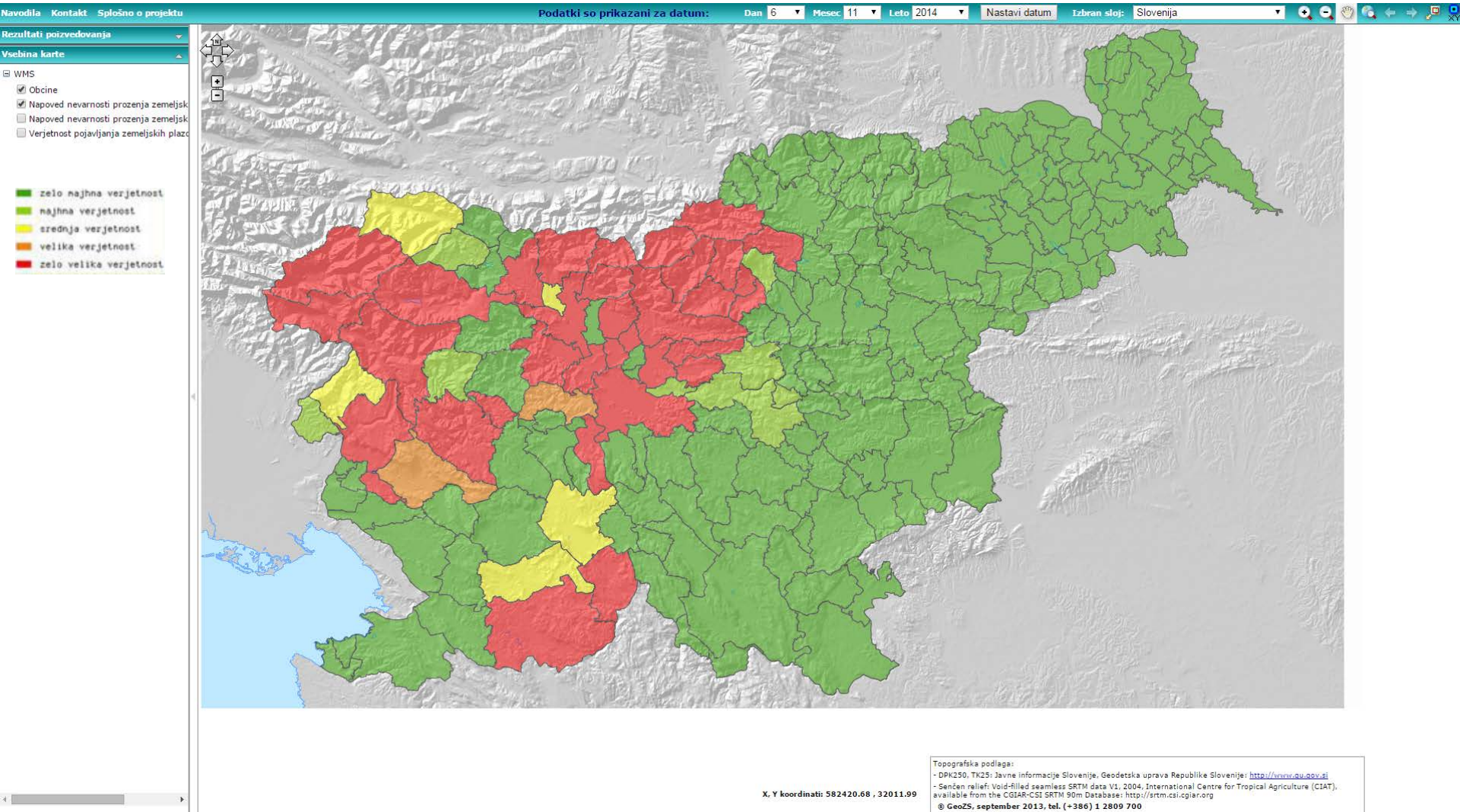
FORECAST EXAMPLE



4th day, 24-hour forecast

Data export and distribution

WMS) – web application <http://akvamarin.geo-zs.si/masprem/>)



MASPREM / MASPREM 2

- Existing landslide prediction system is intended to be upgraded to facilitate specific needs for the infrastructure protection policies and approaches.

Thank you for your attention

GEOLOGICAL SURVEY OF SLOVENIA
Geological information centre
Dimičeva ulica 14, 1000 Ljubljana

Tel: +386 (0)1 2809 700

Fax: +386 (0)1 2809 753

spela.kumelj@geo-zs.si

<http://www.geo-zs.si>