

Summary: This municipal LEWS has been operational for more than 40 years (oldest system in the world), with four major development phases. The current version computes a predicted total number of landslides (N_{tot}) at a 5-minute interval, by summing up the predictions for each grid cell covering the entire area, based on a landslide frequency model (f_i), rolling 24-h rainfall (R_{24}), and number of registered slopes ($N_{S,i}$) per grid cell.

- Development phases:**
- first generation (1977–1983)
 - second generation (1984–1998)
 - third generation (1999–2003)
 - existing system (2004–now)

Types of landslides

Failures of 4 common types of slopes: soil cut slopes, rock cut slopes, fill slopes, and retaining walls

Monitoring

Real-time rainfall data by ~120 rain gauges

Forecast

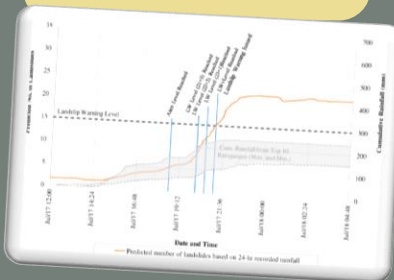
1 to 3 hours rainfall

Slope data

~60,000 registered man-made slopes and their spatial distributions

Types of assessment

- Prediction of total number of landslides (N_{tot}) in the entire area
- Threshold $N_{tot} = 15$

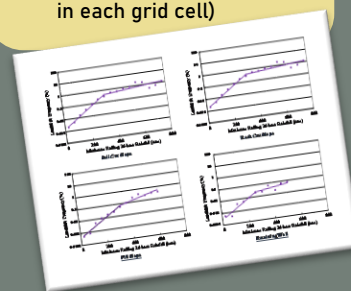


Spatial discretization

1,5 x 1,2 km grid over the entire area (1600 grid cells)

Formulation

N_{tot} = Sum of N
 (for 1600 grid cells)
 N = Sum of [$f_i(R_{24}) \times N_{S,i}$]
 (for each slope type, i ,
 in each grid cell)



Human consultation before issuing a warning?

Yes

Warning zones

Entire area

Warning levels

Two
 (warning/no warning)

Warning time

Updating interval of 5-minutes

Information type

News in TV, mobile app and other media

Landslide data:
 ~5200 events, years 1996–2016