

Summary: This national Landslide Early Warning System employs measured and forecasted radar rainfall data to compute a short-term 60-min cumulative rainfall index and a soil water index, to account for long-term rainfall. The information is updated every 10 mins for a 1 km x 1 km grid nationwide, and the warnings are issued adopting a 5-level scheme, associated to actions recommended to citizens.

Types of landslides

Debris flows and spatiotemporally concentrated slope failures (debris avalanches)

Monitoring

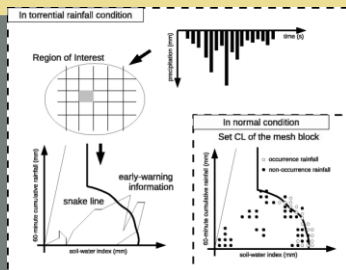
Radar-measured rainfall data

Forecast

60-min cumulative rainfall index and soil water index calculated using 1-3 hour forecast rainfall

Types of assessment

Threshold exceedance of critical conditions (Critical Line, CL) considering the expected values of 60-min cumulative rainfall and soil-water index

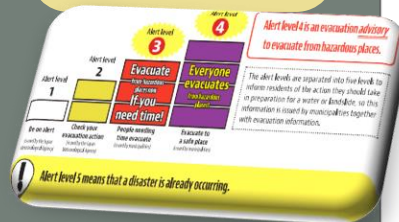


Spatial discretization

1 km x 1 km grid over entire area

Formulation

The Critical Line (CL) is set, in each grid cell, using only non-occurrence rainfall and adopting the Radial Basis Function Network (RBFN) method



Human consultation before issuing a warning?

Yes (for evacuation orders)

Warning zones

Municipality, with detailed info for each grid cell

Warning levels

Five (Alert Level 1 to 5)

Warning time

Updating interval of 10 minutes

Information type

- Website
- E-mail and Smartphone App warning when level 4 is issued in the registered region

Development:

2013 - 2019 launched for 5 km x 5 km grid
 2019 - Today updated for 1 km x 1 km grid

"Sediment disaster Warning" jointly issued by JMA and prefectural governments with human consultation, at alert levels 3-4, to help mayors determine when to issue evacuation orders - Basic Act on Disaster Management, Article 60(1) - and to encourage citizens to evacuate voluntarily.

Landslide data
 (for performance evaluation):
 more than 15000 events, years 2003-2020